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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.

EXCELLENT PROGRESS ON THE NEW YORK SUBWAY.

The work of constructing the Rapid Transit Subway in this city had not been long under way before the engineers confidently predicted that cars would be running by Christmas of 1903. That was nearly two years ago; and the progress of the work in the interval has been so satisfactory that the early opening of the road is to-day more certain than ever. With the exception of the huge irrigation dam in Egypt, illustrated in our last issue, we know of no other great engineering work of modern times that will have been completed many months before the contract date. It is unfortunate for New York city that similar dispatch has not been shown on some other municipal improvements, notably the Croton Dam, the Jerome Park Reservoir, the new East River Bridge and its successor, Bridge No. 3, all of which have been allowed to drag wearily along, the speed of construction being apparently left entirely to the inclination of the contractors. According to figures furnished to the SCIENTIFIC AMERICAN by the Chief Assistant Engineer of the Rapid Transit Commission, Mr. George S. Rice, out of a total estimated cost of $35,000,000, $21,000,000 has been paid out to date, and judged on this basis the road may be said to be sixty per cent completed. Out of a total earth excavation of 1,700,000 cubic yards, 1,580,000 cubic yards, or 93 per cent, has been taken out. Of a total rock excavation of 1,300,000 cubic yards, 862,000 yards has been excavated, leaving 34 per cent yet to be done. A most important item as affecting the completion of the work is the delivery of steel, of which 65,000 tons are required. Up to date some 40,000 tons, or 62 per cent, has been delivered. In estimating the time necessary for completion it should be borne in mind that the remaining work will be put through with greater celerity than that which has been already done, for the reasons that the plant is on the ground, valuable experience as to best methods of doing the work has been gained, and everything is in smooth working order.

LONG LIFE VS. THE SCRAP HEAP.

In discussing the differences between the methods of management adopted here and in England, one of the leading railroad officials of this country recently remarked that in England they do not know the value of the scrap heap. In the main the criticism was correct; for undoubtedly in their desire to get the greatest possible amount of work out of a machine before condemning it, the English have carried the principle too far, and are to-day using cars and locomotives which cannot, from any point of view, be said to be doing economical work. In this country, we build with the expectation that the rapid development in the size of individual units, and the changes due to a policy which aims at the quick adoption of every well-proved method or device, will make it necessary to condemn machinery and plant long before it is worn out, and introduce more up-to-date machinery, which will quickly save in time and labor a greater sum than its own first cost. Perhaps also the smallness of the scrap pile in Great Britain may be accounted for in some measure by the difference in local traffic conditions, particularly as regards railway passenger service, where the policy is to run many express trains of moderate weight, as against the heavier and less frequent express trains in this country. Hence many locomotives, that were built twenty or more years ago, are still sufficiently powerful to haul the British express trains of to-day, and this in spite of the fact that of late years there has been a considerable acceleration of the speed.

The long life of the English locomotive is a direct testimony, of course, to the excellence of its design and construction, and to this is to be attributed, in part, its higher cost as compared with the cost of an American locomotive of the same class. At any rate, it is certain that there have been some remarkable instances of continuous and extremely hard service performed by individual locomotives for a long stretch of years. The Locomotive Superintendent of the London & Northwestern Railway Company has recently issued some most interesting data regarding the performance of an express engine, the "Charles Dickens," which is well known in England and will be familiar to many Americans who have traveled between Manchester and London. This engine was built in 1882, just twenty years ago, at the company's works at Crewe, and in the two decades of its service it has run exactly two million miles. As the average performance of an English locomotive is a little over twenty thousand miles a year, it will be seen that, on the basis of ordinary duty, this remarkable engine has practically performed a hundred years of service. The engine has been accustomed to take an early train, starting at half past eight in the morning, from Manchester to London, a distance of about two hundred miles, returning from London the same day at four in the afternoon. It has recently completed its 5,312th round trip in addition to nearly two hundred other trips that it has made; and it is significant that during the whole of its long journeyings not a single passenger on the trains which it has hauled has suffered injury. In the twenty years of its service, the speed has gradually risen from 42 to 50½ miles an hour, and this in spite of the fact that the weight of the trains has been increased by an addition of heavy dining and corridor cars and other weight-involving luxuries of modern travel. During its twenty years of service the engine has burned 27,486 tons of coal and has evaporated 204,771 tons of water, the consumption of coal averaging 32 pounds to the mile—a remarkably economical performance. The engine has been laid up for repairs during this period only 12 per cent of the time, and the cost of its maintenance has been a fraction over 3 cents a mile.

