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ABERDEEN CONCRETE SHIPBUILDING CO., LTD., TORRY, ABERDEEN, 1918 TO 1920.

STANLEY BRUCE

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Cover photograph: Hull of the 'Cretetree' as photographed on the Isle of Scalpay, near Ardinashaig, Harris, Western Isles, Scotland, by Marc Calhoun. https://marccalhoun.blogspot.co.uk

This book has been published on an entirely non-profit basis, and made available to all online free of charge as a pdf. The aim of the book is to make the history of ships built by the Aberdeen Concrete Shipbuilding Co., Ltd., available to a wider audience. There is much available on the internet, especially on www.aberdeenships.com which gives much more details from many newspapers not stated in this publication. However, what's currently available is scattered and doesn't readily give the full picture when looking at the perspective from an individual shipbuilding company.

If you have any comments regarding this book, or any further information, especially photographs or paintings of ships where I have none. It would be historically good to show at least one for each ship, and since this is an electronic edition it will be possible to update and include any new information.

I can be contacted at bardofthebroch@yahoo.com

If printing this book, it is best printed as an A5 booklet.

Preface

Shipbuilding in Aberdeen has sadly ceased, but looking back, many local yards had a proud history of building a wide variety of vessels of all types over a long period. Some world renown vessels came from the Aberdeen yards. However, no shipbuilding material can be quite as unusual as concrete, and very few people are aware that there was a yard in Torry specialising in this. This material was used due to shortages of steel, and for its low price and speed of construction by unskilled labour. The vessels it built were fairly basic, and used by the war department for transporting materials. At least one of these unusual vessels has survived to the present day.

This little book gives a fascinating insight into the short lived concrete boat building yard in Aberdeen.

John Dunn, MBE, RTEM.

Chair, Torry Heritage Group.

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Concrete Ships 1849 to 1918, Portland Cement Association.

ABERDEEN CONCRETE SHIPBUILDING CO., LTD., TORRY, ABERDEEN, 1918 TO 1920.

BY

STANLEY BRUCE

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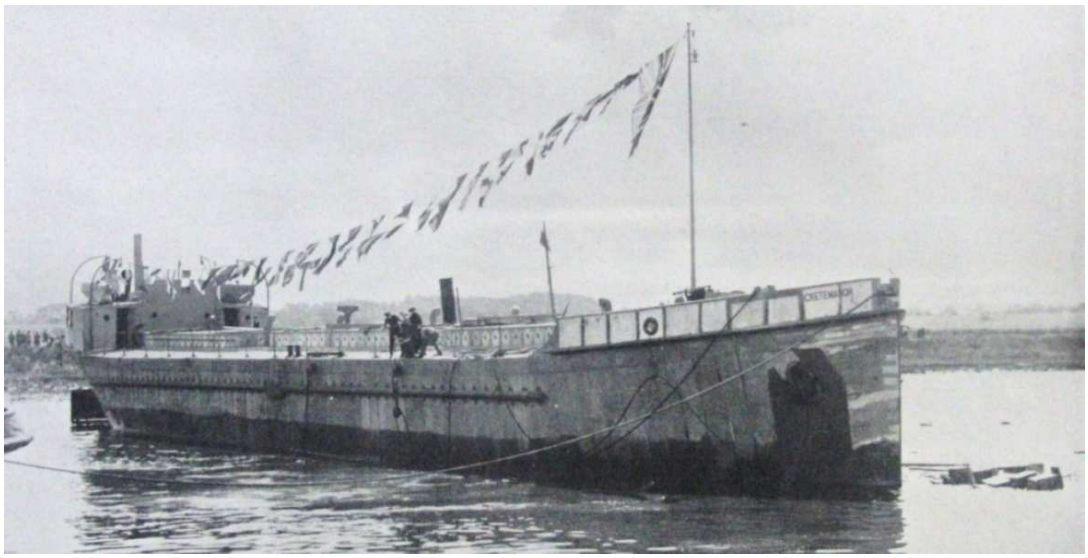


Launch of the 'Cretemanor', Preston 1919.
(From A New Way of Building Concrete Ships).

Introduction

The aim of this book is to highlight and record the ships built by the Aberdeen Concrete Shipbuilding Co. Ltd., Torry, Aberdeen, and make this part of Aberdeen's maritime history available to a wider audience.

I have included as far as known for each vessel, principal dimensions, tonnages, Lloyds classification, and details of loss. Also included is any significant information on the history of the ships. Unfortunately, I don't have any photographs taken in Aberdeen, however I have included other photographs of similar ships.

The Aberdeen Concrete Shipbuilding Co., Ltd. was established in 1918 during World War 1. The company was owned by James Scott & Son and their premises were at South Esplanade East, Torry, Aberdeen. According to the Aberdeen Post Office Directories of the early 1900's James Scott & Son were plasterers. That would explain why the hull of the 'Cretetree' is so smooth. The company was established simply because there was a shortage of steel during the war, and the Admiralty needed more ships, so concrete hulled ships were better than no ships. Another advantage of building concrete ships was that they only used about one third of the steel needed to build, compared to that required for a conventional steel ship.

WW1 ended on the 11th November 1918, which was 4-months before their 1st concrete ship was completed in Aberdeen, so none of the ships in this book saw active service during WW1.

Stanley A. Bruce, BSc, I.Eng., I.MarEng., MIMarEST.

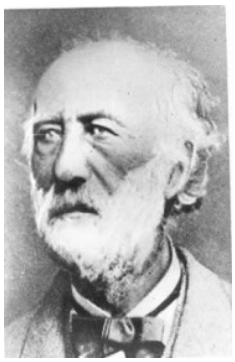
Former shipbuilder,

Hall Russell & Co., York Place, Footdee, Aberdeen, (1980 to 1991).

Creteships.

In 1824, Portland Cement was invented by Joseph Aspdin, an English mason. He patented his product and named it 'Portland Cement' after a quarry on the Isle of Portland, England, because his finished product resembled natural limestone found there.

