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The Steamship of The Future

Steamships of the Future Will Make Those of To-day Look Like Tugs.

WHEN the rising generation is big enough to spend its honeymoon, or to incur the disagreeable necessity of escaping the attentions of process servers, it will travel on steamships which will make those of to-day seem like tugs. To be more specific, not later than forty-two years hence the largest twenty steamships in existence will have these average dimensions: Length, 1,000 feet; breadth, 100 feet; draught, 33 feet; gross tonnage, 30,000. As the average dimensions of the present largest twenty are, length, 640, breadth 68.9, draught 32.1, and gross tonnage, 17,151, it will be seen that the steamships will have to do some tall growing.

These confident predictions are made by Elmer Lawrence Corthell, B. A., M. A., Dr. Sc., of New York and Chicago. As Mr. Corthell is not a professional prophet, but an engineer who has done a notable part of the world's work in the past, and is still engaged in some great undertakings, his predictions regarding the future of the world's commerce are of the liveliest interest.

E. L. Corthell played an important part in convincing Congress in 1874 of the wisdom of authorizing the construction of the famous Eads jetties at the mouth of the Mississippi, and was engineer in charge of the construction of the jetties, which increased the depth of water in the South Pass from nine feet to more than thirty feet. He made surveys for the Tehuantepec Ship Railway in 1880, and subsequently, by means of a number of notable addresses delivered in the principal cities of the United States, attracted the world's attention to the project. He built bridges over the Mississippi river at Hannibal, La., and St. Louis, Mo., and at New Orleans. He planned and executed the harbor improvements at Tampico, which increased the depth of water from eight feet to twenty-six feet and made that city the second port in Mexico. He reduced the nebulous idea of the Chicago World's Fair to a tangible proposition by solving the engineering problems of that great undertaking, and subsequently carried out some important works that were instrumental in making the Fair a success. He was also one of the leading spirits in organizing the International Engineering Congress, held during the Fair. Ten years ago the works of various kinds constructed under Mr. Corthell's supervision footed up an aggregate value of $100,000,000. In 1898 he represented the United States government at the International Congress of Navigation at Brussells. He was also at the Paris Congress in 1900 and at the Milan Congress in 1905. At present he is president and chief engineer of the company which is making important improvements in the harbor of Rio Grande Do Sul, Brazil, the difficulties of which have baffled some of the world's foremost engineers. He is a member of something like a score of scientific societies in America and Europe.

In 1898, when Mr. Corthell's first prediction was made, the number of steamships in existence was 11,271, having a total tonnage of 17,889,006. He predicted that in five years this number would increase to 12,002, with an aggregate tonnage of 20,801,205. The actual number in existence in 1903 was 13,381, representing a tonnage of 26,158,358. The average tonnage of steamships in 1898 was 1,587. Mr. Corthell predicted that this average would increase to 1,704 by 1903. In reality the average at the end of five years proved to be 1,955 tons. The average dimensions of the largest twenty steamships in 1898 were: Length, 541 feet; breadth, 61 feet; draught, 29 feet; gross tonnage, 10,717. He predicted an increase in the next five years to a length of 586 feet, a breadth of 64.8 feet, a draught of 29.4 feet and a gross tonnage of 13,374. When the five years had elapsed the actual dimensions were found to be: Length, 640 feet; breadth, 68.9 feet; draught, 32.1 feet; gross tonnage, 17,151. Steamships of 500 feet or more in length had increased from twenty-two to ninety-three—an increase of 323 per cent. Now Mr. Corthell predicts that in 1948 there will be a total of 16,685 steamships, representing a total tonnage of 45,000,000, or an average of 2,700 tons. The average dimensions of the largest twenty steamships will be: Length, 1,000 feet; breadth, 100 feet; draught, 33 feet; gross tonnage, 30,000.

Other interesting features of Mr. Corthell's predictions, which are based on the developments of the past, are that the speed of the fastest steamships in 1948 will be thirty knots, that t[he] number of sailing vessels will [be] creased from 56,281 in 1873 to [1]948, and their tonnage from [1]6 to 3,241,000. The weight of [se]commerce in 1948 will have [in]d to 435,000,000 tons, and the value[e] combined exports of the leading [na]tions of the globe will have reach[e] stupendous total of $10,000,000,[0]

In discussing the outlook for [the] ture Mr. Corthell said:

"There is no reason why stea[m]should not continue to increase [in] and there is every reason why [they] should do so. It is unnecessary to repeat the arguments of commercial men regarding the reduction in the cost of transportation by increasing the size of the mass to be moved. The natural outcome of the present tendency of transportation, both on land and water, is to increase the volume to be moved; larger cars and longer trains and more powerful locomotives to move them on the land, and larger ships and greater power on the sea. The competition of countries and ports with one another, and the necessity of reaching the markets of consumption by distant producers all serve to increase the freight capacity of steamships; and the longer the course the greater the demand for size.

