



Auxiliary Steamships and R. B. Forbes

BY CEDRIC RIDGELY-NEVITT

WHEN American shipbuilders were first faced with the problem of commercial steamship design, they adopted two general solutions. The simpler was to build a sailing ship and have the nearest iron works supply and install machinery. This conservative approach would be strongly supported by the sailing ship captain who would command the vessel and the sailing ship owner who wanted to build her as cheaply as possible. The second solution was developed by the builder who conceived the steamship as a new entity. The imaginative designer knew that steam had been proven reliable by a decade of successful operation on the Hudson River. In addition, he realized that the speed of his vessel would be limited largely by the amount of coal she could stow in her bunkers. As a result of these considerations, a fine-lined vessel with a small rig was produced; it was easily driven, yet it had a large amount of space in the hull for machinery, fuel, and a limited amount of cargo. This was a true steamship.

As early as 1820, both types had appeared. The *Savannah*, of trans-oceanic fame, was a sailing ship with an engine, while the *Robert Fulton*, first of our steam coasters, was a steamship with sails. The latter vessel was built by Henry Eckford, the most progressive builder of his time. It is to the credit of the American shipbuilders that they followed Eckford's lead; by 1850 the American steamship was a definite type. The details, naturally enough, were adopted from their sailing ship predecessor, but the general design was new.

Stemming from the first type mentioned, the conception of a combination sailing ship and steamship was an attractive one. When the wind was fair, the ship could sail; when it was not, she could steam. Nothing could be more logical and less profitable. The great advantage of the out-and-out steamship was its fixed-schedule operation, occasionally slower, but generally far faster than the competing sailing ship. Both shippers and travellers were willing to pay extra prices for certainty in

passage time. And, as a result, the steamers carried mail, first-class passengers, and express freight. The high revenues extracted paid for increased first cost and increased operating expenses.

Steam auxiliaries cost more to build than sailing ships and more to operate whether sailing or steaming. Since they counted on luck and the wind, they rarely carried enough coal for an entire passage; that made fixed schedules only a possibility. Moreover, the owner who chose such a half-way craft was inclined to install an engine of low power so that his ship's speed under steam was well below that of a fully powered steamship. The cumulative result was that the auxiliary steamship could command little or no advantage over a sailing ship. American owners soon discovered the fact; no costly ventures in large auxiliaries like the English *Adelaide* and *Golden Fleece* were ever made in this country.

Mr. Robert Bennet Forbes, merchant ship owner of Boston, was a firm believer in the auxiliary steamship. He was, of course, primarily interested in the Oriental trade.¹ Since no steamer extant could carry enough coal for so long a trip, the steam auxiliary was the only possible solution, aside from the sailing ship.

The development of the auxiliary steamship in this country was due largely to the enthusiastic Mr. Forbes. It was not in line with the more general growth of the American steamship, but is, nevertheless, worthy of note. Although not commercially successful, two of his vessels proved themselves of great military value during the Mexican War.

Naval vessels of the time were either sailing ships or auxiliaries, and auxiliary supply and transport ships fitted into the Navy's scheme of things with the greatest of ease. They could make about the same speed as their accompanying warships. In an emergency, their holds could be fitted with coal for long passages under steam. Here, the small engine and its low coal consumption proved most advantageous.

Because Forbes was proud of his ships and only too happy to tell the rest of the world about them, there is available detailed information about some of these vessels.

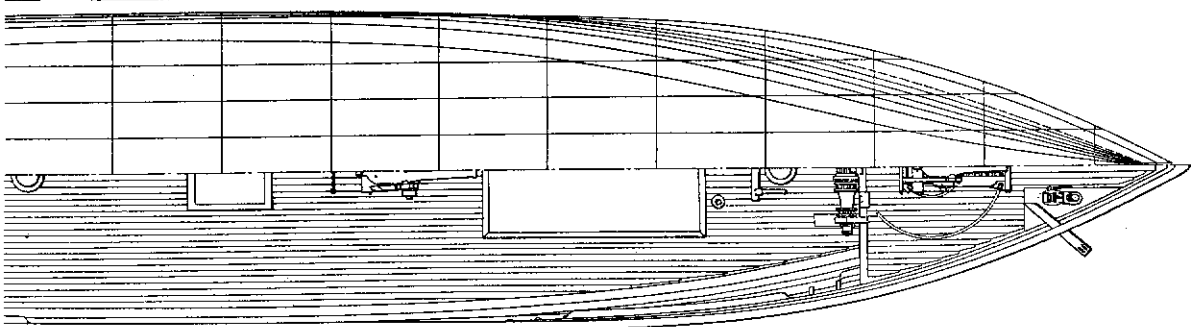
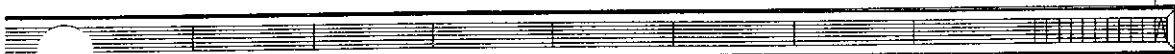
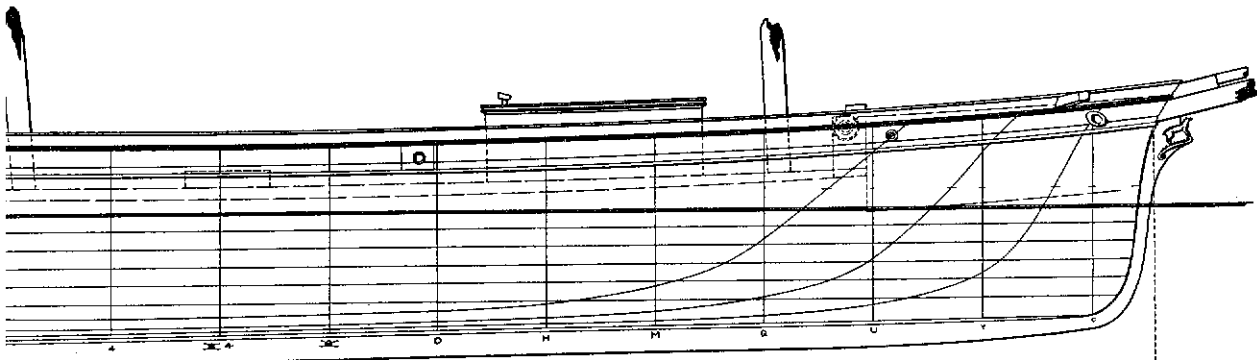
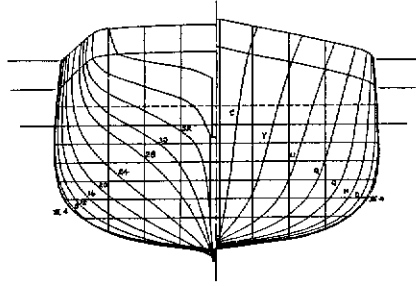
His first venture was the *Midas* of 1844, a steam topsail schooner built by Samuel Hall of East Boston. A model of her made by Forbes, himself,² was recently lent the Peabody Museum of Salem, and, although its date of construction has not been established, it appears to be a good