In 1848, Joseph-Louis Lambot, Miraval, France built a reinforced concrete rowboat, 12 feet long x 4 feet wide, using a material he called 'ferciment'. (Patented in 1852). He built a second boat in 1849. These small boats can be seen in French museums in Paris and Brignoles. (See page 3 for photo).



J. L. Lambot.

In 1887, after further developments in building techniques a small concrete vessel the 'Zeemeeuw' was built in Sas van Gent, Holland by the brothers Picha-Stevens. Concrete-hulled barges 50 to 60 tons capacity were later built and used on Dutch canals.

In 1905, Carlo Gabellini, of Rome, Italy, built a series of 150 ton reinforced concrete river barges.

1917, 25th July: a reinforced concrete ship 84ft long x 20ft beam x 11.5ft draft, named the 'Namsenfjord' (Weight of Hull 134 tons, engine and equipment 40 tons, deadweight 182 tons, and 356 tons load displacement[2]) was launched in Norway by Nikolay Knudtzon Fougner, in Fougner's Steel Concrete Shipbuilding Company, Moss. She was the first self-propelled concrete ship. She was single screw and was driven by an 80 BHP heavy oil diesel engine of the·Bolinder type.

Technical specification for the 'Namsenfjord':

"For calculation purposes the following assumptions were made as regards permissible stresses:

Concrete: to have an ultimate compressive strength of at least 4,000psi at 28 days, the proportions of mixture and the class of material being determined from practical tests before commencing the actual pouring.

Permissible compressive stress, 1,000psi.

Permissible shearing stress, 120psi.

Steel Reinforcement: to be of open hearth, mild, medium grade steel, of ordinary shipbuilding quality, having an ultimate tensile strength of 28 to 32 tons per sq. inch and an elongation of 20 percent, in eight inches' length.

Permissible tensile stress, 12,000psi.

Permissible shearing stress, 8,000psi.

The steel reinforcement were rods from ¼ inch to 1-1/4 inch diameter, amounting in all to 10 tons."[2]

The ship designer is said to have designed the ship to DNV Rules for a steel ship then increased the scantling sizes by 20%.

'Namsenfjord' (Photographer unknown).

1918, 23rd May: a reinforced concrete ship 600GRT, 145ft overall length x 27.5ft beam x 15.75ft draft, named the 'Stier', fitted with a 320 BHP crude oil diesel engine was built in Norway for Mr. G. M. Bryde, of Christiania, she had 58 tons of steel reinforcement. (A 1,000-ton ship was built a year earlier for Gunnar Brekke of Christiania).

The mixture of the concrete was approximately:
1 part cement: 1 ¾ parts sand: ¾ parts gravel.
This showed an average ultimate compressive strength of about 4,500psi at 28 days.

There were various other concrete ships made in America prior to and during WW1.

Due to the wartime shortage of steel the Admiralty in 1917 (3 years into WW1) commenced a programme of ship construction using concrete. Officially known as 'ferrocement' (reinforced concrete), the steel reinforcement gives the concrete its tensile strength, without the reinforcement the concrete would crack easily. Ships built were tugs and barges, these were needed to transport iron ore from Spain to Britain. Aberdeen was one of 25* shipyards established to build these concrete ships; 22 off these yards were run by the Ministry of Shipping, and 3 off operated by private concerns. A total of 220 concrete ships were ordered, but only 52 (possibly 54) barges and 12 tugs were built, due to the war ending the other ships ordered were cancelled after the Armistice.

Initially these ships were made of reinforced concrete, comprising of a skeleton of steel rods which were then covered with moulds and filled with concrete following the lines of a conventional steel ship. Later ships used the Ritchie Unit System. This work required much less skill than building a conventional steel ship, so it was thought that workers could be trained very quickly. However, steelworkers were still needed to cut and form the steel reinforcing bars. It was initially thought that building a concrete barge would be cheaper than building a steel one, but because of the lack of skills and perhaps delays due to weather the average cost to build a concrete barge ended up at £27,000 which was around 37% more than a steel one.

**Some reports give this figure as 18.*

The increased cost seems to be due to difficulties during construction, perhaps due to an inexperienced workforce. Many of the newly established concrete shipbuilders had to call on skilled labour from the cement industry for assistance.

The concrete would only have been as good as it's mix, i.e. aggregate (sand and gravel max. 6mm), water, waterproofing compound additive, and cement. (Water should only be enough to achieve workability and kept to a minimum, too much water reduces the concretes compressive strength). The cement mix would have been relatively stiff when poured and probably needed much ramming or chapping into the moulds. Uniformity of batches was critical.

Nowadays mechanical vibrators powered by air, hydraulics, or electric are used to remove as much trapped air and release excess water as possible from the cement, back in 1918 this would have probably been done by hand.

In 1922, London based ship-owners, Stelp & Leighton, Ltd. established the Crete Shipping Company Ltd., London, and bought all the fleet of surviving concrete barges and tugs from the Admiralty. They used the vessels to carry coal to the Continent until 1924 when their business ceased operations. Most of the vessels were then left mothballed on the Tyne.

Concrete ships were used again during WW2, however due to improvements in technology they were lighter and stronger than their WW1 predecessors.

Ship Classification

The concrete ships were listed in Lloyds Register as 'experimental'. Being classed as such, meant that they required a Lloyds survey every year; steel ships at the time were subject to a 4-year survey cycle. The Lloyds classification given had a limitation 'for Coastal Towage'; this also included ports in the Baltic, but only during summer months i.e. April to October.

Ships Built by Aberdeen Concrete Shipbuilding Company Limited.

I have prepared the following list from scratch and put the ships in chronological order as far as my knowledge allowed, so hopefully I have included all the ships built by the Aberdeen Concrete Shipbuilding Company Limited, my apologies if not. (Please feel free to get in touch if you know of any others).

Ship Name	Yard No.	Rig	Date Built	GRT (Tons)	Date lost (L)
Cretetree	1	Barge	1919	1,000	Currently beached.
Cretetorrent	2	Barge	1920	1,000	Unknown
Unknown	3 to 6	Cancelled after the armistice.			
Cretehatch	7	Tug	1919	262	1949 (L)

Cretetree (1919).

