

### The Speed and Carrying Capacity of Screw Steamships.

This was the title of a lecture given lately by Mr. William Denny, Dumbarton, under the auspices of the Greenock Philosophical Society. The lecture was delivered before a large audience, in the Greenock Watt Institute, the occasion being the anniversary commemoration of the birth of James Watt, Greenock's great townsman. The results of an elaborate analysis of the Clyde and east coast vessels, with respect to weights and dimensions, were exhibited in a set of tables placed before the audience, the data for which had been supplied to Mr. Denny by various shipbuilders. These showed that the ratio of structural weights to load displacement was greater in the Clyde vessels than in those of the east coast by 18 per cent, thus affording a proportionate advantage in the matter of carrying power to the east coast vessels. In enumerating the causes for this, the lecturer criticised what he considered to be errors on the part of shipowners in determining the proportions of steamers, and of the registration societies in fixing the scantlings. On the latter head, he said that, from a long experience of submitting sections to Lloyd's, he found that the principle upon which they went was that, although a builder might propose an arrangement by which at the same time the weight of a certain portion of the structure was decreased and its rigidity and strength increased, he was required to put the economical weight into some other portion of the structure or to add it to some portion of the rearranged part, the principle being that no builder must be allowed to build a given ship of less weight than his neighbors, even although by the application of his thought and intelligence he could do this not only without disadvantageous results, but with actual advantage. He was not going to blame Lloyd's society or any other registration society for this, because their duties were so delicate in the way of seeing fair play between one builder and another that they were obliged, even at the risk of efficiency, to adopt principles which should secure them from the suspicion of unfairness. Proceeding to speak of the structural character of ships, Mr. Denny said, at the present moment they desired to see material employed with the greatest economy, and at the same time completely fulfilling its purposes, they must not go to the mercantile marine, but to torpedo boat builders, to the wonderful light structures of the Admiralty, or to the equally light structures produced by private builders free from the control of the registration societies for light draught steamers.

With regard to proportions, the lecturer said that it would be well if owners clearly understood that a steamer of 55 feet moulded breadth must have, as a minimum for efficiency, a moulded draught of about 28, or, if she were to get full justice, say 30 feet; and a steamer of 60 feet beam should have a minimum moulded draught of 30 feet, or better, of 33 feet. That there were some dock proprietors who had received wiser advice upon this point than many shipowners was evidenced by the fact that the new docks which it was proposed to construct at Tilbury, on the Thames, were to have clear draughts of water of 30 feet and upward. Steamers were increasing in size, and the least costly increase for weight-carrying, and up to certain point for speed, was in beam, provided sufficient draught could be obtained. Steamers would follow their natural course of development, and it would be for dock proprietors, river trustees, and harbor boards to see that their docks, rivers, and harbors were of such depth as to permit them to favor steamers so developed. He believed it was found daily more difficult to build the larger types of Atlantic steamers rigid enough for the service even with the great percentage of their displacement devoted to structural weight. A reaction would set in against their extreme proportions and absolute length. When that happened beam would be increased as a consequence, draught increased, and distinct preference accorded to ports having great draughts of water. Besides, the great draught of water and comparative shortness of a steamer were more favorable to the efficiency of the screw, by keeping it well immersed, than an enormous length with shallow draught, which told very much against the screw's efficiency. So important was this matter that the White Star Line tried to overcome the difficulty by a mechanical arrangement. It could only really be overcome by an increased draught of water, and formed thus another argument in its favor.

Detailing his idea of the best form of ships for the future, as exemplified in ships for the great Atlantic trade, Mr. Denny said: "Having secured machinery of the highest possible practical weight for the power to be developed, and, at the same time, of the highest possible present economy, they had to secure a hull of such strength and rigidity as would sustain both the sea strain to which it must be subject and the vibration due to powerful machinery and propellers. They might decide at once that the material to be employed was steel, as being that from which they could obtain the greatest amount of strength and reliability, with the least possible weight. They must, further, decide upon the dimensions of the steamer to be employed, and while, in doing this, supplying a form of little resistance, they must, if possible, supply a form which would make the smallest calls upon them for weights of construction. He had already shown them that extreme actual length was unfavorable to the realization of such wishes. He did not think that either the City of Rome, the Servia, or the Alaska was a type of the future vessel, either for speed or cargo carrying. He was convinced that the steamer which was to do the express Atlantic work would be a vessel of what might be called at the present time moderate length—that was a vessel which

would not only be shorter than the City of Rome, but shorter than the Servia, and shorter than the Alaska, which, of the three steamers, so far as he could learn, came nearest the type he had in view. He believed the steamer to do this work would be under 500 feet in length between perpendiculars. What her other dimensions should be would have to be fixed by experiment and a very careful series of calculations and thought.