¹ Robert Bennet Forbes (1804-1889), who first arrived in China in 1818 as a boy on board the ship *Canton Packet*, was a partner in Russell and Company, Canton from 1839 to 1844 and from 1849 to 1854. For an account of career as a ship master, merchant and ship owner, see his *Personal Reminiscences* (3rd ed., Boston, 1892).

² *Personal Reminiscences*, p. 208 note.

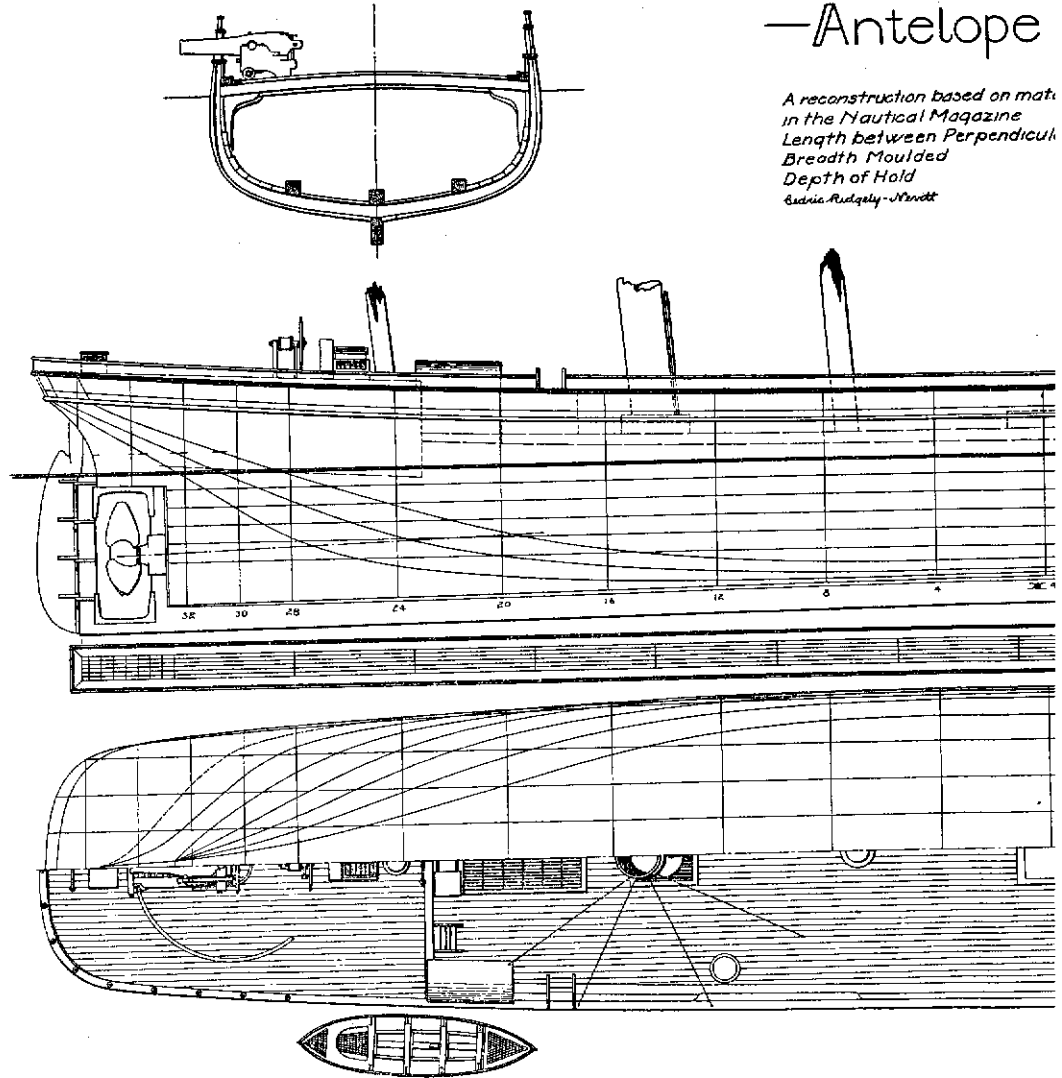
Antelope 1855—

