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Contents.

(Illustrated articles are marked with an asterisk.)

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No. 1150.

For the Week Ending January 15, 1898.

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Table listing contents of the main issue, including 'I. AERONAUTICS', 'II. ARCHÆOLOGY', 'III. BALLISTICS', etc.

CYLINDER RATIOS IN MULTIPLE-CYLINDER STEAM ENGINES.

The best ratio of expansion in multiple-cylinder engines has yet to be determined. At present there is considerable divergence of practice. Each builder is guided by his own conclusions, which are based more upon observation than upon any scientific tests.

The results were in some respects surprising, although previous experiments with the Rockwood compound engine had shown similar results. The diagram showing steam consumption per indicated horse power proves that at about 37 horse power the steam consumption was about the same in each case.

ELECTRIC LOCOMOTIVES AT TERMINAL STATIONS.

Although the day when the electric will supplant the steam locomotive on trunk lines may be quite remote, it is steadily encroaching upon its domain in certain branches of locomotive work. The latest evidence of this comes in the shape of an announcement that the handsome Union Depot at Boston is to make use of electric locomotives and that no steam traction will be used within a mile of the station.

Before leaving this subject, it should be noted that an electric switching locomotive has this week made a successful trial on the Hoboken Shore Road, New Jersey. It has been built for hauling heavily loaded freight trains between the railroad terminals and the wharves of the transatlantic liners at Hoboken.

traction will prove a great boon in the populous district affected by it.

FORETHOUGHT IN THE CONSTRUCTION OF DRYDOCKS.

The figures which have been given out respecting the new additions, costing \$5,000,000, which are to be made to the dock system of Liverpool are very significant. The most striking feature is a new drydock which is to be 920 feet long, with an entrance 94 feet wide.

AROUND THE WORLD IN TWENTY-EIGHT DAYS.

When Jules Verne wrote his fascinating book, "Around the World in Eighty Days," he set a mark which the public has evidently agreed to use in noting any advance in the speed of circumnavigating the world. The writer aimed to show the very utmost that could be accomplished by the means of transportation of his day, and at the time the book came out it had all the possibility and improbability which characterized the other works of the author.

The Russian minister of communication, M. Chilkov, has stated that when the great railroad is opened the tour of the world can be completed in thirty-three days, the various divisions of the journey being covered as follows:

Table showing travel routes and durations: Bremen to St. Petersburg (1 1/2 days), St. Petersburg to Vladivostok (10), Vladivostok to San Francisco (10), San Francisco to New York (4 1/2), New York to Bremen (7), Total (33).

These figures are evidently based upon the actual running speeds of the various transportation lines, and an estimated speed of about 25 miles an hour from St. Petersburg to Vladivostok.

There is no doubt that even this time could be greatly reduced if the speed of the trains, and to a less extent of the ships, were not kept down by considerations of economy.

If any one were to set out to complete the circuit of the globe in the least possible time that modern transportation, in the shape of existing ships and railways, is capable of, irrespective of cost, it would be possible to reduce the estimate of M. Chilkov by five days at least.

In the figures given below it is assumed that the traveler has the services of the fastest existing ships on the ocean, and that the trains are run at the highest rate of speed consistent with the gradients, curvature and condition of the roadbed, in the various districts passed over. Thus the "Kaiser Wilhelm" would be available for the Atlantic passage, with her speed of 22-34 knots per hour, and a 20 knot ship is assumed for the Pacific passage.

The probable best time that could be made by chartering special trains would be about as follows:

Table showing routes, miles or knots, speed per hour, and time in hours: New York to Plymouth (2,900 miles, 22-35 knots, 133.8 hours), Plymouth to London (194 miles, 60 miles, 3.2 hours), London to Moscow (1,800 miles, 50, 36.0 hours), Moscow to Tchelabinsk (1,100 miles, 40, 27.5 hours), Tchelabinsk to Vladivostok (4,500 miles, 37, 121.6 hours), Vladivostok to San Francisco (5,400 miles, 20 knots, 270.0 hours), San Francisco to Omaha (1,864 miles, 40 miles, 46.6 hours), Omaha to Chicago (493 miles, 50, 9.9 hours), Chicago to New York (998 miles, 30, 18.6 hours), Total (685.2 hours).

This gives a total of 27 days 17 hours for the whole journey. If 7 hours be allowed for delay in transfers,