"A very important feature of the subject is the urgent necessity of increasing the draught of steamships. The length and breadth have far outstripped this other most important dimension. The draught, of course, is rigidly limited by the depth of water in channels and at docks.

"The reasons insistently and persistently stated by naval architects for increased draught, not only for greater stability, speed and generally better proportions of steamships, but for greater capacity and greater economy of transportation are of the strongest and most convincing character. As the displacement of a steamship is increased by increasing the draught, the power required to drive a ton of displacement at a given speed is reduced. Some instances of the limitations of draught may be cited to show how important is the question of providing greater draught and greater depth of channels to meet this draught. The Deutschland, one of the largest vessels of to-day, like all the swiftest mail steamers, carries very little freight because of the limits imposed by her departure draught. It has been stated that this great ship of more than 23,000 tons displacement can carry only 500 to 600 tons of cargo. If her draught could be increased one foot, about 950 tons more cargo could be carried, and two feet increase would represent about 1,800 tons more cargo. The freight earning capacity would thus be nearly trebled for one foot extra draught, or made fivefold for two feet, with a very trifling loss of speed, even at a deeper draught.

"The Moldavia, of the Peninsular and Oriental Line, on a draught of 27 feet 4½ inches, carries about 3,000 tons of cargo. Each additional foot of draught gives an increased carrying power of about 650 tons. Three feet increase would, therefore, add about 2,000 tons, or 66 per cent to her freight earning capacity. There would be some decrease in speed, but nothing sensibly affecting her time on passage. Facts such as these explain the insistence of shipbuilders and ship owners in u[rging] the necessity for greater depths.

"As to the cost of fuel in [large an] small steamships, theoretical calcul[ations] and actual practice agree in sho[w]ing that the consumption of c[oal] ton miles is about 8 to 4.4, as betwe[en] a 390 foot ship and a 750 foot [ship] the one having a loaded displacement of 8,640 tons and the other 26,[000] one with a draught of 24 feet 6 inche[s] and the other 32 feet 4½ inches.

"The operation of the l[aw controllin] the development of steam[ships, partic]larly in respect to their dr[aught, is ine]orable. The naval arch[itect and t]steamship companies feel [its effects fi]of all, because behind them [urging th]on to greater and deeper [ships are] world's commercial requ[irements]

the demand for cheaper transp[ortation]. In spite of the apparent lethar[gy of] maritime powers, national and loc[al] awakening to the situation of po[rt] quirements, the size and draught o[f] sels are still increasing.

"A detail of navigation requirem[ent] not often referred to is the depth nee[ded] under vessels in the entrance chann[el]. A ship moving at even low speed, s[ay] knots an hour, will have a gre[ater] draught than in deep water. As is [said] in nautical language, she 'squats.' [The] water between her and the bed of [the] channel is driven out, and often the [ship] will actually drag on the bottom, w[hich] if stationary there would be a foot [or] a half of water under the keel. In [the] entrance channels of New York ha[rbor] this is a well known fact. For this [reason] son alone, to say nothing of the [necessary] requirement of considerable space [be]tween the ship's keel and [the] due to vertical move[ment] of the ship [in] a seaway, there should be not less th[an] three and a half feet in the entra[nce] channels between the deepest draug[ht] vessels and the bed of the channel.

"The ports of the world must meet [the] commercial requirements of the age [by] a marked and continual enlargement [of] facilities, and those who control th[ese] policy should study carefully the [re]quirements of steamships and, look[ing] to the future, lay their plans adequat[ely] and wisely to meet these ever increas[ing] requirements."

Data collected by Mr. Corthell to sh[ow] what is being done to provide a suf[ficient] depth of water for larger vessels s[hows] that there are 138 ports which now [have] a depth of entrance channel of less [than] thirty feet at low water, and 70 w[hich] have a depth of more than thirty [feet]. When all the channels are deepene[d as] now proposed, the number having [less] than thirty feet in the channels at [low] water will be increased to 91. Nin[e] five ports now have less than thirty [feet] of water in the entrance channels [at] water, and 113 have more than [thirty] feet. When improvements now [under] way are completed the number [will] more than thirty feet at high wa[ter] be 136.

The most fortunate port in the U[nited] States in this respect is Tacoma, [with] the entrance channel is five hundred [feet] deep and the depth at the wharv[es] forty to forty-eight feet. Seattle [is] next with a channel two hundred [feet] deep and a depth at the wharves [of] thirty-seven to fourty-four feet. [New] York will be third when the [new] channel is completed to give a [depth] forty feet at mean low water, and [New] Orleans will be fourth with a [depth] thirty-five feet.