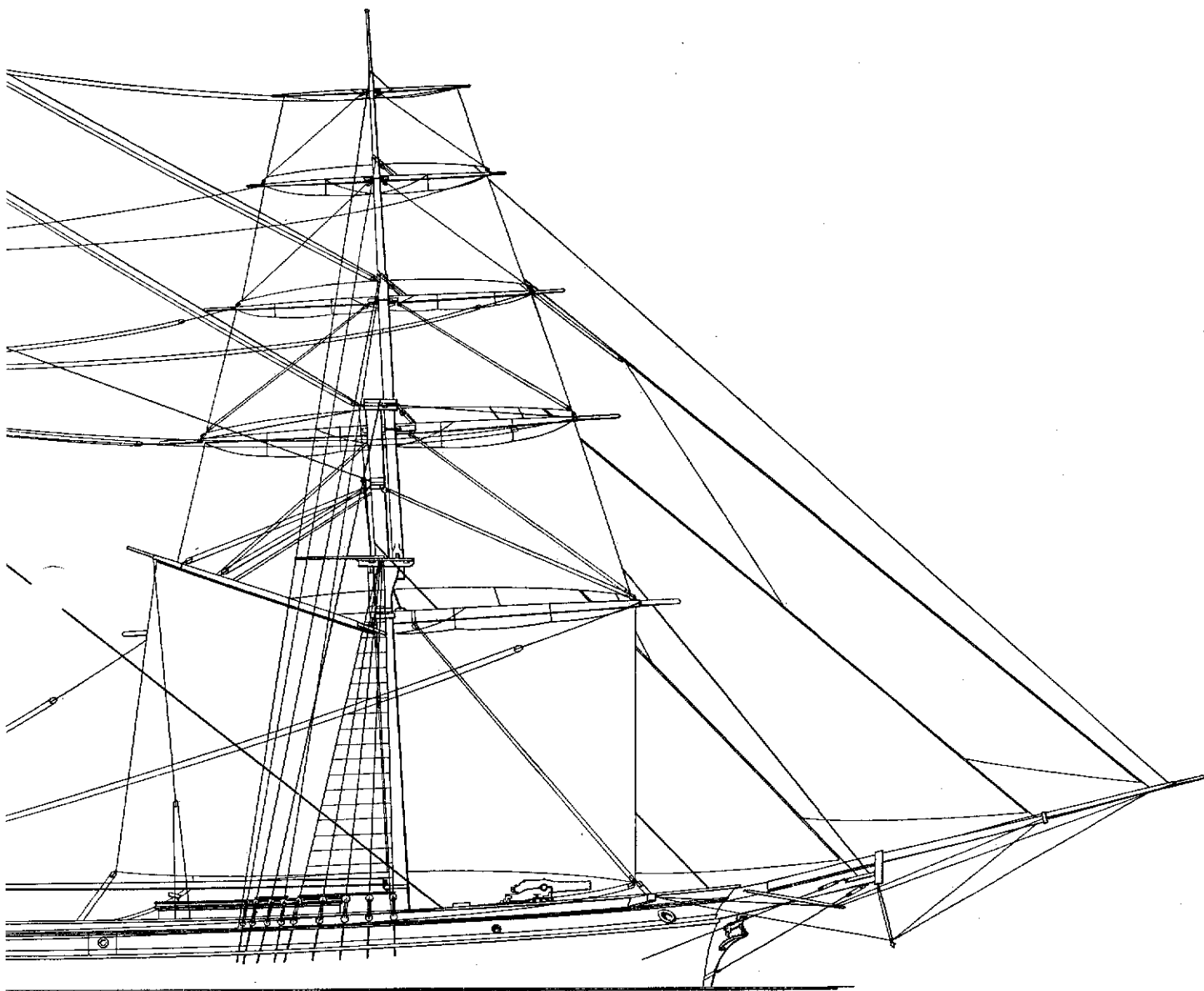
Construction based on material published
in *The Nautical Magazine*
Length between Perpendiculars 157'-7"
Depth Moulded 26'-10"
Depth of Hold 10'-6"
Ridgely-Newton Oct 1940



—Antelope

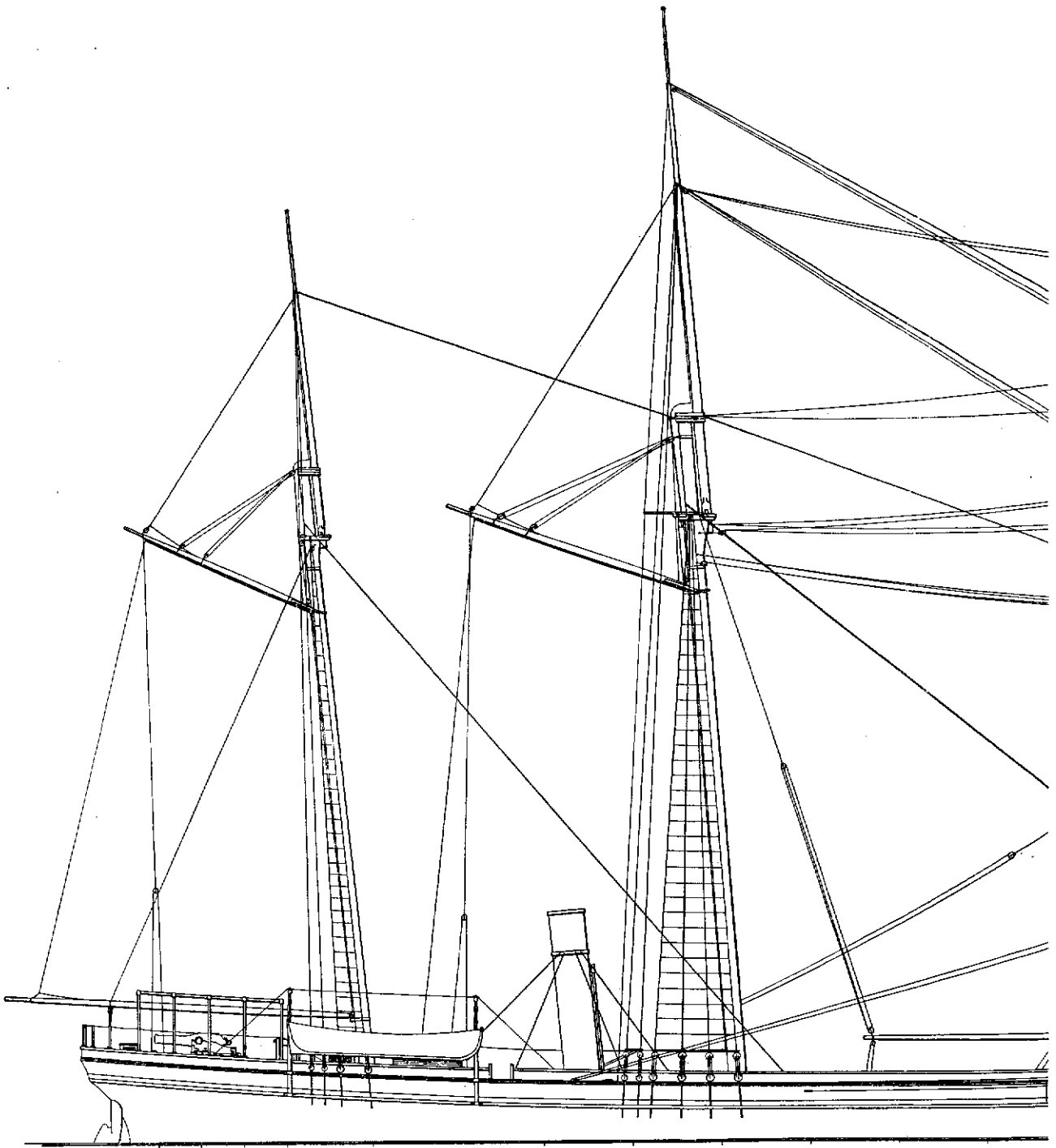
*A reconstruction based on mats
in the Nautical Magazine
Length between Perpendicular
Breadth Moulded
Depth of Hold
Sedric Ridgely-Nisbett*