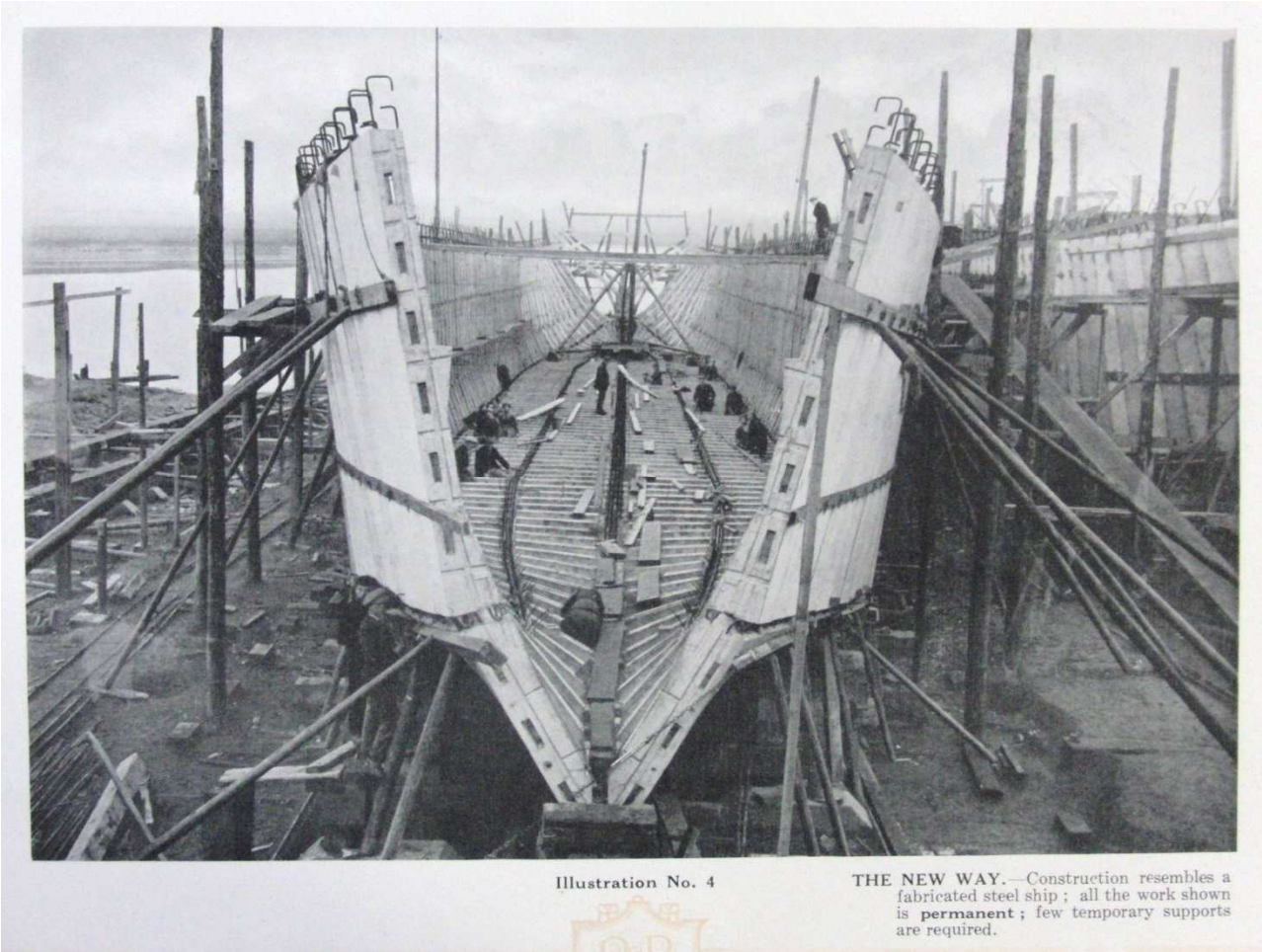
1st concrete-hulled ship built in Aberdeen.

The hull of this ship minus the wooden bridge can be seen on the Isle of Scalpay, near Ardinashaig, Harris, Western Isles, Scotland. She is currently beached, and is being used as a jetty and a fishermen's store. Considering she was built almost 100 year ago, her hull is in considerably good shape, so good it wouldn't surprise me if she's still sitting there in another 100 years. December 1918, she was named at her launch by Lady Taggart wife of the Lord Provost of Aberdeen, Sir James Taggart (1849 to 1929).

Hull of the 'Cretetree' as photographed on the Isle of Scalpay, near Ardinashaig, Harris, Western Isles, Scotland, by Marc Calhoun.

Cretetree (1919). Continued.

Ship Name(s)	**PD146: Cretetree.**
Yard No.	**1.**
Rig	Barge.
Engine(s)	None fitted, except for a donkey engine used to provide steam for the steering gear and windlass.
Launch Date	14th December 1918. (Completed March 1919).
Owner	Admiralty.
Registered Port	London. Official No.: 143055.
GRT	745 tons. (Deadweight - 1,000 tons).
Length	180 feet. (54.86m).
Breadth	32 feet. (9.75m).
Draft	16 feet, 6 inches. (5.03m).
Construction	Concrete.
Figurehead	Not fitted.
Classification	Lloyds Register of Shipping. Class: Experimental.
Other information	1921: ownership transferred to the Board of Trade. 1922: owned by the Crete Shipping Co., Ltd, London. 1928: owned by John W. Robertson, Lerwick. WW2: she is said to have been used at Scapa Flow. 1948: owned by W. A. Bruce, Stornoway, and used as a coal hulk. 1955: deleted from Lloyds Register, and taken as a hulk to the island of Scalpay, and used as a jetty and a fishing gear store.
Date Scrapped / Lost	Her concrete hull is still in one piece, and in good condition (excluding her former small wooden bridge, which is missing) on the north coast of the Isle of Scalpay near Ardinashaig, Harris. 57 52' 37.11N, 6 42' 1.11W. Canmore Id: 102877.



