

## The “Fourah Bay” – First Elder Dempster Ship with Sulzer Machinery

A New Class of Cargo Liners for the Owners’ West African Services



The first ship in the Elder Dempster Lines’ fleet to be propelled by a Sulzer engine has recently entered service. She is the 8,139-tons d.w. shelterdecker “Fourah Bay”, built by Scotts’ Shipbuilding and Engineering Co., Ltd., of Greenock, designed for the owners’ West African services and equipped as a cadet training ship.

The “Fourah Bay” is the first of a series of “F”-class ships, a new design prepared by Elder Dempster to meet the latest requirements of the West African trade and the service speed has been increased to 16 knots as compared with the 14 knots of the recent “D”-class ships although the “F”-class vessels are somewhat smaller as the following particulars indicate:

	<b>“Fourah Bay”</b>	<b>“D”-class ships</b>
Length overall	465 feet 0 inches	460 feet 0 inches
Length between perpendiculars	430 feet 0 inches	430 feet 0 inches
Breadth moulded	62 feet 0 inches	63 feet 0 inches
Draught	25 feet 2 inches	26 feet 1 inches
Corresponding deadweight	8,139 tons	9,550 tons
Gross register	7,704 tons	6,200 tons
Grain capacity	501,895 cubic feet	627,744 cubic feet
Bale capacity	457,889 cubic feet	577,566 cubic feet
Service speed	16 knots	14 knots
Trial speed	18.15 knots	16.25 knots

Of all-welded construction, with the exception of the bilge strakes, sheer strakes, stringer angles and side frame attachments, the “Fourah Bay” has been built to the highest classification of Lloyd’s Register and is of conventional three-island layout with the machinery amidships. There are three cargo holds forward of the machinery space and two aft; a ‘tweendeck runs throughout the hold length and there are deep tanks in No. 2 ‘tweendeck and in No. 3 lower hold. The ‘tweendeck tanks are arranged for the carriage of dry cargo, latex, glycerine, or groundnut oil and those in the hold can carry similar cargoes or water ballast. No. 3 ‘tweendeck is about 17 feet deep and is specially designed for the carriage of 12 double-decker buses, the deeptank crown which forms the bottom of the ‘tweendeck being completely flush for this purpose, with the tank lids recessed into the tank crown and enclosed by gutterways with flush-closing plates. The ‘tweendeck deep tanks are provided with oiltight access doors from No. 2 ‘tweendeck to enable them to be used as special cargo lock-up spaces when they are not being used for liquid cargo. There is a fair amount of sheer on the main deck which has enabled the ‘tweendecks to be quite deep at the ends of the vessel – apart from the special arrangements in No. 3 hold – the ‘tweendeck rising from about 9 feet 6 inches to about 15 feet.

MacGregor chain pull-type covers are employed on the main deck hatches and there are flush-fitting wooden covers in the second deck hatches.

The main and second deck hatch sizes are as follows:

<b>Hold No.</b>	<b>Main Deck</b>	<b>Second Deck</b>
1	27 feet 0 inches x 22 feet 0 inches	27 feet 0 inches x 22 feet 0 inches (maximum)
2	37 feet 6 inches x 22 feet 0 inches	37 feet 6 inches x 22 feet 0 inches
3	45 feet 0 inches x 22 feet 0 inches	17 feet 4.75 inches x 9 feet 0 inches (deep tank hatches 4 off)
4	37 feet 6 inches x 22 feet 0 inches	37 feet 6 inches x 22 feet 0 inches
5	27 feet 6 inches x 22 feet 0 inches	27 feet 6 inches x 22 feet 0 inches

There are three bipod masts which are used as ventilation trunks for the holds and ‘tweendecks and which carry twelve 12.5-ton and one 50-ton derricks. In addition there are two 7.5-ton derricks on samson posts at the after end of the main deckhouse and on the bridge front. The derricks are served by ten 5-ton, two 8-ton and four 3-ton capacity Clarke, Chapman electric winches.

## **Extensive Use of Aluminium Alloys**

Previous cargo liners on the West African services have employed aluminium alloys to a large extent in their superstructures and this material has also been used extensively in the "Fourah Bay". All the superstructure above bridge deck level, including the deckhouses, the engine-room casing and the funnel, the bulwarks, rails, radar mast, a swimming pool and the poop deckhouse are constructed of this material which has enabled a saving of about 170 tons to be attained compared with conventional steel construction.

A now typical Elder Dempster feature is the employment of a Pyrene-E.D.-Hol inert gas fire extinguishing system, the gas being supplied to the cargo spaces through the supply and exhaust ventilation trunks.