e 1855—

Dimensions
H Oct. 1940



—Antelope 1855

Drawn from Spar Dimensions
Cedric Ridgely-Heurt Oct 1940

reproduction of the vessel. She was not large, 148 tons and scarcely over 100 feet long. The hull had a plumb stem, a very deep keel, raised fore-castle, and a quarter-deck from mainmast to taffrail except for a sunken well at the wheel. The *Midas* was the first vessel to carry Forbes' double topsail rig — possibly the model was built to illustrate this feature. The fore-topmast was stepped abaft the lower masthead, and the lower top-sail-yard was hoisting; it was lowered almost to the top when the sail was furled. Another interesting feature, although it is not connected with Forbes' double topsail rig,³ was the squaresail on the fore-yard with a short boom at the center of its foot and a sheet thence to a traveller on the fore-castle head.

The *Midas* was one of the early vessels in this country engined by John Ericsson, who gave her twin screws with shafts carried on brackets bolted to the stern-post. The propellers were cumbersome affairs with a rim at about two-thirds the radius out from the hub, and, for some unspecified reason, they were supplied with four blades inside and five outside the rim.

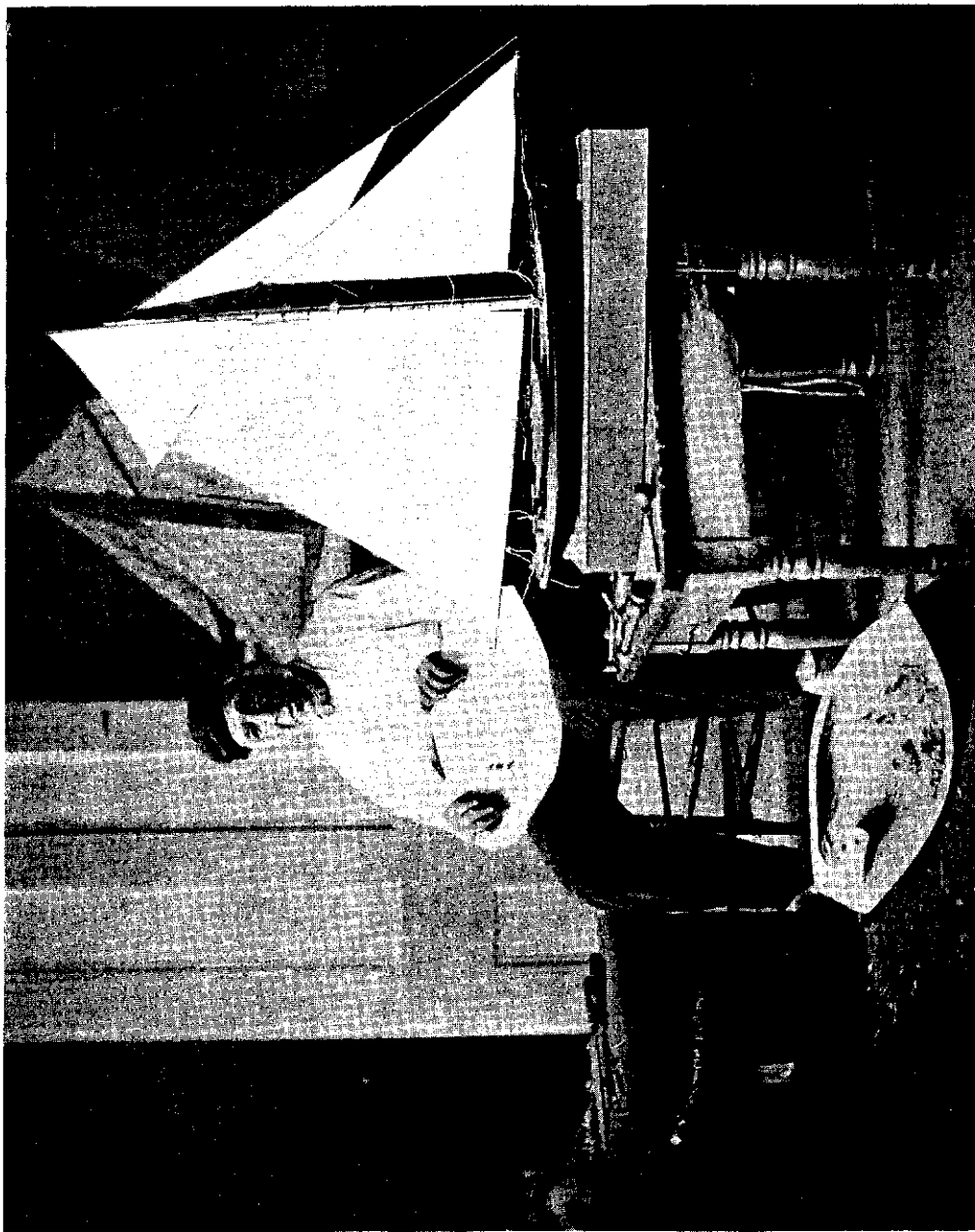
On 4 November 1844 she sailed for China by way of the Cape of Good Hope and Singapore. For those who collect historical 'firsts,' she was the first American steam vessel to round that cape. On the way, she had trouble with her shaft bearings on the few occasions when her machinery was used. It is interesting to note that Ericsson was still running into difficulties because of unsatisfactory shaft bearings in the U.S.S. *Madawaska* some twenty-three years later. At any rate, the *Midas* arrived in Chinese waters, as Forbes puts it, 'with her brass bearings much injured, her boiler nearly ruined by neglect and bad engineering, and her reputation damned.' Perhaps the engine room temperature of 140 degrees did not tempt her engineer from the coolest spot he could find.

As long as her boiler lasted, the *Midas* was used as a tug between Hong Kong and Canton; after it finally gave out, her screws were removed and she sailed for New York via Cape Horn. Her engines were removed and she was sold for use in the Rio de Janeiro trade.

Under sail, she is said to have made 230 nautical miles in a day, a very good figure for so small a boat. Since Forbes does not mention her speed under power, we can assume that it was not high.