THE LATEST ATLANTIC STEAMSHIP.

The two giant steamships which have been recently launched in Europe, the "Cedric" of the White Star Line at Belfast, and the "Kaiser Wilhelm II." of the North German Lloyd at Stettin, are both record ships, the one in displacement and the other in length and speed. The "Cedric" is practically a sister-ship to the "Celtic," but exceeds that vessel in displacement by about 1,000 tons. She is 700 feet in length, 75 feet in beam, 49 feet in molded depth, and at her maximum draft of 36½ feet (to which, by the way, she cannot be loaded until the new 40-foot channels are dredged) she will displace about 38,500 tons. The fact that the White Star Line should order another vessel of the huge proportions of the "Celtic" proves that, so far as their operation is concerned, there is a constant gain in economy as the proportions of these huge ships are increased. We have met both shipbuilders and shipowners who have asserted that a 1,000-foot vessel would be the best kind of a paying investment, and that there would be such ships afloat to-day were it not for the limitations imposed by the depth of harbors and the length of steamer piers.

The "Kaiser Wilhelm II." is, of course, in a different class from the "Cedric," and, like her, she will be the finest ship of her class. She belongs to the type of high-speed, luxuriously-appointed express steamers, which may be said to have had their commencement with the appearance of the "Lucania" and the "Campania" on the Atlantic. Like all the latest record-breakers in this service, she is a German-built and German-owned vessel. In her lines, general appearance, construction, and arrangements for the comfort of passengers, she will be a greatly enlarged edition of the "Kronprinz;" but in the arrangement of her engine room she will present considerable novelty, at least in a vessel of this type. Her length having been determined at 706½ feet, the "Kaiser Wilhelm II." may claim to be the longest ship afloat, the "Oceanic" being 2½ feet less. Her beam, 72 feet, is 3 feet less than that of the "Celtic" and "Cedric," and 4 feet greater than that of the "Oceanic." Her molded depth is greater than that of any other ship afloat, being 52½ feet as against 49 feet for the "Oceanic," "Celtic" and "Cedric." The molded depth of the "Kronprinz Wilhelm" is 43 feet, so that the shell plating of the new vessel is carried up 9½ feet, or the depth of one deck, higher than in the earlier German vessels. As a matter of fact, the "Kaiser Wilhelm II." will have a complete set of staterooms on what is ordinarily the boat deck, that is to say, one deck more than is usual on a vessel of this class will be devoted to passenger accommodation. The displacement of the vessel will be 26,000 tons on a draft of 29 feet, to which draft the vessels of this line are limited by the channel depths at the German ports. This is about 2,500 tons greater than the displacement of the "Deutschland" on the same draft, and 2,500 tons less than that of the "Oceanic" when she is drawing 32 feet 6 inches of water, and it will be 10,000 to 12,000 tons less than the maximum displacement of the "Celtic" and "Cedric."