In the 'midships deckhouse there is accommodation in two-berth cabins for 16 deck cadets who will serve as seamen and there are three two-berth cabins in the officers' accommodation for senior deck, engine-room and purser cadets. A large study and a combined recreation room and duty mess are also provided for the cadets' use. African engine-room and catering department ratings are accommodated in the poop and poop deckhouse which, like the 'midships deckhouse, is air conditioned with plant supplied by the Winsor Engineering Co. which also supplied the hold and 'tweendeck mechanical ventilation. An Adams Hydraulic sewage disposal system serves all the accommodation.

## **First Sulzer Engine for an Elder Dempster Vessel**

In the past two years or so several British owners who have traditionally relied upon British-designed oil engines for their motor vessels have, for various reasons, turned to the Continent when engining their latest ships and the "Fourah Bay" is indicative of this trend being the first Elder Dempster ship with a Sulzer engine. This is a five-cylinder Winterthur-built unit of the well-proven RD76 design, a turbocharged, loop-scavenged two-stroke engine of 760 mm cylinder bore and 1,550 mm piston stroke of the type which has frequently been described in this journal. The engine was installed by the shipbuilders – their first installation of this type – and Scotts' are now constructing a similar engine for the "Fourah Bay's" sister ship "Falaba" building at Greenock for the same owners.

At 119 r.p.m. the maximum continuous rating of the Sulzer 5RD76 in the "Fourah Bay" is 7,500 s.h.p. (metric) at 8.05 kg./cm<sup>2</sup> b.m.e.p., the pistons employing water cooling. There are two Brown, Boveri VTR500-type double gas entry turbochargers on this engine which is designed for operation – including manoeuvring – on heavy oil of up to 3,500 sec. Red. 1 viscosity. Balance weights are fitted at the extreme ends of the crankshaft to minimize primary couples – a feature also of the De Schelde-built Sulzer 9RD90 "large-bore" engine which was commented upon in a previous issue of this journal (*The Motor Ship*, December, 1961).

Auxiliary equipment in the “Fourah Bay’s” engine-room includes a battery of De Laval centrifuges for oil fuel, Diesel oil and lubricating oil treatment, four 200-kW. Allen generators each powered by a six-cylinder pressure-charged Allen Diesel engine running at 525 r.p.m. and an Atlas AFG.6 fresh-water generating plant. This machine is fully automatic and is designed to produce 25-30 tons/24 hr. of fresh water using either the main engine cooling water at a temperature of about 150°F or auxiliary steam at about 100 lb./in<sup>2</sup> (338°F).

Steam is generated at sea by a 5,000 lb./hr. Spanner exhaust-gas boiler and there is also a 4,750 lb./hr., 120 lb./in<sup>2</sup> Cochran oil-fired boiler with oil-firing equipment of the semi-automatic type supplied by Clyde Fuel Systems, Ltd.

Most of the engine-room pumps are of Drysdale or Stothert and Pitt manufacture: Hamworthy have also supplied the oil fuel booster and turbocharger lubricating oil pumps as well as the main air compressors. Bulk oil cargo discharging is handled by four Thom-Lamont pumps and there are four Buckley and Taylor associated heaters each or 50 tons/hr. capacity.

Sea trials of this first Elder Dempster Sulzer-engined ship took place in the light ballast draught condition without significant ship or machinery vibrations. On the measured mile a mean speed of 18.15 knots was attained. As stated, the service speed is 16 knots.