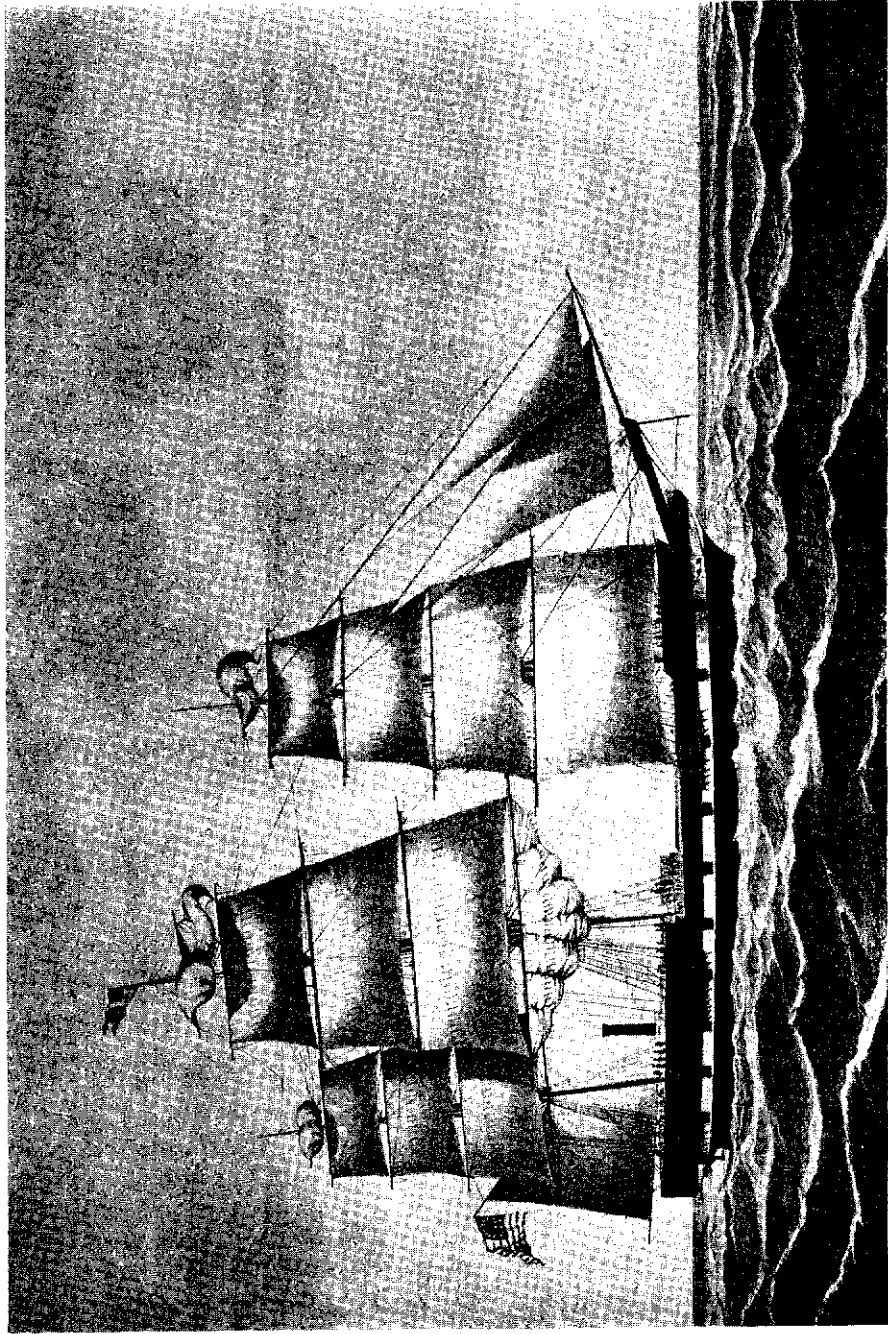
Close on the wake of the *Midas* came a slightly larger auxiliary, the *Edith*, 120 by 20 by 18 feet, a bark, which sailed for India in 1845. She, too, was built by Hall and engined by the Delamater Iron Works from

³ Robert Bennet Forbes, *A new rig for ships and other vessels, combining economy, safety and convenience* (Boston, 1844).



Robert Bennet Forbes in his workshop building the model boats
which he gave to the children of his friends

Photograph in Peabody Museum of Salem



Steam packet ship *Massachusetts*
Lithograph by Fitz Hugh Lane in the Macpherson Collection

designs of Ericsson. She had certain improvements; instead of two propellers to drag through the water while sailing, she had but one. Its shaft came through the hull at one side of the stern-post and the propeller was carried on a pivoted bracket that could be swung sideways and upward to lift the propeller out of the water. The propeller was placed abaft the rudder and the latter slotted to clear its shaft.

The engine room was insulated from the cabin floor by sawdust filling placed between the deck beams. The first time steam was raised, a leak made the sawdust soggy, the cabin damp, and put her captain in mortal fear of an explosion.

In India, British underwriters refused to insure her; in China, shippers feared that the heat from her furnaces would damage opium. As long as there were other craft available, the *Edith* lay without cargo. Eventually, she, too, had her propeller removed and sailed home again.

After her machinery was put in order, she was first chartered and later purchased by the War Department for use as a transport in the Mexican War. In 1849 she was sent to the Pacific Coast and stranded in a heavy fog off Santa Barbara.⁴

Largest of all the Forbes vessels was the steam packet *Massachusetts*. In appearance, she was a typical packet ship of the period save for a small funnel abaft the mainmast and her double topsail rig. Built in 1845, she was 160 feet long, 32 feet 2 inches in beam, 20 feet deep, and carried a large rig with a skysail on the main and a 66-foot main yard. Her engines had two cylinders at right angles to each other, 25-inch bore by 36-inch stroke. They developed some 170 horsepower, a very low figure. Consequently, her two boilers burned only 9 tons of anthracite coal per day; under the best of conditions she could make 8 knots. The propeller lifting gear was similar to the *Edith's*.

