

THE COURIER

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for this type of engine until he is told that it has a pull of from 16 to 30 tons, as against 919 pounds! A locomotive built not long ago for the Santa Fe road weighed 133½ tons. Trevethick's engine, built just a century ago, weighed five! Stephenson's "Rocket" (1829) was several hundred pounds lighter. Even between 1850 and 1860 the average weight of a passenger locomotive was twenty tons and of a freight engine thirty.

One of the first advances in American locomotive construction was to mount the front end of the boiler by a stout pivot upon a small independent truck or bogie. Previously the forward wheels were secured to the whole frame. That plan made the machine exceedingly rigid and awkward on sharp curves, where derailment often resulted. Another improvement was the "link motion" for reversing, for which the credit has been claimed both for an American, James, and Stephenson. A more even distribution of weight on the wheels was secured by another Yankee notion, "equalizing levers."

At the close of the fiscal year 1901 there were in operation in the United States 196,887 miles of track, or within about 25,000 miles of the total for North America. If these roads could be stretched out into one continuous line, they would be long enough to encircle the globe at the equator about eight times, or to reach nearly nine-tenths of the distance from the earth to the moon.

In its "Transportation" edition, "The Scientific American" makes some striking comparisons to indicate the bulk of material used in the construction of these roads. It takes the Great Pyramid of Egypt as the starting point in its calculation. That mighty structure is 756 feet square at its base, and rises 481 feet, and contains about 91,500,000 cubic feet. If a shell of the same shape and dimensions were manufactured it could be let down over the capitol at Washington without touching, and the apex of the pyramid would be two hundred feet or more above the dome of the building.

If the steel rails used in laying the track of these American roads were melted up into a single lump of a shape that would admit of measurement it would be found to contain 15 per cent more material than the Great Pyramid.

Another comparison can be made with the Washington Monument, which rises 550 feet above its base. This same mass of steel would equal it in height if cast in a rectangular block 436 feet square at the bottom. Some of these rails weigh from 80 to 100 pounds to the yard, but most of the track west of the Mississippi is considerably lighter. Probably 25,000,000 tons would not be a wild estimate of the total weight.

One can't mould wood like steel, and even if one could it would doubtless be impossible to cast in one chunk the timber now employed for railroad ties. One can compute volumes, though, and it is estimated that all the wooden ties in service to-day occupy a space equal to twenty-four great pyramids. A similar calculation for rock and gravel ballast on these American roads gives a bulk 135 times as great as the above mentioned standard of comparison. Following the ratio of length to height which is found in the pyramid of Cheops, the heap of ballast would measure 3,900 feet on each side at the base, and rise to a height of 2,500 feet, or about half a mile!

When it comes to rolling stock, equally impressive results are reached. The 39,729 locomotives in service are equivalent to three great pyramids, 35,811 passenger cars to three and a half pyramids, and 1,409,472 freight cars to forty-two pyramids.

Over a million employees are required to operate and keep in running order the railways of the United States. Nearly half of them (459,704) are trackmen and laborers. These figures include switchmen, flagmen and watchmen as well as section bosses and track repairers. Then there are 204,194 machinists and shop workmen, 127,141 station agents and station men, 116,585 conductors and brakemen, 92,458 engineers and firemen, 39,701 clerks, 26,606 telegraph operators and 4,780 general officers.

Just now the United States does not enjoy the superiority which she once had in shipping. Her clippers were at one time the speediest sailing vessels in the world. To Germany belongs the honor of having built the fastest steamships in the merchant marine today. England has made the best record for speed in naval vessels, and an American private yacht, the Arrow, owned by Charles R. Flint, has made the best time achieved by a craft of any description in the world that is propelled by steam. The two fastest Atlantic liners, the Deutschland and Kronprinz Wilhelm, have developed an average speed of about 23½ knots for a whole voyage. The Kaiser Wilhelm II. of the North German Lloyd line, now undergoing the finishing touches in her equipment and decoration, is expected to beat this speed by half a knot. Two Cunarders, whose construction has been planned in a general way, although their designs are not yet on paper, are to make 25 knots. The bulkiest ship afloat is the Cedric, of the White Star line, which displaces 37,870 tons, is seven hundred feet long and 75 feet wide.

This country can boast, however, of running nearly a score of lines of American built steamers to foreign ports, in ad-

EDISON GRAPPLES PERPLEXING PROBLEM



Having given to the world his latest invention, which is in the form of a storage battery, Thomas A. Edison, America's famous inventor, is now trying to solve the problem of how to derive power direct from coal. If the great inventor is able to achieve success in this line his discovery will undoubtedly be one of the greatest triumphs of modern science.

dition to several others engaged in the coasting trade. The best time made by any of the vessels in this service is 21 knots, achieved by the St. Paul and St. Louis in their best days. These steamships run from New York to Southampton. On the Pacific ocean the Korea has for several months been winning honor for her builders by a speed of 19 knots. She will soon be joined by the Siberia, a sister ship in size, power and equipment. Two recent additions to the Red Star line, the Kronland and Finland, are a trifle longer than the Korea, but are good for only about seventeen knots.

