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Contents.

(Illustrated articles are marked with an asterisk.)

Table listing various articles such as Barnum, P. T., dead; Books and publications, new; Canal, Lake Union and Washington; Cardboard machine, McCoy's; Cloth pressing machine, an Eng. lathe; Cutlery used by savages; Dental pain, diagnosis of; Electric railway, first, 1837; Furnace, American blast, in England; Galvanometer, sensitive; Glass cutting by means of heat; Inventions recently patented; Inventors, chances for; Iron, pig, storage yards for; Life boat, the first, in France; Locomotive, cylinder of the Stourbridge Lion; Locomotives, heavy, for St. Clair Tunnel; Mitchell, Commissioner, on our patent system; Navy, speed; Patent centennial celebration; Palladium plating; Patents, consideration of, in forming the Constitution.

TABLE OF CONTENTS OF SCIENTIFIC AMERICAN SUPPLEMENT No. 798.

For the Week Ending April 18, 1891.

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Table listing detailed contents of the supplement, including: I. AGRICULTURE—Onion Culture for Pickling; II. ARCHAEOLOGY—The Amenide Mummies; III. THE FAMOUS Continental arm designed for use as a magazine rifle only; IV. ASTRONOMY—How to Measure the Invisible; V. BIOGRAPHY—Dr. Otto and his Invention; VI. CHEMISTRY—Spontaneous Combustion; VII. CIVIL ENGINEERING—Sea Wall to Protect Iron Ore Mining Operations; VIII. ELECTRICITY—A Great Dynamo for the Paris Central Lighting Station; IX. MATHEMATICS—A Simple Elliptograph; X. MECHANICAL ENGINEERING—Boring and Chuck Lathe; XI. MISCELLANEOUS—The Italian National Exhibition at Palermo; XII. NAVAL ENGINEERING—A Steering Screw Propeller; XIII. PHYSICS—Photography of Jets and Bursting Soap Films; XIV. RAILWAY ENGINEERING—Heating Cars with the Thermo-Siphon; XV. TECHNOLOGY—Bleaching by Permanganate of Potash.

SPEED IN OUR NEW NAVY.

We have heretofore pointed out that there appeared to be a conspicuous falling off in the speed of our new war ships as soon as they left the contractors' hands. We have also called attention to the fact that this is not the case with the large first class mail steamers in the merchant marine. These boats continue in active service, year in and year out, and yet maintain, on nearly every voyage, the same high speeds they originally exhibited on their trial trips. We have asked why our new naval vessels, built and supplied, as they are supposed to be, with the very latest and best appliances, should not, in like manner, be able to run at all times as fast as the contractors made them go. In time of war, in critical moments of action, celerity of movement might be of vital importance. In time of peace we prepared for war. We have suggested, in order to have our ships always ready and in good order for high speeds, that they might be kept in constant action by employment in carrying the mails, for example, and thus their speed, like the merchant steamers', would never be lacking. Our representative has interviewed the Secretary of the Navy and other officers, whose interesting views we have heretofore presented. We now subjoin the results of further interviews had by our representative with other officers:

Chief Engineer Melville, U. S. N., said: "As to the alleged falling off in speed of the new cruisers, I will have nothing to say. I do not wish to criticise the navy."

"The new cruisers, when they have been tried under the same conditions that obtained at the contractors' trips, have made even better speed than at the initial performance."

Asked to give the figures and the days on which these later trials were made, he declined, but said: "They are in the log books."

The SCIENTIFIC AMERICAN representative interviewed Assistant Engineer McFarland, who kindly exhibited the books, according to which, and to the statements of Lieutenant McFarland, the new cruisers have never equaled in speed the records made on the trial trips.

The reporter then asked Chief Engineer Melville, "What is the best way or method of keeping the engines and men up to their maximum efficiency?"

"The best way to accomplish this is to dock the vessel regularly every three months, clean her bottom, and sheathe her, put a sufficient and an efficient force aboard, and all will then have been done that is necessary. The idea of carrying the mails in the new cruisers is not a bad one, but for the fact that the naval vessels are not adapted to such service, and they would never prove satisfactory substitutes for the vessels now engaged in that service."

Assistant Engineer McFarland said: "The reason why the new cruisers have not made as good time on their subsequent trips as on their trial trips is that they have fallen short in speed, because there was no effort made to have them equal the speed developed on the contractors' trip. Economy is the great consideration in the management of the new vessels, and it would be an enormously expensive operation to keep the cruisers running up to anything like the trial speeds."

"Then the speeds of the later trials of the new vessels have not equaled the speeds of the trial trips?"

"No, because we did not wish to put them to their utmost speed, on account of the tremendous horse power required to run a cruiser at high speed. Take for example the Yorktown's performance at Newport. At a speed of 19.44 knots it required 3,225 horse power, a speed of 13.18 knots called for 1,025 horse power, and a speed of 14.82 knots, 1,585 horse power. In other words, the required horse power varies directly as the cube of the speed; and indeed at higher speeds the equation is I. H. P. = K. S.^{3.5}. This increase of horse power calls for a corresponding increase in coal consumption, and it is apparent how extravagant it would be to keep the cruisers running up to their highest speed when no apparent benefit is to result."