The *Massachusetts* was designed for the Atlantic trade, but she made only two round trips. Her first crossing of seventeen and one-half days, New York to Liverpool, eleven days under steam, proved that she could

⁴ Dr. John Haskell Kemble of Pomona College has kindly supplied the following information about the *Edith's* career on the Pacific coast. *Edith*, Captain Corrillard, arrived San Francisco 21 March 1849, one hundred and thirty-four days from New York, and forty-one days from Valparaiso. She made the passage in one hundred and ten running days, of which she steamed fifteen. Cargo of quartermaster's stores, principally clothing. She called at Rio de Janeiro as well as at Valparaiso on the voyage. San Francisco *Alta California*, 22 March 1849, 2/4.

Edith ran aground 'eighteen leagues below San Luis Obispo,' which would be about Point Arguello (probably on one of the beaches above, rather than on the rocks at the point), seemingly late in August 1849. There had been a dense fog for two days, and it had been impossible to see land or get an observation. All her crew, and most of her furniture and provisions were saved. Her masts were cut away, and she was lightened as much as possible, but she bilged and filled with water. As late as mid-September, there was some slight hope of getting her off. San Francisco *Alta California*, 6 September 1849, 2/3; 13 September 1849, 2/2.

not hope to compete with the Cunard Line and its four steamships. These had been maintaining regular sailings to Boston for five years. Her return trip was even slower, twenty-eight days, practically all under sail because Welsh coal taken on at Liverpool would not burn in her grates. The second trip was just as disappointing, for rough weather made the use of steam impossible.

The *Massachusetts* then passed into the War Department's hands and was used to carry General Winfield Scott to Vera Cruz. After the war she was transferred to the Navy Department which found her a most useful vessel. In 1849 she was on the Pacific Coast,⁵ where she was engaged in selecting sites for navy yards and lighthouses. She was subsequently rebuilt, and her name changed to *Farralones*. She remained on the Pacific Coast until 1870, when she was sold, converted to a sailing ship, and sailed for Europe with a wheat cargo. She was finally wrecked on the coast of Chile.

Mr. Forbes obtained enough, no doubt, from the War Department to write off his venture in steam auxiliaries with a very comfortable profit. After these three steamers, he built no more of the type until 1855, when the Japan and China packet *Antelope* was launched. She was a bark of 415 tons, built, as usual, by Hall. S. H. Pook designed her and Otis Tufts supplied her engines. In 1845, Mr. Forbes had to go to New York for his machinery; since then, however, Boston foundries and machine shops had appeared to meet the increasing demand for both marine and stationary engines.

The accompanying drawing is an attempt to reconstruct the *Antelope* from the available data: original lines, spar dimensions, scantlings, a lithograph, and a detailed deck description. For most vessels of the eighteen-fifties we have far less to go on. Unfortunately, only the original lines are extant and considerable changes were made. The depth was increased 1 foot, the length 10 feet. The drag of the keel increased, and the hull emerged from the process with deadrise instead of the planned flat floor. I have made these changes in the designed lines. I have retained the shape of all sections forward of the propeller post above the lowest waterline and added four extra frames amidships. The stern had to be fined down in the interests of fairness. The result is conjectural, of course, but the same procedure was probably followed in altering the mold loft lines.

A steamship's hull in 1855 would be flat-floored with a very square

⁵ Dr. John Haskell Kemble informs me that the *Massachusetts* was on the Pacific Coast when the *Edith* was lost in the late summer of 1849.

midship section, its keel would be parallel to the load waterline, and it would have more depth in comparison with beam than a sailing ship. The *Antelope's* lines show none of these characteristics. She is a good example of sailing ship design applied to a steamship. Another interesting point is the deep 28-inch keel, a feature seen in some of the clipper ships. There are advanced elements, as well. Most ships of the period had hawse holes cut in the bow, but steamships were beginning to install hawse pipes, thereby keeping the forecastle both clean and dry. In the *Antelope*, one wonders why the cables were not led in the more usual fashion to clear the pivot gun mounted on the forecastle head.

She was well armed for so small a vessel, carrying a sixty-four-pound shell gun amidships and thirty-two-pounders on the forecastle and quarter-deck. All were of Dahlgren design. Small arms were kept in the cabin and a port let in the bulkhead gave command of the deck from that point if she were boarded.

Abaft the forecastle, which was furnished with twelve berths and a table 'tastefully painted and grained,' was a large deck-house containing other quarters and the all-important galley. Lashed to the main hatch was a small house used as a hospital. Aft, the corners of the main cabin were cut off making it octagonal. This was necessary to make room for the berths in the rooms forward and aft of it. On the quarterdeck, the wheel was well forward to clear the pivot gun, and the compass, an imported one suspended by india-rubber, was built into a skylight.

Her quarter boats were of sheet metal. The sides of one were corrugated, but the other, which was self-bailing, was smooth. A ship's boat of cedar is also mentioned, but the *Nautical Magazine's*⁶ lithograph shows only two boats visible.

The *Antelope* was sheathed with yellow metal and painted black outside and buff inside. If she followed the usual practice, her bowsprit, yards, booms, doublings and tops would be black and the masts bright.