A couple of the most notable American steamships are now approaching completion at New London, Conn. They are intended for the Pacific service, and will establish connection between J. J. Hill's railway system and Asiatic ports. These closely approach the Cedric in size, being 630 feet long and 73 feet wide. If

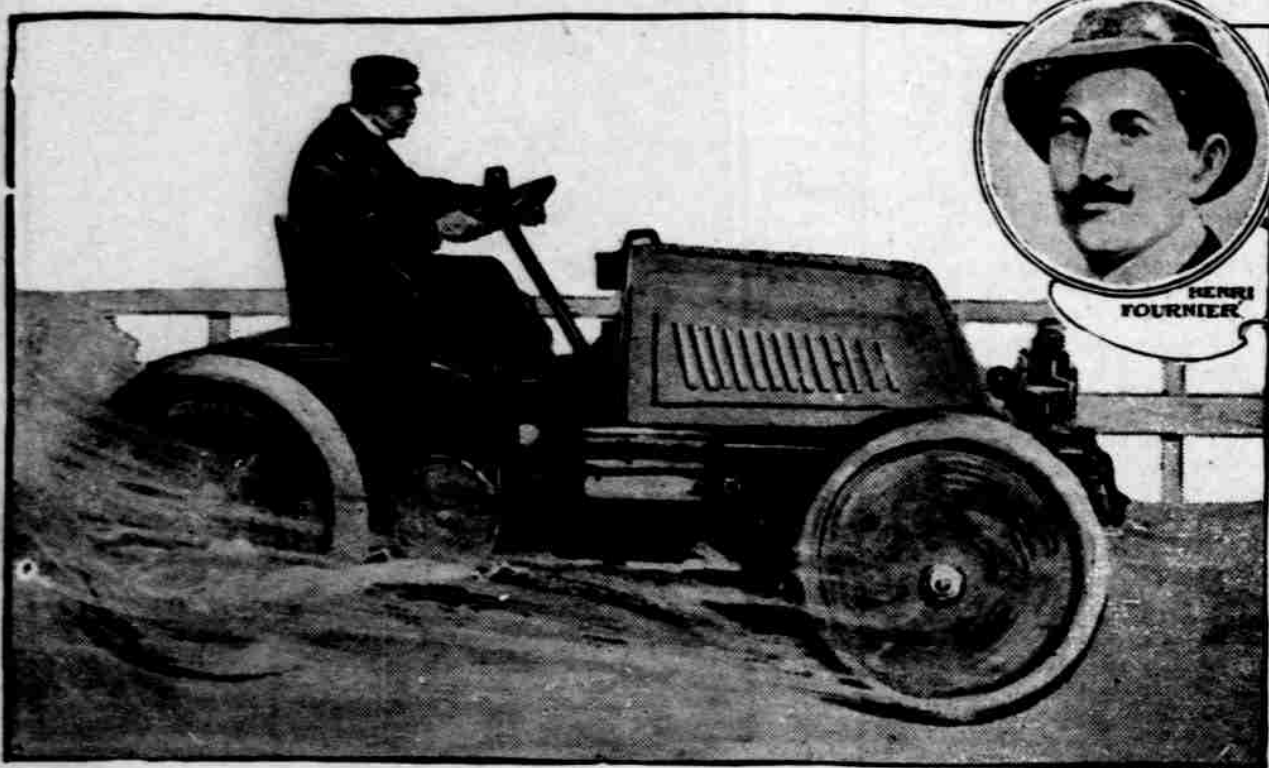
loaded so as to draw 33 feet of water, their displacement will be 33,000 tons, but at 36½ feet they will displace 37,000 tons.

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Naggsby—It's funny how women will change their minds. When I first met the girl who eventually became Mrs. N., she declared she wouldn't marry the best man in the world. Within a year she married me.

Waggsby—But what makes you think she changed her mind?—Baltimore American.

TO RIDE A MILE IN FORTY SECONDS.



Henri Fournier, France's famous chauffeur, is in this country attending the great automobile show at New York. He is arranging several big auto races, among them one with W. K. Vanderbilt, Jr. He will also represent his country in the great international auto race. Fournier announces his determination to make a dash of a mile in forty seconds. He feels confident that he can perform this feat. He expects to fly over a long course at the rate of one hundred and six miles an hour.

MICA
 Makes short roads.
AXLE
 And light loads.
GREASE
 Good for everything
 that runs on wheels.
 Sold Everywhere.
 Made by STANDARD OIL CO.

SADDLES
HARNESS OR
HORSE COLLARS
 With this Brand on are the Best Made
H.B.
 BRAND
 ASK YOUR DEALER TO SHOW THEM
 BEFORE YOU BUY.
 MANUFACTURED BY
HARPHAM BROS. CO.
LINCOLN, NEB.