Concrete ship 'Cretemanor' under construction at Preston 1919. (From A New Way of Building Concrete Ships).

The Aberdeen Daily Journal, Thurs 16th May 1918: Concrete Ships, Utility and Limitations of the Vessels.

"The first ever concrete vessel ever produced in this country will very shortly pass into the service of this Government. She has a displacement of 9,000 tons and a deadweight carrying capacity of 400 to 500 tons. This is an interesting craft as her production marks what may prove to be the inauguration of a new era in shipbuilding. As with most innovations there are pros and cons to the proposition. To the general public, the idea of a concrete ship may appear a novelty. Such is not the case. Some 70 years ago, saw the birth of the present movement when a Frenchman – M. Lambot patented the idea and produced a concrete rowing boat. Some 40 years later a sloop was built in Holland which has been in use ever since. Just recently the Admiralty owing to the exceptional circumstances

obtaining have given a fresh stimulus to the production of these vessels. Accurately to designate the class one should term them Ferro-concrete or reinforced concrete ships. This means that a steel skeleton is employed, which is packed round and filled in with concrete. It is strong under compression, but has substantially no tensile strength. This defect is therefore counterbalanced reinforcing with steel rods. Different systems are adopted but the general principle of getting the steel portions of the vessel into position and then packing the concrete round them, obtains in all".

The Aberdeen Journal displacement and deadweight figures above seem incorrect. See my calculations / figures later in page 22.

The Aberdeen Daily Journal when referring to country, must mean Scotland as the following concrete ships are known to have been built in England prior to their article:

1910, in England a concrete barge called the 'Pioneer' was built for use on the Welland Canal, Canada. It was 80 feet long x 24 feet beam x 7 feet draft. Whole railroad carloads of stone were dropped into its hull from a 12-foot trestle without causing any damage. *An article in Engineering News, New York, 4th January 1915, called attention to the satisfactory service which this boat had given for four years. This period was sufficient to reveal defects, had there been any. The fact that no serious ones were disclosed should prove beyond question that concrete barges are a success.*

1912, in England, the Yorkshire Hennebique Contracting Co., Ltd., Leeds, built for the government a concrete barge 100 feet long x 28 feet beam for carrying heavy equipment on the Manchester Canal. The bottom / hull of this barge was 3 inches thick except under the boiler room and coal bunkers, where the hull was 4 inches thick.

20th September 1918, The Aberdeen Weekly Journal report:

The last summer excursion for the present season of the members of the Aberdeen Mechanical Society was held on Saturday afternoon, when a visit to the yard of the Aberdeen Concrete Shipping Company Ltd., at South Esplanade East, proved most interesting. The building of reinforced concrete vessels is a subject which has been attracting much attention in

these times of national emergency. One of the chief advantages of the use of concrete in the building of ships is that unskilled workers can be largely utilised, and that the work does not take away labour from the steel shipbuilders. At the Aberdeen yard, where the company is showing great enterprise there are at present three vessels in course of construction - two 1,000 ton dumb barges, for towing purposes, to be used for crucial traffic, and a tug which will be propelled by steam, with engines of 750 horsepower, and which will displace 535 tons. The dimensions of each of the barges are - length 180ft, bean 31ft 6in, moulded depth 19ft and of the tug - length 125ft, beam 27ft and moulded depth 14ft 6in. Reinforced concrete vessels it may be mentioned, displace about 40 per cent more than steel vessels of the same deadweight. The steel is only about 42 and a half per cent of that in steel vessels.

23rd December 1918, Aberdeen Press & Journal report:

The first launch of a concrete vessel at Aberdeen took place on Saturday from the yard of the Aberdeen Concrete Shipbuilding Company, Ltd., South Esplanade East, when a reinforced concrete barge to the order of the Admiralty was successfully launched directly from the ways, the first time in Scotland of such an achievement. The barge is 180 feet long, with a beam of 31 feet 6 inches, and a depth of 19 feet, and will have a carrying capacity of 1000 tons. The barge is designed for cross-channel and coastal traffic, and will carry a crew of six. It will be fitted with a donkey engine to supply steam for the steering gear and a compound windlass. The work of construction has been given employment to between 200 and 300 men. Another barge of the same type is well under way, and the firm has also received contracts to build four reinforced concrete tugs for the Admiralty of 725 indicated horse-power. A large company of ladies and gentlemen had been invited to witness the launching ceremony, the naming being performed by Lady Taggart, who was accompanied by Lord Provost Sir James Taggart. As the vessel left the ways she was named Cretetree. The derivation from concrete and tree, of which the vessel is constructed, is obvious. The Cretetree took to the water in graceful style, amid the hearty cheers of the spectators, thousands of whom lined the Victoria Bridge and the whole extent of Point Law, on the opposite side of the Dee. The barge was afterwards taken in tow by tugboat. Cake and wine were served to the invited guests – Mr. James Scott, jun., in the chair. Lord Provost Sir James

Taggart proposed "Success to the Cretetree" in happy terms. He said he had expected to find a little boat that went up and down canals and also that it would be an impossibility to float it (laughter) but she floated like a duck, and it was a great pleasure to see the vessel taking the water in such a graceful manner. (Applause.) They had expected the barge to be a great deal, in connection, with the war, but they wanted barges for much more industrial and pleasant duties, such as for food, because they were about tired of a ration of half a roast a week and a chicken once in a fortnight. (Laughter.) The first trip ought to be to Norway for a cargo of granite to Aberdeen, because they could not get tonnage to take over stones to keep the men going. They in Aberdeen were most grateful to the Concrete Shipbuilding Company for starting a new industry. They had been losing a lot of industries, and speaking about getting new ones, and this was one of the most important when they were employing about 300 hands. It was a jolly good start, and they would give Mr. Scott all the hands they possibly could. There was a lot of women workers in Aberdeen, and they were "the boys." (Laughter.)

Mr. James Scott, senior proposed the toast of "Lady Taggart", and, as a memento of the occasion, he presented her, in the name of the shipbuilders, with a gold brooch, for which Lady Taggart returned thanks.