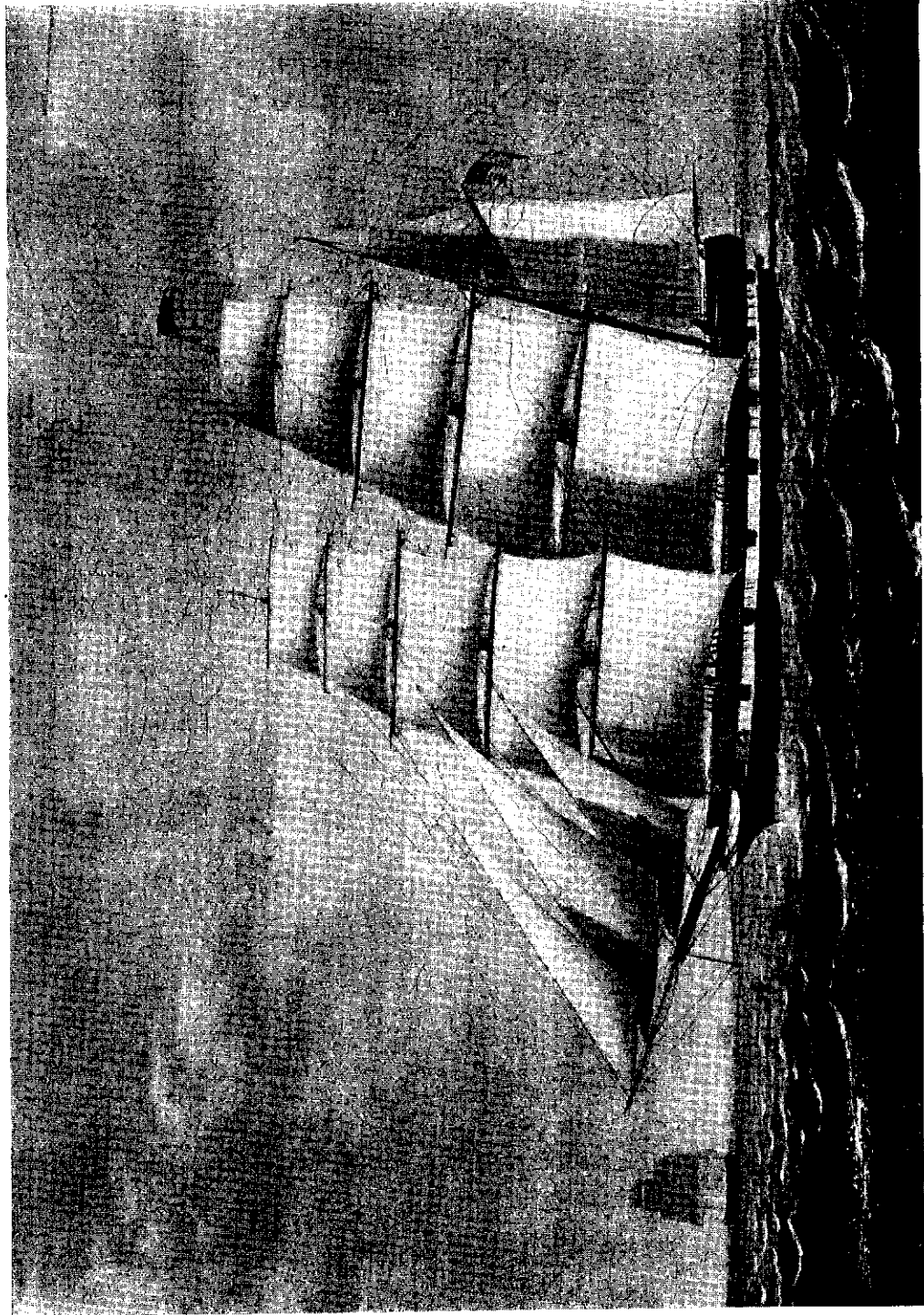
Aloft she carried Forbes' improved rig with the topmast stepped forward in the usual fashion. On the fore and main were lightning conductors let in the mast as far as the cross-trees; there they branched to follow a shroud down either side and connect with the sheathing as a ground. A cargo boom was mounted on the foremast, and a shifting mainstay could be rigged for setting a storm staysail.

The *Antelope* was driven by a two-cylinder, inverted engine of 30-inch bore by 26-inch stroke. Her two boilers could burn either hard or soft

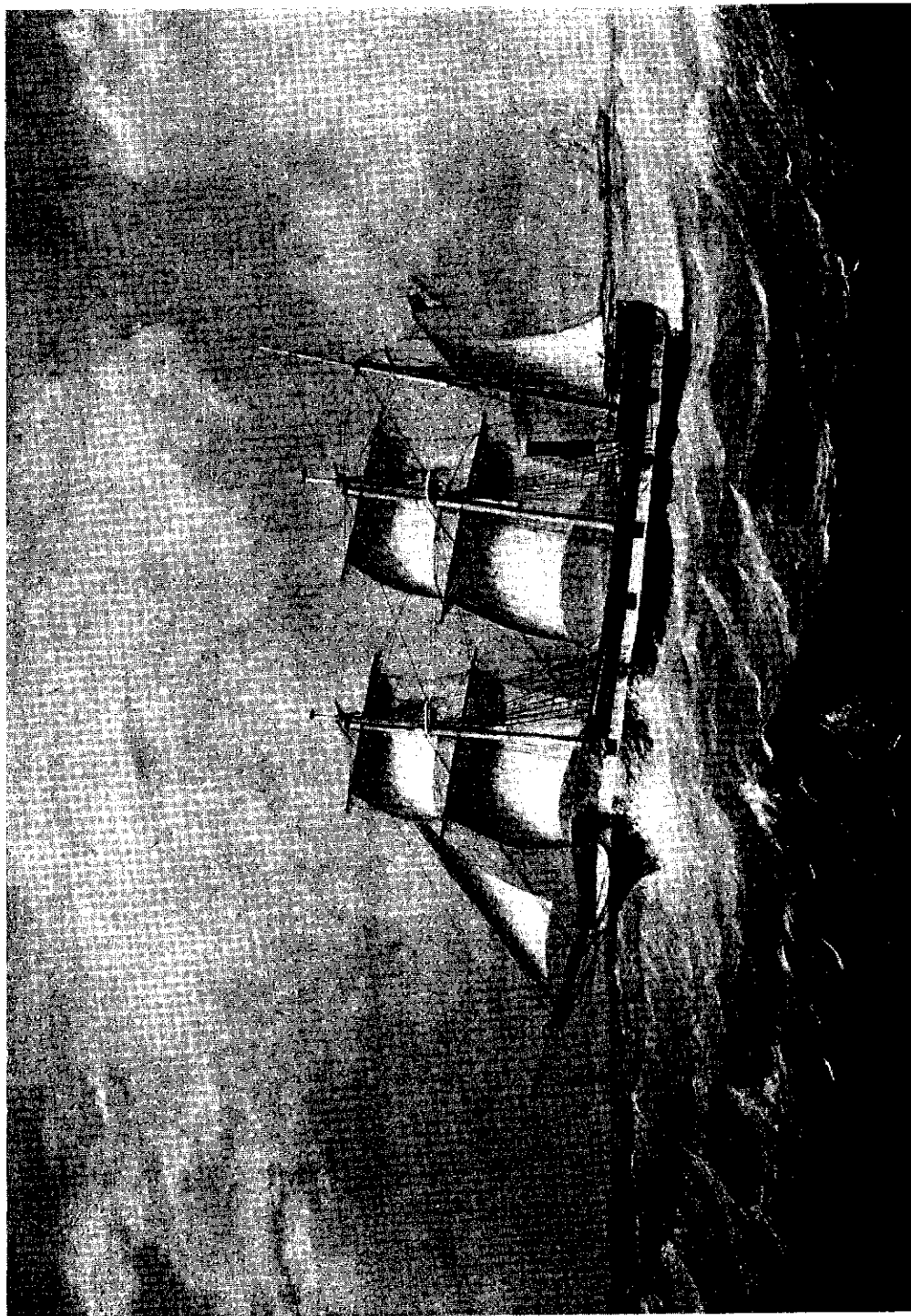
⁶ *U. S. Nautical Magazine and Naval Journal*, III (1855-1856), 11 et seq.