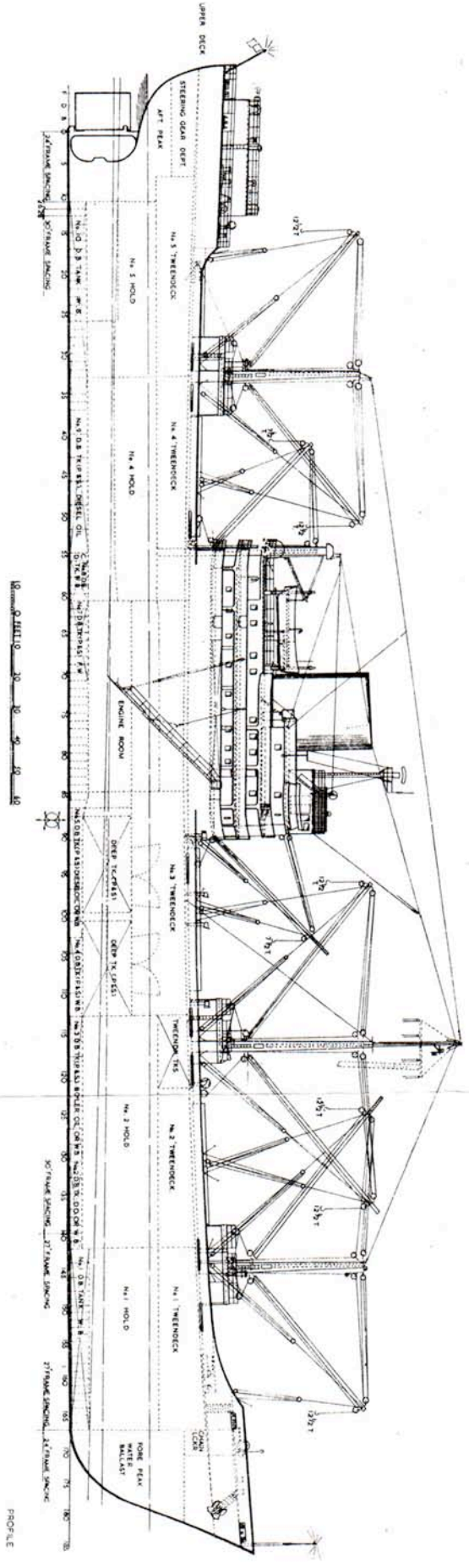
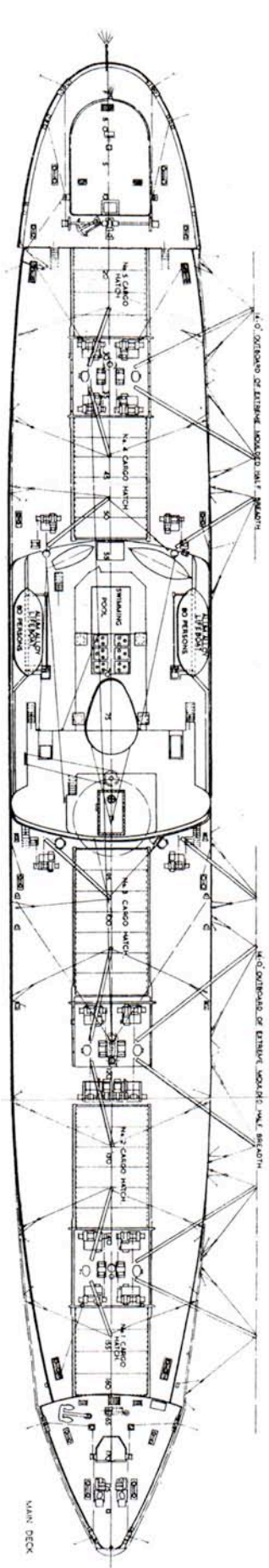
#### **Editorial Note:**

The photograph at the beginning of this article was supplied by Andrew Mumford. It shows the Fourah Bay on her acceptance trials on a hazy winter’s day – probably 18<sup>th</sup> December 1961 – off Gourock in transit to the Skelmorlie or Arran measured mile.

The text for this article has been taken from the March, 1962, edition of *The Motor Ship*.

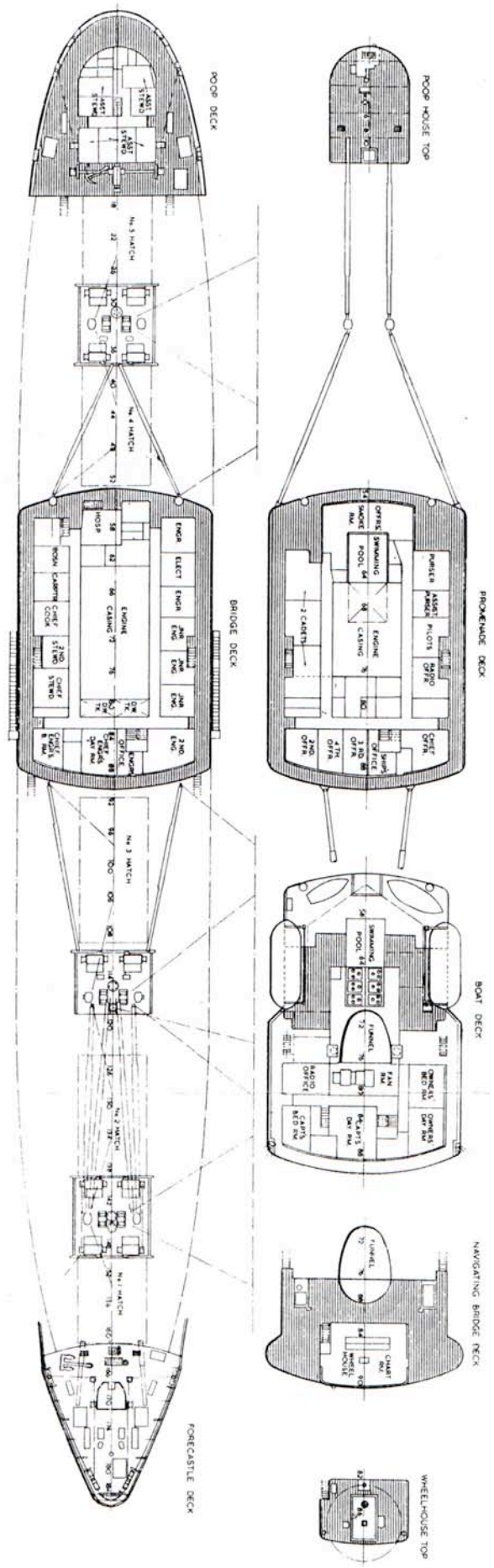
The General Arrangement Plans that follow have also been taken from the March, 1962, edition of *The Motor Ship*.