Ritchie Unit System.

This system patented by Ritchie & Black, Liverpool used pre-cast sections which were assembled on the slipway to form the ship's hull. I could not establish if the concrete ships built in Torry, Aberdeen, used this system or were built in situ using wooden moulds.

The hulls of concrete ships were designed to keep the number of moulds required to a minimum, with the shape of the mid-ships area kept the same as far as practical forward and aft for around 50% of the ships length.

Cretetorrent (1919).

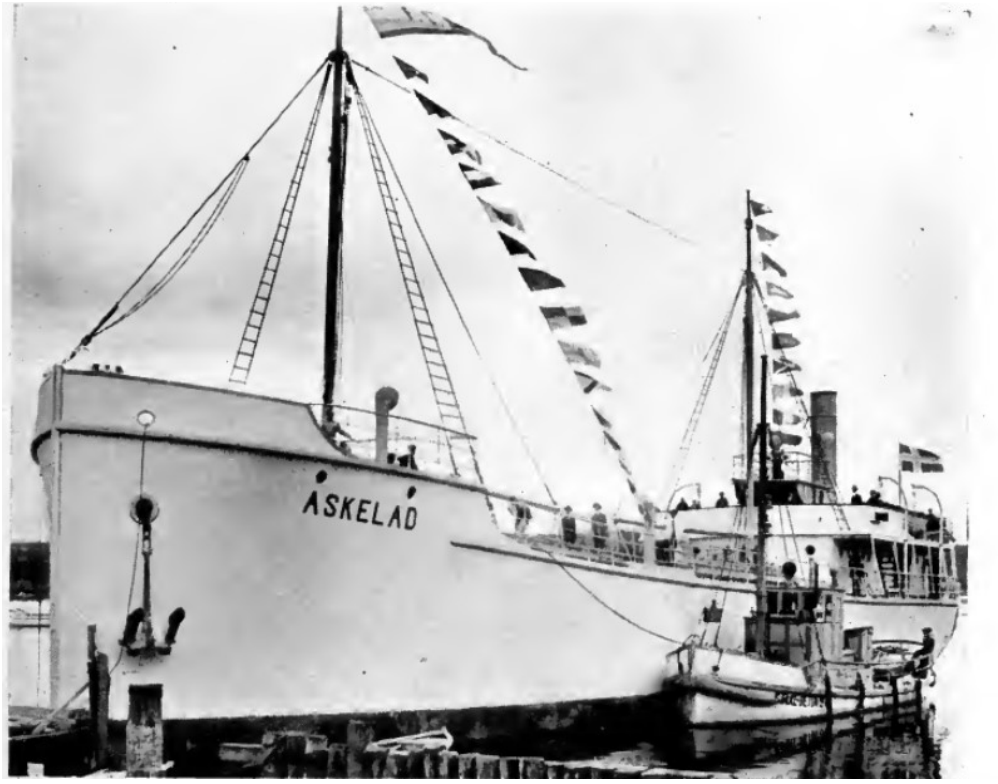
She was the second ship built by the company. It's worth noting that she was completed 2-months after her launch. Their first ship the 'Cretetree' was completed 3-months after her launch. A saving of one month could be due to better weather and / or due to experience over-coming teething problems.

Ship Name(s)	**PD147: Cretetorrent.**
Yard No.	**2.**
Rig	Barge.
Engine(s)	None fitted, except for a donkey boiler used to provide steam for the steering gear and windlass.
Launch Date	April 1919. (Completed June 1919).
Owner	Admiralty. (Shipping Controller, London).
Registered Port	London. Official No.: 143304.
GRT	745 tons. (Deadweight = 1,000 tons).
Length	180 feet. (54.86m).
Breadth	32 feet. (9.75m).
Draft	16 feet, 6 inches. (5.03m).
Construction	Concrete.
Figurehead	Not fitted.
Classification	Lloyds Register of Shipping. Class: Experimental.
Other information	1921: ownership was transferred to the Board of Trade. 1922: she was owned by the Crete Shipping Co., Ltd., London. 1927: she was owned by C. Vlassis, Greece.
Date Scrapped / Lost	Unknown, however she was deleted from Lloyds Register of Shipping in 1930.

Askelad

In the book 'Seagoing and other Concrete Ships' by Nikolay Knudtzon Fougner C.E., Christiania, Norway (1922) I found details of this ship M.S. 'Askelad' built in Norway. Her dimensions are very similar the Aberdeen built barges 'Cretetree' and 'Cretetorrent'.

M.S. Askelad: 176ft x 31ft x 19ft depth, deadweight 1,000 tons, GRT 759 tons, and block coefficient 0.77, and 105 tons of steel reinforcement.



M.S. Askelad with the 'Staal-Beton 19', the first Concrete Tug, alongside.

Information on the 'Askelad':

Weight of reinforced concrete hull	*733 tons.*
Weight of equipment	*120 tons.*
Weight of machinery	*31 tons.*
Displacement, light	*884 tons.*
Deadweight, freeboard 2" 6½"	*1,036 tons.*
Displacement, loaded	*1,920 tons.*

Cretehatch (1920).