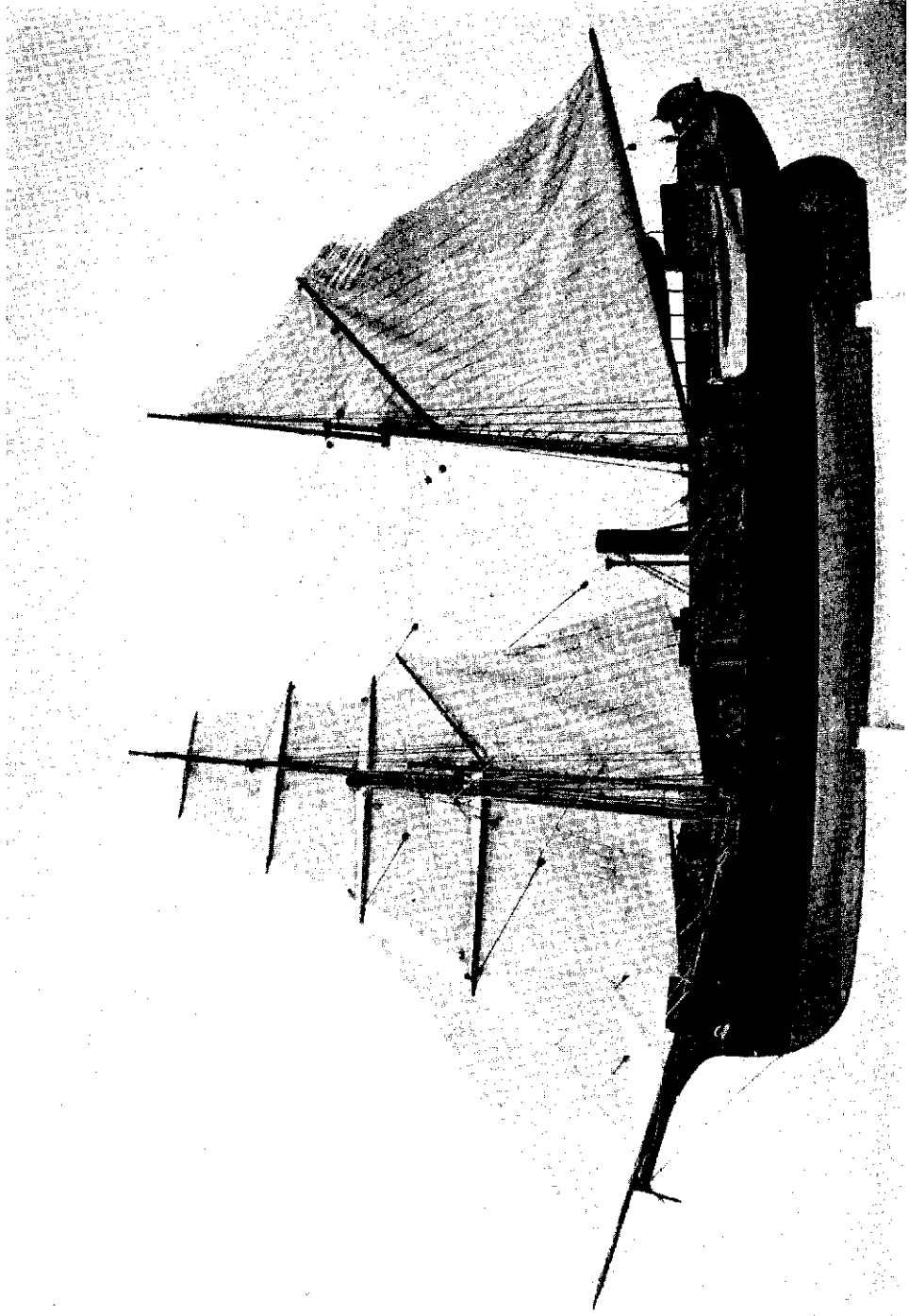
Steam packet Antelope
Lithograph by Filz Hugh Lane published in the Nautical Magazine



Steam bark Edith
Oil painting in Museum of the U. S. Naval Academy, Annapolis



Steam bark Edith
Oil painting in Museum of the U. S. Naval Academy, Annapolis



Steam topsail schooner *Midas*
Rigged model built by Robert Bennet Forbes for the Massachusetts Historical Society,
now lent to Peabody Museum of Salem

coal. Although many steamers of her period used forced draft blowers, she had none.

Her auxiliary equipment included a fire pump and a hydraulic ash hoist. Two propellers were tried and the Griffiths screw, of English manufacture, chosen because it reduced vibration; this type of propeller, with its large spherical hub and blades unusually wide at the base but narrow at the tip, was very popular in this country and was used in a number of our naval vessels. There was no lifting gear; the propeller was uncoupled and allowed to run free when sailing.

Forward, in the hold, was the magazine equipped with flooding cocks; at the end of the forecastle came a watertight bulkhead; before the boiler, a double bulkhead with insulating material between to protect the cargo from excess heat. Seventy-five tons of coal were stowed in bunkers on either side of the engine room.

A large crew of twenty-one was planned for so small a vessel:

Captain	8 Seamen
2 Mates	2 Firemen
2 Engineers	2 Landsmen
Gunner	Steward
Carpenter	Cook

Nothing is known of her career. Forbes states that she was built for Russell and Company for use in Chinese waters, but the American Lloyds Register gives Forbes as her owner. The *Antelope's* name was dropped from this list only two years after she was built.

Aside from naval vessels, these four Forbes ships were the chief examples of the steam auxiliary as developed in the United States. Later, the type was to appear again for sealing and whaling in Arctic waters. Prior to the Civil War, however, such craft did not seem to fit into our pattern of maritime activity.