An entirely new feature, at least in a transatlantic vessel, is the arrangement of the engine room. It was realized that in the engines of the "Deutschland," which have indicated 37,000 horse power, the limit of size for single engines had been reached; consequently, in providing the 38,000 to 40,000 horse power for the "Kaiser Wilhelm," it was determined to use four sets of four-cylinder, quadruple-expansion engines, placed in tandem, two sets on each shaft, each set being placed in its own separate water-tight compartment. The arrangement is new in passenger vessels, but has long been in use in the navy, our own "Brooklyn" being provided with four sets of engines. The contract speed of the vessel is 23 knots, and judging from the excess over contract speed obtained by other vessels built at the Stettin yard, it is probable that the "Kaiser Wilhelm II." will cross the Atlantic at an average speed of 24 knots an hour. The accommodations on this ship will be greater than on any previous vessel. She will carry 775 first-class, 343 second-class and 770 third-class passengers, making a total of 1,888 passengers. If to this be added a crew of 48 engineers and greasers, 229 stokers, 170 stewards, 61 cooks, 45 sailors, we get a total of 2,441 souls as the complement of the ship when her passenger list is completely filled.

THE RETURN OF LIEUT. PEARY.

Although Lieut. Peary returns to us once more without having reached the pole, his expedition has not been inglorious. He has at least succeeded in outstripping all previous American Arctic explorers, by penetrating to latitude 84 degrees 17 minutes. It cannot be denied that this is by no means the most northerly point ever reached; for the intrepid Nansen worked his way over the ice to latitude 86 degrees 14 minutes, and the Duke of Abruzzi forced his way to latitude 86 degrees and 33 minutes. The careful surveys made, the elaborate meteorological and geological studies undertaken, and the wealth of information collected fully compensate the failure to reach the pole.

Somewhat more than four years have elapsed since Peary ventured once more to undertake the baffling task of reaching the North Pole. It was his intention to force his way up the west coast of Greenland, through Smith Sound and Robeson Channel, and to establish a base of supplies at Sherard Osborn Fjord. He never carried out this intention. The ice closed in around the "Windward," so that he could not sail more than fifty miles above Cape Sabine. There Peary was held by the ice, an unwilling captive, for a year. Although icebound, he was not idle. Sled-parties were sent out in all directions, and much geographical information gathered. Of these sled-expeditions the most important was undertaken to Lady Franklin Bay, lying on the western side of Robeson Channel. The bay had been explored more than once, but no white man had visited it since the Greely expedition of 1883. It was during this Lady Franklin Bay trip that Peary sustained a severe injury. During a bitter storm, one of his feet was so badly frost-bitten that it was found necessary, on his return to the ship, to amputate a few of his toes.

News from friends at home was brought to the party by the "Diana," sent to the north in 1899 by the Peary Club. A few months later she returned, preceded by the "Windward." After establishing bases of supplies at advantageous points, Peary proceeded to Fort Conger, where he quartered himself in March.

Accompanied by his servant Hensen and five Esquimos, Peary left Conger on April 15, 1900, for Greenland. Doubling the north coast, he reached the most northerly point of Greenland, latitude 83 degrees 39 minutes, which is likewise the northernmost land ever trodden by man. Pushing on eleven minutes further, an impassable sheet of water was encountered. Compelled to abandon the idea of dashing for the Pole, Peary swept the eastern coast within a degree of Independence Bay. On July 10 Fort Conger was regained.

In 1900 the "Windward" was once more sent to the north. At Payer Harbor, near Cape Sabine, the "Windward" stayed from August 15 to July 3, 1901.

In the following spring Peary quartered himself at Conger. On April 1 he started northward over the Polar Sea, with Hensen, four Esquimos and six sledges. After six marches open leads and floes in motion were encountered. Each day's march became more perilous. Finally, at 84 degrees 17 minutes north latitude, northwest of Hecla, the polar track became impracticable, and further efforts to advance were given up. After an arduous journey Cape Sabine was reached on May 15. An excursion was made a few days later to Cape Louis Napoleon in order to complete the survey of Babbit's Bay. Several weeks later the "Erik" arrived with provisions. Then both the "Windward" and the "Erik" started for home.

The expedition has been the means of clearing up much that was but ill-understood. Highly-prized relics of former expeditions, as well as rare animals, geographical, mineralogical, and meteorological data were secured. With the news of the Baldwin fiasco not quite cold, Peary's return after a successful Arctic trip is particularly gratifying to Americans.