

sion, if these are afterwards departed from by an erroneous method of practical construction. Theoretically, the guide curves should have no thickness; and, although this desideratum is unattainable, we can, at all events, approach almost indefinitely near to it. It is not easy to secure the necessary accuracy of fitting through all the details, by hand labour. The more extended use of machine tools specially designed to carry out the end in view, and of cast steel as a material of construction, may do much to reduce the first cost and improve the performance of the turbine; the latter imparting that stiffness and strength which cannot be obtained from the use of sheet-iron. It is impossible to over-estimate the importance of correct form, and it requires little reflection to show how easily thin guide plates may be deflected by the pressure of the water when the wheel is at work, although, when at rest, their shape may leave nothing to be desired. Machine tools would rapidly and cheaply impart that smoothness of surface and delicately beautiful curvature to the guide plate and buckets, on which the efficiency of the machine almost wholly depends.—*Mechanics' Magazine*.

THE WONDERS OF THE PORT OF LONDON.

The custom-house port of London extends from London Bridge to the North Foreland, on the Kent coast, and the Naze, on the Essex coast, including not only the Thames, but the wide estuary below the river. This mighty port has grown up gradually.

There were no docks in London until this century, which has witnessed the expenditure of twelve millions sterling in the construction of docks on either side of the Thames. Six thousand ships now enter these docks annually, and the cry is "still they come!" All the docks are filled, though some do not pay well.

There are shipped off now, yearly, from the port of London alone, commodities to the value of thirty millions sterling, beside those from other ports of the United Kingdom, and there is imported a still larger quantity of colonial produce. The ships which actually belong to the port of London are not less than 3,000 in number, averaging about 300 tons each, or 900,000 tons of commercial shipping in all—a stupendous quantity to enter and depart from one single river. It is a quarter of the total amount for the whole kingdom. Five hundred of these are steamers, and one-half of all the mercantile steam navy of England belongs to and is registered in the port of London. No less than 30,000 ships enter the port of London yearly—more than 80 per day. Some of these ships make many voyages, but there are 30,000 arrivals with 30,000 cargoes. The vessels average 200 tons each, giving us an aggregate of 6,000,000 tons.

The coasting trade of London is most wonderful. Of the 30,000 vessels just named, 18,000 bring cargoes from other British ports; and 9,000 of these go back empty, mostly to coal ports. Five million tons of coal are burned annually in the metropolis, and about 12,000 cargoes of coal are brought into the Thames annually—one every hour, and a handsome surplus over. The spread of railways from London has had very little effect in diminish-

ing trade by other modes of conveyance. The canal boats carry more than before railways were constructed, and the number of carriages and horses employed in Great Britain, the use of which railways were designed to supersede, is greater than it was before these railways were made. But the grandeur of the foreign trade of London strikes the imagination still more forcibly. All the corners of the earth seem to be brought to a focus in the river Thames: 12,000 ships now enter there yearly, bringing nearly 12,000 cargoes of all that the earth can produce of value and beauty. Every forty minutes during the year a ship passes Gravesend, bringing stores from some colonial clime, in many cases much more than London's own proportion. For instance, seven-eighths of all the coffee brought to all parts of the United Kingdom; seven-ninths of all the live stock; one-half of the sugar, tobacco, wool, fruit, rice, hides and skins; nearly one-half of the bacon, ham, barrelled salt meat, butter, cheese, eggs and lard; five-sixths of all the spices, and no less than fifteen-sixteenths of all the tea. London consumes just as much of all this as she wants, and sends the rest into the provinces and abroad.

It is truly wonderful where all the commodities go to: 10,000 pounds of pepper every year—the sound of the words makes one sneeze!—24,000,000 bushels of corn, 1,000,000 hundredweights of flour and meal, and more than 1,000,000 of oil cake entered the Thames alone in one recent year. Two ships every day, or thereabouts, of the average capacity of 700 tons, enter the Thames from India and China alone. The export trade is enormous. No less than ten or eleven millions sterling are in the forms of clothing and materials for clothing; £1,000,000 in boots and shoes, £1,000,000 in "millinery and haberdashery," £1,000,000 for apparel and slops, all go from one port in one year! Some of the items of imports are curious. Think of whole ship loads of Dutch eels, in cargoes of 20,000 pounds each, coming to London; oxen fattened for the London market in Schleswig Holstein; Ostend butter and Ostend rabbits, which are sure to find a market, in spite of the home supply.

Two million empty oyster shells were once brought over to London in one ship for the sake of that beautiful lining which constitutes the mother-of-pearl used for many fancy and ornamental purposes. One fact most instructive is observable in this vast trade of the port of London, viz.: whatever is brought over, in whatever shape, from whatever place, and by whatever persons, it is sure to find a market. The price may be beaten down, if the demand is languid, but they never think of saying "We don't want any."

Notwithstanding the vast commercial importance of London, the great American trade is mostly within the grasp of Liverpool, because the Mersey is nearer to America than the Thames, and cotton is most needed in Lancashire, and because the chief articles sold to America—such as metals, hardware, earthenware, &c.—are fabricated nearer to Liverpool than to London. In the trade with Australia, too, Liverpool beats London, as measured by the relative population of the two places.—*Chambers' Journal*.