### American Shipbuilding.

A leading daily paper, having spoken of shipbuilding as a lost art in this country, a correspondent, who speaks with information, denies the charge, and says:

There are at the present time not less than 23,000 American built steamers and sailing vessels engaged in the coastwise, lake, and river trade of the United States. These American built vessels cost from \$1,250,000 each downward, according to the service required, the highest priced being engaged in the Long Island Sound and Hudson River service. Some of the coastwise steamers are staunch sea-going vessels of 2,000 tons and upward, equal to any of their size in the world. There are about 167 American built ocean steamers, from 2,000 to 5,000 tons burden, in service between the ports of the United States and England, China, Japan, Australia, and Central and South America. To keep up this fleet of 23,000 American built vessels, and to provide for the increase made necessary by the rapid growth of the country, requires about 5,000 new American built vessels every year. American built sea-going steamers have displaced English steamers between New York and Cuba and Mexico—notably the *Alexandre* and other lines.

American shipbuilders are competing successfully with English builders even in foreign countries. South America comes to the United States for nearly all its steamers. One firm on the Delaware has built 29 iron and steel steamers for the river Amazon alone, and have the thirtieth at their yard nearly finished. The same firm has built 7 steamers for service on the Orinoco, and some 60 steamers altogether for South America and Mexico, and has 11 vessels now on the stocks and on hand—3 for the United States Government, 1 steel steamer and 1 iron steamer and 6 steel barges for South America. It is also a well-known fact that the governments of England, France, and Russia have recently purchased torpedo boats, steam launches, and vedette boats in the United States.

One more example and I am done. In 1861 our navy consisted of 34 old wooden war steamers, 48 old wooden sailing war vessels, or 82 old wooden vessels altogether. In a little over three years' time it was increased to 836 vessels, of which 63 were ironclads and 102 unarmored cruisers. The owners of our private iron steamship yards contributed a fleet of 165 monitors, ironclads, and unarmored iron cruisers. This was the first ironclad fleet in the world, and was copied by all maritime nations. If need be our builders can again put a fleet of vessels afloat that other nations will be glad to copy.

### The Slate Pencil in Marble Cutting.

An English sculptor says that he has found the slate pencil of great use as an aid and guide in the progress of working a statue in marble.

Its usefulness arises from the fact that the tint of lines and shading made with it on the marble bears extremely close resemblance to that of the shadows produced by actual cuttings, thus, by this means, enabling the sculptor to see the effect of what he proposes to do. In this fashion, tentatively, with the slate pencil he can sketch on his marble in progress the further forms and refinements he would introduce, which afterwards he can carry out, as far as he approves, by following them in actual execution, thereby escaping the peril of a too free use of his chisel in the first instance.

In an oil painting, if an error be made, the color may be altered or removed, and the requisite variation introduced; but marble once cut away cannot be restored, and the deficiency admits of no satisfactory remedy. Therefore, any method which will enable the sculptor to escape this danger by affording him the opportunity of previously testing the effect of what he proposes, without actually cutting it in, may well be thought worthy of consideration.

The forcible markings of lead pencil or black chalk, which are so much more powerful than the shadows of marble, and different in tone, while they are appropriately used by the master sculptor to indicate to his workmen distinctly on the marble what he wants done, are, on that very account, unsuitable to imitate and test the effect of proposed cuttings. Also the markings made with these materials are more permanent than those of slate pencil, and thus also perhaps more fitting for the direction of assistants. But, on the other hand, when the service sought is tentative, then even the easy brushing away of the slate pencil marks is convenient, as they thus may be the more readily altered until the effect desired is obtained. This quality, combined with the special and far more important advantage of the tint of slate pencil on marble so exactly counterfeiting its shadows, may well recommend it to the sculptor in making preliminary tests of the further details he seeks to introduce in his work when it has come into his own hands from those of his assistants. It pioneers and denotes the way for the chisel to advance, and acts like a cautious guide to avert a possible catastrophe; as a heedless, ill-considered, or impatient stroke with the hammer and chisel may at any time during the progress of a statue sadly prejudice its future.