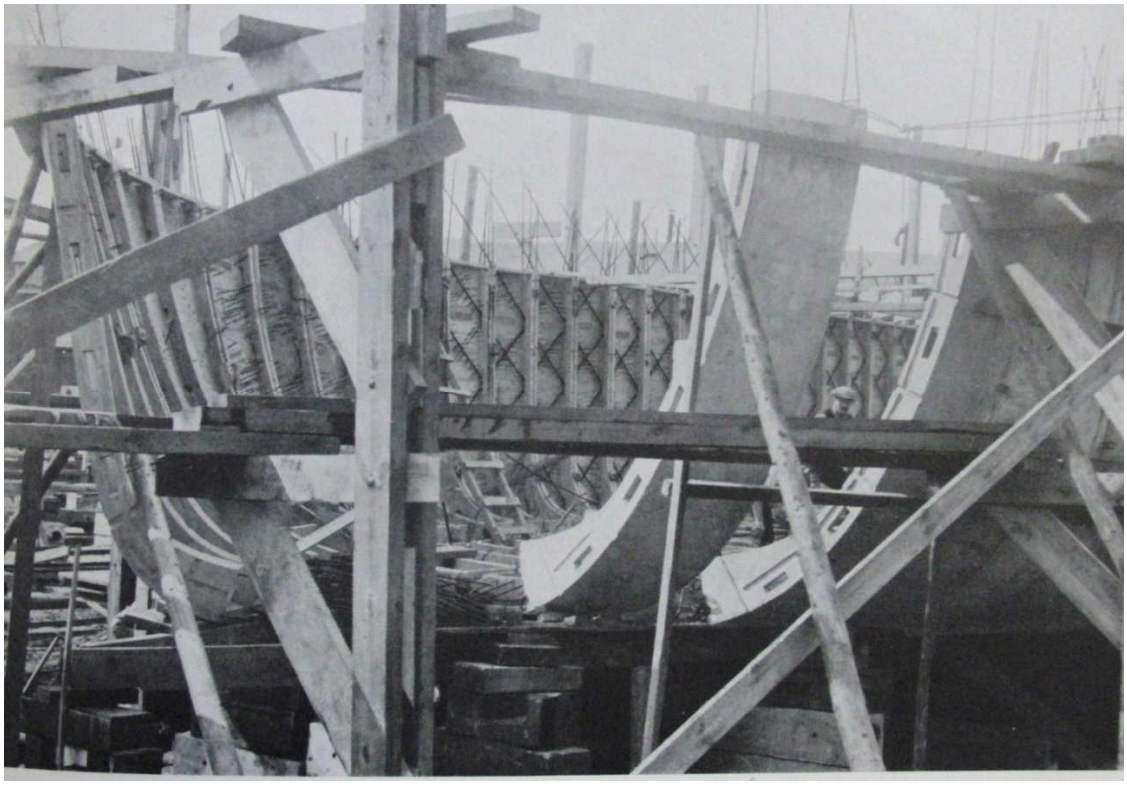
The Aberdeen Journal, Thursday 25th March 1920 reported: *"The concrete tugs and barges built by Aberdeen Concrete Shipbuilding Co. are proving as successful under peace conditions as during war time. Mr. J. Gibson master of the 'Cretehatch' writing from Antwerp states that the vessel is the best tug in concrete 'concern' the cleanest and the most powerful tower. 'I have been complimented on my smart voyages', he says 'and it is a real treat to see many of the tugs on the coast. Our first voyage was from Blyth to Dieppe and back to Blyth, the return journey being accomplished in forty-seven hours. No tug has ever done that before in this 'concern'. Then we towed from Hull to Antwerp and back to Hull, the return journey being done in twenty-three hours.'*

Her deckhouse and forecastle deck were both made of concrete, but her bridge and parts of her deck were made of wood. Her forecastle deck was designed for mounting a gun, however due to her launch occurring after the armistice no gun was fitted. She had accommodation for seventeen of a crew. She had a steam engine which was powered by coal, and her hull had a coal bunker either side of her engine with a capacity of 80 tons. Her rudder post, boiler top casings, skylights etc. were made of steel.

Ship Name(s)	**CT40 - Cretehatch.** Renamed: 'HY Tyne II' (1924).
Yard No.	**7.**
Rig	Tug, screw steamer.
Engines	Screw powered by a 750 ihp, triple expansion steam engine. Steam at 180psi was delivered by two Scotch marine boilers 11 feet long and 9 foot 6 inches in diameter.
Launch Date	July 1919. (Completed January 1920).
Owner	Admiralty. (Shipping Controller, London).
Registered Port	London. Official No.: 143923.
GRT	262 tons.
Length	125 feet. (38.10m).
Breadth	27 feet, 6 inches. (8.38m).
Draft	13 feet, 4 inches. (4.06m).
Construction	Concrete.

Figurehead	Not fitted.
Classification	Lloyds Register of Shipping. Class: Experimental.
Other information	1921: ownership was transferred to the Board of Trade. 1922: she was owned by the Crete Shipping Co., Ltd., London. May 1924: she was towed from Aberdeen, dismantled and converted to a club house for the Northumberland Yacht Club, Blyth, and renamed 'HY Tyne II'. (HY – House Yacht). 1939 to 1945: during WW2, she was requisitioned by the Admiralty as a ward room for Wrens at the local submarine base in Blyth.
Date Scrapped / Lost	26th October 1949: she capsized at her moorings in a gale, and was a total loss, no lives were lost. 1950: the wreck was dispersed by the Blyth Harbour Commissioners.

CT – Concrete Tug.



Concrete ship 'Cretemanor' under construction at Preston 1919. (From A New Way of Building Concrete Ships).

Some Advantages of Concrete Ships.

- Less steel is required.
- Thought to be cheaper to construct.
- Quicker construction.
- Less skilled labour required.
- Shipyard plant is simpler, cheaper, and easily installed.
- Materials for making the concrete usually available locally.
- Claims of increased efficiency due to a smoother hull.
- Cheaper to maintain.
- No need to paint the hull.
- Easy to repair.
- Incombustible material and non-magnetic (Good for wartime).
- Longer service life.
- A hull as smooth as glass, and proof against barnacles and corrosion, with less water resistance when compared to steel.
- Less vibrations transmitted from engines as compared to a steel ship.

Some Disadvantages of Concrete Ships.

- Greater weight, basically 100% increase compared to steel.
- Increased in displacement for a given deadweight.
- Increased net tonnage, means more expensive harbour dues.
- Bad weather can cause bigger delays when building using concrete when compared to using steel.
- Extra mass, so less space for cargo.

The biggest concern regarding concrete ships by engineers during WW1 can be summarised as follows:

"There is great danger of cracks developing leading to serious corrosion, so that the behaviour of these ferro-concrete ships will naturally be watched with the greatest of interest by engineers. Their life will no doubt greatly depend upon the imperviousness of the concrete to sea water, upon freedom from cracks and upon the resistance offered by the reinforcing metal to the corrosive action of sea water". (The Concrete Institute, April 1921).

