

occasion, when on a voyage to Dublin, the 'Shannon,' a large merchant steamer, had been obliged to run for shelter, one of these vessels had rode out the gale, and made her passage. He believed, that they were propelled by Mr. Smith's screw, and that he could give all the particulars of their construction.

Mr. F. P. SMITH said the vessels alluded to, were the 'Margaret' and the 'Senator,' trading from Hull. They were fine four-masted schooners, of 242 tons burthen; each vessel had on board two engines, severally of 14 H.P., placed as close as possible to the screw propeller, which was driven by gearing. The total weight of the engines, screw, and tubular boilers with their water, was 15 tons, and they worked under a pressure of 8 lbs. to 10 lbs. of steam.

In a trial between one of these vessels and the 'Shannon' steamer, it was found, that between Dublin and London, the 'Shannon' consumed 90 tons of fuel, while the schooner, with 300 tons of cargo on board, only used 18 tons of coal and arrived in London within 10 hours after the 'Shannon.' In an experiment with the 'Senator' with 172 tons of cargo on board, when steaming only, the rate through the water by the log, was $6\frac{1}{2}$ knots; and with sails and steam, the rate was $9\frac{1}{2}$ knots to 10 knots. It was remarkable that this increase of speed did not appear to augment the consumption of fuel; whereas with paddle-wheels and sails, the consumption of fuel increased in proportion to the rate of the vessel through the water.

Captain HOSKEN could not permit the discussion to terminate without stating that in his opinion as a naval officer, one of the great merits of the screw, as a propeller, was its capability of being adapted to a full-rigged ship, using at times her canvas as usual. The British seamen would thus be fully as much employed as heretofore, and they would retain that superiority, which had so largely contributed to the high position held by Great Britain in the scale of nations.

Mr. J. FIELD, V.P., said he had received a communication from Lady Bentham, relative to some of the improvements in naval architecture, introduced by the late Sir Samuel Bentham, which appeared to be so interesting, that, with the permission of the President, he would request a portion of it might be read to the meeting.

The communication commenced by stating, that as in the paper on the construction of the 'Great Britain,' particular stress was laid upon the advantage of fixed water-tight bulk-heads, dividing the hold into several compartments, the merit of the first introduction, of that great improvement in naval architecture, must be claimed for Sir S. Bentham, it then proceeded,—

"On reference to his Naval Papers, it appears, that in the year 1795, he was entrusted by the Lords Commissioners of the Admiralty,

to construct six vessels of war, according to his own ideas and under his direction, at Redbridge. In the Naval Papers, No. 8, part 8, 'Improvement in vessels of War,' a short communication is given, of the several expedients he introduced into them, with a view to strength, durability, efficiency, and diminution of cost; (page 91) it appears, that he had introduced in those vessels 'fixed bulkheads, or partitions formed in a manner calculated to contribute to strength, both in the transverse and longitudinal directions; that they comprehended in their construction, diagonal braces, at the same time, that they served as partitions for the convenience of habitation, or for the separation of stores;' that they connected the bottom, sides, and decks together, so as to prevent their racking or working at sea; that 'a farther use of these partitions was, that having been made water-tight, as practised by the Chinese of the present day, as well as by the ancients, they tended to secure the ship against foundering, by confining the water from a leak, to the space between two partitions.'"

"Again (page 99) amongst the various expedients enumerated, as tending to diminish the danger of material injury, or the loss of a ship in case of her striking the ground, it is stated, that "the interior of the vessel having, as above-mentioned, been divided into several water-tight compartments, it is not even the flowing of water freely, into one or two of these compartments, that would endanger the loss of the ship."

"So also in 'The Elements and Practise of Naval Architecture,' (page 177, third edition,) in giving an account of the above-mentioned vessels, of Sir Samuel Bentham's construction, the author says, 'the mode of structure of these vessels is very different from that of others,' and after mentioning various particulars, says, 'but the principal strength seems to depend on the thwartship braces and bulkheads, which connect the sides together, more conformable to the practice of civil architecture.'"

"Besides these fixed bulkheads, the metallic water-tanks (invented by Sir Samuel Bentham for the preservation of water), were on board these vessels, 'so contrived, that their fore and aft partitions, extending in height, from the bottom of the ship to the deck, operated as supports to both bottom and deck.'—Naval Papers, No. 8, page 108. So also 'the metallic canisters, for keeping powder, were adapted to the shape of the vessel.'"

"It may be added, that other of the improvements introduced, I understand, in the 'Great Britain,' had, as well as the water-tight compartments, been half a century ago exemplified in Sir S. Bentham's vessels, such as the tumbling-out of the topsides and the straight decks."

"The above-mentioned work, 'Elements and Practise of Naval Architecture,' and Sir S. Bentham's 'Naval Papers,' Nos. 2, 7, and 8, record the extraordinary strength and efficiency of his vessels, as well as a variety of peculiarities in their construction, whereby that strength was given, with about half the quantity of timber used in the customary mode of construction, and only one-sixth part of the copper was used for fastenings."

"This statement cannot, in any way, detract from Mr. Guppy's merit in the construction of the 'Great Britain.' Real genius disdains to appropriate, without acknowledgment, the improvements of others; thus Sir S. Bentham referred as above to the Chinese and to the Ancients. Whether Mr. Guppy may have re-invented the expedients in question, or have perceived the advantage of them, as proved by the actual service of the vessels in which they were exemplified, and have adopted them, to him must be ascribed the benefit which ship-building cannot fail to derive, from his introduction, to general use, of Sir S. Bentham's improvements in naval architecture."*

Sir J. RENNIE, *President*, after expressing to Mr. Guppy the

* Since the receipt of this communication, the Secretary has received from Lady Bentham a paper, from which the following extract is made :—"It is now half a century since Sir Samuel Bentham, in conversation with the First Lord and other Lords of the Admiralty, satisfied them, that the general principles of mechanics were as applicable to naval as to civil architecture, although they never, up to that time, had been scientifically applied to the construction of ships. The consequence was, that the Admiralty induced him to undertake the construction of six vessels of war and a water vessel, in every respect conformably to his own uncontrolled ideas, and under his sole direction. These vessels were, the sloops, the 'Arrow,' and the 'Dart,' and the schooners, the 'Netley,' 'Millbrook,' 'Redbridge,' and 'Cling,' all vessels of war.

"These vessels differed, in exterior form, from the general build of vessels of war, having been larger and sharper; they projected or raked forward, above the water-line, like a wherry; the top sides, instead of retiring inwards, were continued flaring outwards to the upper edge. By this difference in form, the vessels were better supported than the usual ones, when pitching or rolling in a sea, and it was found that they both pitched and rolled easily. In actual service they proved excellent sea boats, sometimes keeping their station on an enemy's coast, when other ships of war were forced to run for safety; sometimes making their port when all other vessels, on the same station, were driven down channel; sometimes out-sailing vessels in company at sea. The 'Netley' was the only vessel, on the station, that could be sent in-shore off Havre, in the night, because she was the only one that could be depended on for working off a lee-shore in any weather, 'when they dared not trust the frigates.' To use the words of the 'Elements and Practise of Naval Architecture,' 'They have, generally speaking, been found to sail remarkably well; but in a head sea and tempestuous weather, their superiority as sea boats has been most decided.'