### ENGINEERING INVENTIONS.

Mr. William B. Turman, of Waldron, Ark., has patented an improved slide valve, which consists in the combination with the steam chest provided with supply and exhaust ports, guide straps, and adjustable pack strips, of a valve provided with an entrance port, interior steam chamber, exhaust ports, an opening between the exhaust ports, and projections on its top and one side.

An improved means for connecting and disconnecting cars from their traction rope has been patented by Mr. William Norris, of Cambridge, Ohio. It consists in peculiar means for connecting the cars to the endless traveling cable, and in the means for automatically disconnecting the cars from the cable at the end of the route without the necessity of stopping the engine which drives said cable.

Mr. Reuben Jones, of Mountville, Ga., has patented an improvement in car couplings, which consists of a draw-head pivoted in a draw-bar, and adapted to be raised or lowered by a lever operated from the side of the car to couple cars of different heights, the draw-head of one car, carrying a coupling link, striking the draw-head of the car to be coupled and forcing back a slide supporting a coupling pin until the hole in the slide registers with the hole in the draw-head, and the coupling pin falls by gravity through the link, coupling the cars.

### The Improvement of the Mississippi River.

In a voluminous report the Mississippi Commission describe a plan by which they believe the low river channel-way, from Cairo to the mouth of the river, can be narrowed to an approximately uniform width of 3,000 feet, by revetments and dikes, and declares that this plan will establish and maintain a continuous low river channel not less than ten feet deep.

Proceeding upon the assumption that the work from Cairo to Vicksburg will cost one fourth of the whole, the commission estimates that the cost of the entire improvement will be \$33,000,000. One member does not regard this estimate as sufficient. The commission then estimates that \$4,126,000 will be required for continuing the work in the next fiscal year. This is for that part of the river below Cairo.

The members of the commission do not agree as to the utility of levees as a means of deepening the channel or improving navigation. Levees have never been erected on the banks of the river except for the special purpose of protecting the lands from overflow. The commission has caused eighty-three borings to be made in the course of the bed of the river, in order to ascertain whether the bed consists of layers of tenacious blue clay, belonging to the tertiary formation, and is, therefore, of a practically permanent character. Most of the borings were more than 100 feet in depth, and some exceeded 200 feet, but in only twenty-two cases were the alluvial strata pierced and the underlying tertiary beds reached. The mean depth of the alluvial beds is 131 feet below high water, and the underlying layers are of clay and sand, with beds of lignite. They would not offer great resistance to erosion, if it should become necessary to reach them, for the clays contain much sand. The commission does not expect that in any part of the stream it will be necessary to disturb these lower layers.

### How to Apply the Soda Remedy in Burns and Scalds.

It is now many years ago (see the *London Medical Gazette* of March, 1844) that the author of this paper, while engaged in some investigations as to the qualities and effects of the alkalies in inflammations of the skin, etc., was fortunate enough to discover that a saline lotion, or saturated solution of the bicarbonated soda in either plain water or camphorated water, if applied speedily, or as soon as possible, to a burned or scalded part, was most effectual in immediately relieving the acute burning pain; and when the burn was only superficial, or not severe, removing all pain in the course of a very short time; having also the very great advantage of cleanliness, and, if applied at once, of preventing the usual consequences—a painful blistering of the skin, separation of the epidermis, and perhaps more or less of suppuration.

For this purpose, all that is necessary is to cut a piece of lint, or old soft rag, or even thick blotting paper, of a size sufficient to cover the burned or scalded parts, and to keep it constantly well wetted with the soda lotion so as to prevent its drying. By this means, it usually happens that all pain ceases in from a quarter to half an hour, or even in much less time.

When the main part of a limb, such as the hand and forearm or the foot and leg, has been burned, it is best, when practicable, to plunge the part at once into a jug, or pail, or other convenient vessel filled with the soda lotion, and keep it there until the pain subsides; or the limb may be swathed or encircled with a surgeon's cotton bandage previously soaked in the saturated solution, and kept constantly wetted with it, the relief being usually immediate, provided the solution be saturated and cold.

What is now usually sold as bicarbonate of soda is what I have commonly used and recommended; although this is well known to vary much in quality according to where it is manufactured—but it will be found to answer the purpose, although probably Howard's is most to be depended on, the common carbonate being too caustic. It is believed that a large proportion of medical practitioners are still unaware of the remarkable qualities of this easily applied remedy, which recommends itself for obvious reasons.—*P. Peppercorne, in Popular Science Monthly.*