How a Concrete Ship Floats.

For any vessel to float, be it wood, steel or concrete, its shape must be buoyant. Buoyancy is the upward force of the displaced water.

A solid piece of concrete (or steel) has a density higher than water and virtually no buoyancy so will sink.

A naval architect will calculate the displaced volume of the ship's hull; however, this can be quite complex to calculate without a computer program. Ship hulls are given a Block Coefficient, this is 1 for a box shape, and less than 1 for a normal hull shape.

Displaced Volume = Length x Beam x Draft x Block Coefficient.

A very crude estimate for the block coefficient for the 'Cretetree' barge would be around 0.77. (The 'Namsenfjord' is recorded as 0.75).

Displaced Volume = 54.86 x 9.75 x 5.03 x 0.77 = 2,071m^3.

Sea water density = 1025 kg/m^3.

Displacement = 2,071 x 1025 = 2,122 tonnes (2,339 tons).

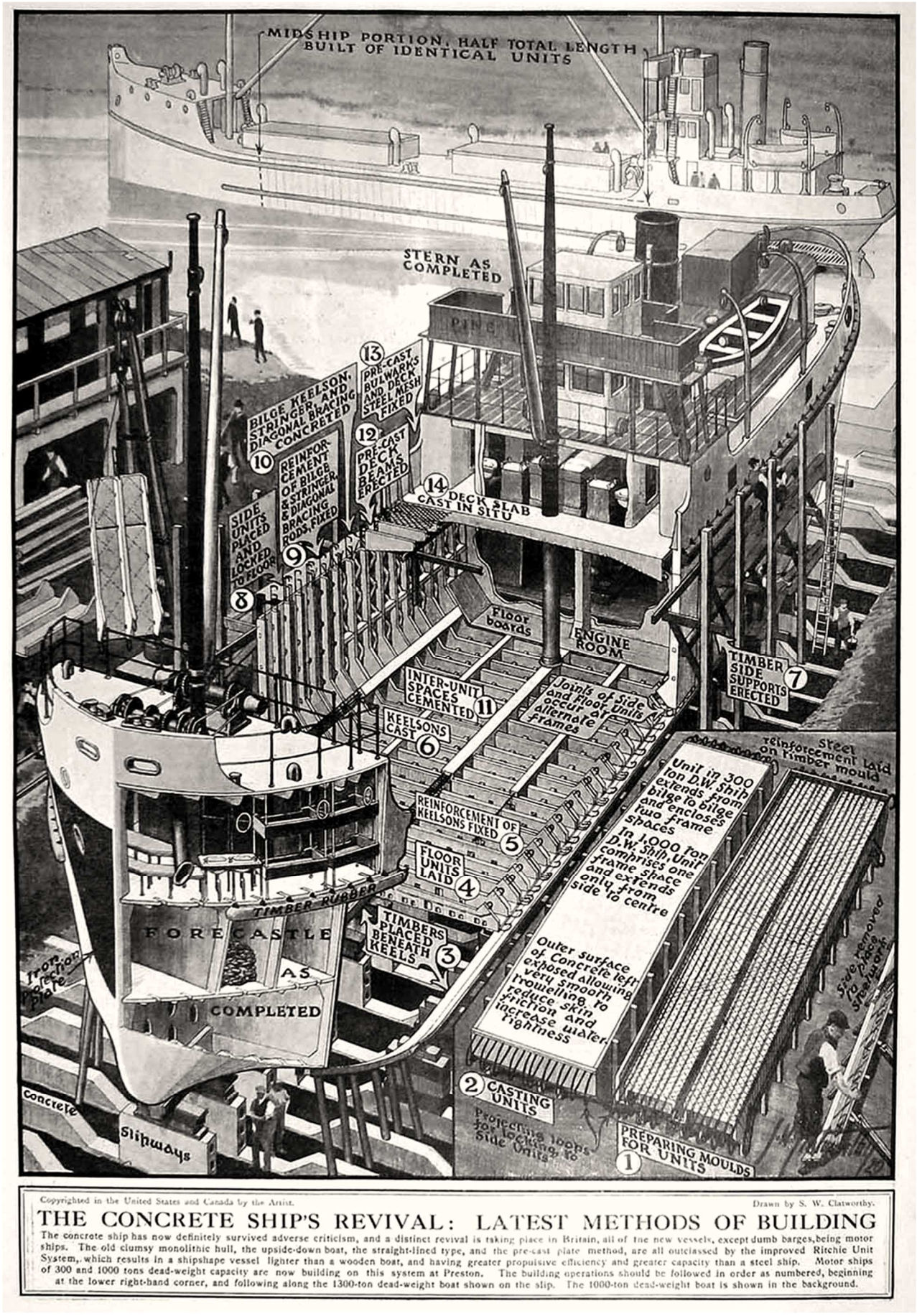
Weight of Hull (Askelad) = 733 tons.

Cretetree: deadweight (DWT) = 1,000 tons. (Which includes Equipment and machinery estimated at 120 tons).

Reserve Buoyancy = Displacement – Hull Weight – Deadweight.

Reserve Buoyancy = 2,339 –733 - 1,000 = 606 tons.

All commercial ships must comply with the Merchant Shipping Act which requires all ships to have a load line (aka Plimsoll Line) marked on the hull, it is an offence to proceed to sea with this load line submerged. (The load line on the 'Creetree' can today still be seen on her hull).



The concrete barges built in Aberdeen are similar to ship shown at the top. (Extract from the Grap, drawn by S. W. Clatworthy).

Concrete Ships Biggit in Aberdein!

A concrete ship, foo can ‘at be?
Wid it nae be o’r hivvy, tae float in ‘e sea?
Biggit in Aberdein min, yer hae’in’ a laff.
No, min it’s richt enuff!