"The press has been talking much about the Baltimore's performance on the recent trip to Sweden. Well, the figures of that voyage go to show that it is not an advisable nor an economical thing to force a cruiser up to her maximum speed when there is no absolute necessity. On the Baltimore's trial trip she reached a speed of 19.8 knots with a horse power of 10,100; and on the trip to Sweden she recorded a speed of 10 knots with a horse power of 1,500."

Chief Constructor Theodore D. Wilson said: "The new cruisers do not reach the speed established on the trial trip because they have never been put to it; and there is no reason why they should be. The trial trips, usually made before the vessel is accepted by the government, are life and death affairs, where a difference of one-quarter of a knot means thousands of dollars to the contractor. He, therefore, uses only the best picked coal, employs forced draught, and puts chief engineers aboard to act as firemen and oilers. We do not, therefore, in subsequent trips attain the speed of these contractors' trials, but, when the occasion requires it, we

can, by thoroughly cleaning the bottoms and overhauling the ships generally, make a record for speed which will compare favorably, class for class, with any vessels in the world. The prevailing idea concerning the trial tests of vessels built for the United States government is that the trial trips are made on the measured mile and that speed is the quality which the contractors seek to demonstrate as being present in their vessels. This is a very erroneous idea, and to it many of the false conclusions regarding the new navy are to be attributed.

"The Baltimore and Newark, the Bennington, Concord, Petrel and Charleston, were not tried for speeds at all. Their contracts were based on horse power, and the contractors received one hundred dollars for each horse power over and above what the contract called for. There has been no deterioration whatever in the cruisers of the navy. I claim that any of them, taken with the same conditions as on the contractors' trials, with perfectly clean bottoms and under forced draught, can make the same speed at any time. It is a noteworthy fact, and one which the SCIENTIFIC AMERICAN pointed out in the interesting interview with Mr. Charles Cramp, of Philadelphia, that the Yorktown has made better speed since she has been handed over to the United States. The Philadelphia and the San Francisco were two vessels which, under the contract, were to have a speed of nineteen knots. Both of these vessels exceeded the stipulated speed, and there is to my mind no doubt but they can again at any time make as good speed as this. Indeed, I believe that with the same pressure a little more speed than this can be attained, because of the fact that the engines are worn down smoother, and are now better adapted each part to the other for working with the smallest amount of wear and tear. I do not believe that the ships after leaving the yards are ever forced up to the same degree as on the contractors' trials; and there is no necessity for it except in cases of great emergency."

"In connection with speed, it is necessary to consider coal endurance and weight of battery; and when all these factors are taken together, our cruisers will be found to compare favorably with those of foreign powers. This is certainly the case with cruiser No. 12, now building at Cramp's. This vessel is to be heavily armored and equipped with powerful batteries; will also have a great coal-enduring capacity, and be capable of high sustained speed. She will have a total displacement of 7,400 tons, with a sustained speed capacity of 21 knots, and be able, in an emergency, to reach a speed of 22 knots, in which case the indicated horse power will be 23,000. The plan of arranging the motive power appliances has been borrowed from the French, and consists in transmitting the force through three screws, one of which is located amidships and the other two forward, one on each side."

"The idea of this arrangement is to distribute the I. H. P. so that instead of 10,000 passing through one shaft, as would be the case if ordinary twin screws were used, each shaft transmits only 6,850. As the business of the cruiser is to destroy the commerce of the enemy, her general appearance will be similar to that of a merchant vessel; and to this end she will be minus military topmasts, and have her sides clear of projections. Another thing should also be considered when we hear talk of the slow speeds of the cruisers. There is a limit to the endurance of the men in the engine rooms, and it would be impossible for a crew of the size ordinarily on board a United States cruiser to continue under the great strain necessary to keep the furnaces and machinery in constant activity."

Lake Union and Washington Canal.

A provision of the last River and Harbor bill authorized a survey to be made for a ship canal to connect Lakes Union and Washington, back of Seattle, with Puget Sound, and appropriated \$10,000 for this purpose.

The entire length of the canal, from tide water to deep water in Lake Washington, including the two miles of channel through Lake Union, will not exceed five miles. Less than two miles of this is through upland, and more than a mile is through the soft, muddy bottom of Union Bay, which is covered by from eight to ten feet of water. The upland excavation will be through the lower portages between Union Bay and Lake Union, and Lake Union and Salmon Bay, the former being three-eighths of a mile and the latter one and one-fourth mile in length. Through both of these portages flow streams of water—canals about the size of a millrace have been dug by private enterprise several years ago. The maximum cut will be in the neighborhood of forty feet, and there will be no excavating in rocky or difficult formations, while the elevation to be overcome by locks from the level of the sea to fresh water level is but ten feet. The building of this canal would afford Seattle some of the advantages possessed by Portland in the Columbia River.

THE Zalinski pneumatic gun has been tested at Shoeburyness, England, with marked success. At 4,000 yards range six projectiles were thrown into a rectangle 2 1/2 x 1 1/2 yards in size.