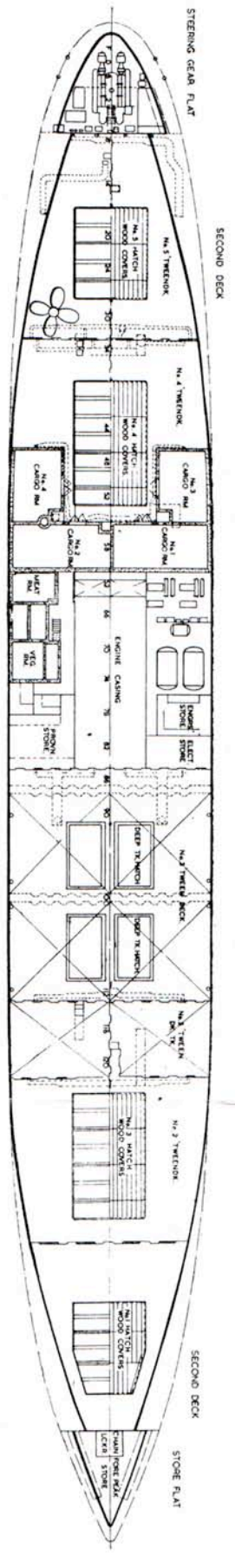
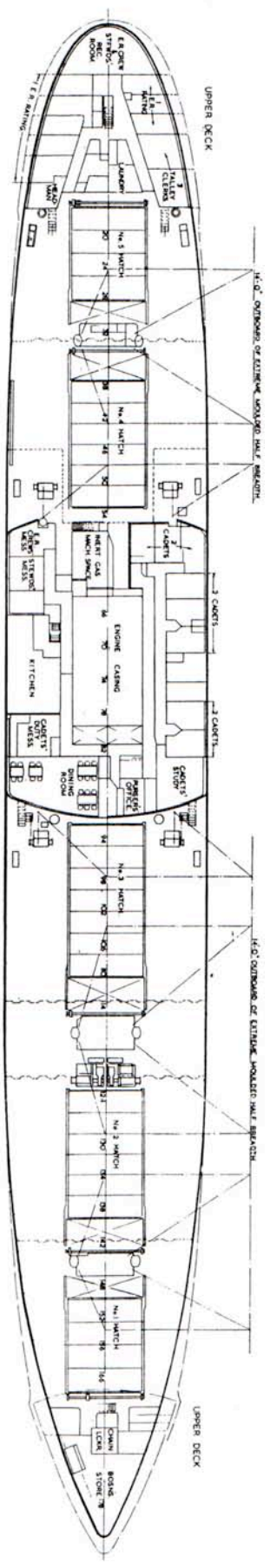
Special thanks go to Duncan Winning at The Ballast Trust, who kindly provided a copy of the original article in *The Motor Ship*.



10' 0" HELLO 20' 10' 20' 40'

PROFILE





**GENERAL ARRANGEMENT PLANS OF THE 8,139-TONS D.W. CARGO LINER "FOURAH BAY."**

Owners : Elder Dempster Lines, Ltd., Liverpool. Shipbuilders : Scotts' Shipbuilding and Engineering Co., Ltd., Greenock. Engine builders : Sulzer Bros., Ltd., Winterthur.