They biggit ‘em in Torry, durin’ ‘e Great War,
Fer ships wir needed tae carry iron ore,
‘ere wis a shortage o’ steel, bit plinty san’,
So concrete wis used here in Scotlan’.

Concrete ships biggit here in Aberdein,
‘At’s something I’d wish I’d seen!
I wish I’d seen, ‘e great muckle moulds,
Wi’ steel reinforcin’, fer her bow, stern, an’ holds.

An’ I wish I’d bin ‘ere tae see’,
‘e workers mixin’, poorin’, an’ chappin’,
Tae see ‘em launched intae ‘e Dee,
An’ tae hear ‘e launch crowd cheerin’ an’ clappin’.

Oh, fit I’d gee,
Tae eence again, be on a boat,
As it slides doon ‘e launch-wyes,
It’s first time afloat.

Wid, iron, concrete, or steel,
It widnae mak ony odds tae me,
I’d jist be a happy man,
Tae eence again be floatin’ on the Dee!

Stanley Bruce,
6th August 2018.

Abbreviations.

DNV	Det Norske Veritas.
GRT	Gross Registered Tonnage.
ihp	Indicated Horse Power.
M.S.	Motor Ship.
psi	Pounds per square inch.

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www.aberdeenships.com	Information on over 3,000 Aberdeen built ships.
www.torryheritage.org.uk	Information on the heritage of Torry.

APPENDIX A
Concrete Tugs Built Elsewhere.

A total of twelve concrete tugs were built in Great Britain during WW1, all to the same design, but only the 'Cretehatch' was built in Aberdeen. Three of these vessels can still be seen today, the following table gives the complete list:

Date	Name	Builder / Location	Still Visible Today
1919	Cretehawser	Wear Concrete Shipbuilding Co Ltd, Southwick-on-Wear, near Sunderland.	Yes: c1942 she was bombed in a German air raid and severely damaged; she was patched and moved upstream, but sank at, Claxheugh Rock, South Hylton, and is still there.
1919	Creterope		No.
1919	Cretecable		No.
1919	Cretebow	Amble Ferro Concrete Co., Ltd., The Braid, Amble, Northumberland.	No.
1919	Cretestem		No.
1920	Cretehatch	Aberdeen Concrete Shipbuilding Co., Torry, Aberdeen.	No.
1920	Cretegaff	John ver Mehr & Co., River Adur, Shoreham-by-Sea, West Sussex.	Yes: she can be seen at Carlingford Marina, County Louth, Ireland.
1920	Creteyard		No.
1920	Cretemast		No.
1920	Creteblock		No.
1920	Creteboom		Yes: she lies in the River Moy near Ballina, County Mayo, Ireland. (She's been there since c1930).
1920	Cretewheel		No.

APPENDIX A
Concrete Tugs Built Elsewhere.
(Continued).

The concrete tug 'Cretebow'; being launched 31st July 1919, at the Amble Ferro-Concrete Co. Ltd., The Braid, Amble, Northumberland. (Photographer unknown).

A report on concrete ships built in Shoreham states that the tugs were built on slipways and launched conventionally. The much larger barges were built in a dry-dock, which was flooded on completion. It also states that *"…. after the formwork was struck, the vessel's exterior was rubbed with cement mortar to seal the pores before a bitumen coating was applied, followed by paint".*

A. H. Guest of Amblecote, near Stourbridge (House builders), in 1918 built concrete canal boats. Like the Aberdeen built barges they were built too late, and never played any significant role during WW1. One of these boats survived and is currently the property of The National Waterways Museum, Gloucester where she is currently floating and on public display.

Further Books in this Series.

Further books in this series are planned, and will all be available to read online or download as a pdf, free of charge at www.electricscotland.com on 'The Shipbuilders of Aberdeen' page.

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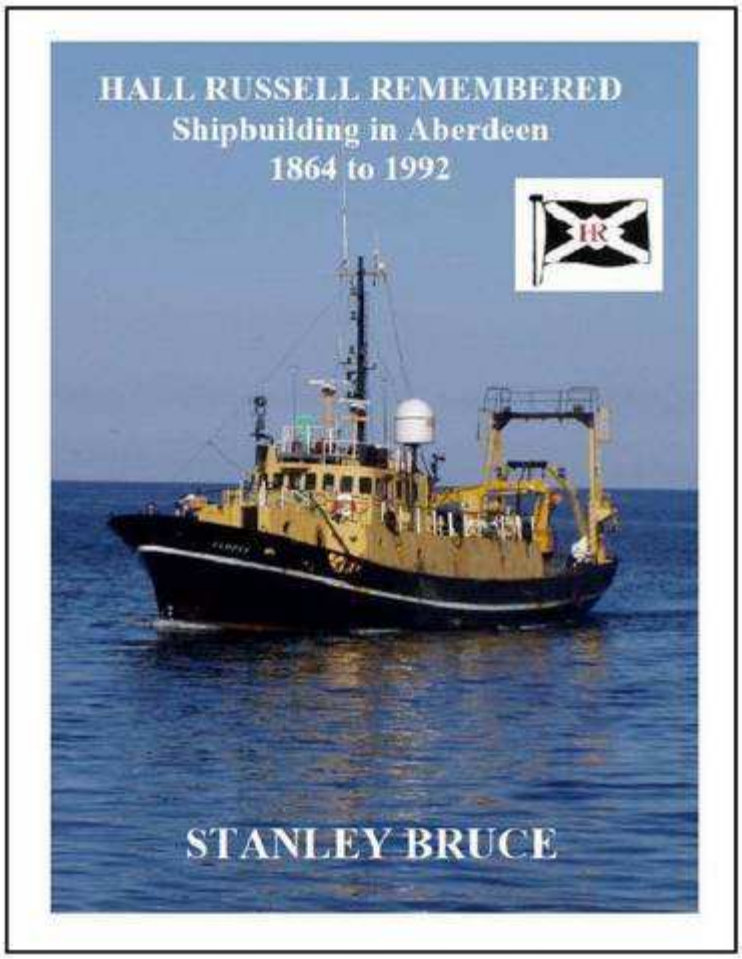

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