

No. 1821

THE BRITISH CORPORATION FOR THE SURVEY  
AND  
REGISTRY OF SHIPPING.

*AEROPOLIS*  
Report No. *2181* No. in Register Book *3545*

*EX LEANDROS*  
" " "

S.S. *CRAGPOOL*

Makers of Engines *Blain Co (1926) Ltd.*

Works No. *1946*

Makers of Main Boilers *Blain Co (1926) Ltd.*

Works No. *1946*

Makers of Donkey Boiler *✓*

Works No. *✓*

MACHINERY



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*00401-02409-0145*

*Shelby & Depledge Limited  
Gullpool*

No.

THE BRITISH CORPORATION FOR THE SURVEY  
AND  
REGISTRY OF SHIPPING.

Report No. .... No. in Register Book .....

Received at Head Office *23<sup>rd</sup> November 1928*

Surveyor's Report on the New Engines, Boilers, and Auxiliary  
Machinery of the ~~Single Triple~~ ~~Twin Quadruple~~ *Steamer* .....

*Cragspool*

Official No. ....

Port of Registry *West-Wharfedale*

Registered Owners

*Paal Shipping Co Ltd*

Engines Built by

*Blair & Co (1926) Ltd  
Stockton-on-Tees*

at

Main Boilers Built by

*Blair & Co (1926) Ltd  
Stockton-on-Tees*

at

Donkey ..

at

Date of Completion

*4-28*

First Visit

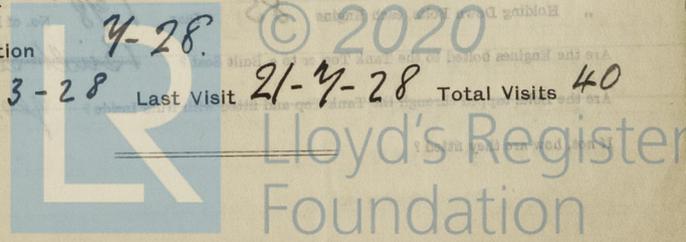
*19-3-28*

Last Visit

*21-7-28*

Total Visits

*40*



## RECIPROCATING ENGINES

Works No.

1946

No. of Sets

1

Description

Triple expansion.  
S.C. Berks.

No. of Cylinders each Engine

3

No. of Cranks

3

Diars. of Cylinders

26 1/2" - 44" - 43"

Stroke

48"

Cubic feet in each L.P. Cylinder

116.2

Are Spring-loaded Relief Valves fitted to Top and Bottom of each Cylr.?

H.P. only.

"

"

each Receiver?

I.P. + L.P.

Type of H.P. Valves,

N.E.M. Eng. Co. Poppet Type  
Niston slide.

" 1st I.P. "

" 2nd I.P. "

" L.P. "

" Valve Gear

slide  
Stephenson link.  
Surface.

" Condenser

Cooling Surface

3076

sq. ft.

Diameter of Piston Rods (plain part)

7/4"

Screwed part (bottom of thread)

5.68"

Material

Iron.

Diar. of Connecting Rods (smallest part)

7 1/4"

Material

I.P.

" Crosshead Gudgeons

7 1/2"

Length of Bearing

8"

Material

I.P.

No. of Crosshead Bolts (each)

4

Diar. over Thrd.

3 1/4"

Thrds. per inch

6

Material

I.P.

" Crank Pin

2

" " "

" " "

" " "

" " "

" " "

" " "

" " "

" " "

" Main Bearings

6

Lengths

4 at 16 1/4", 2 at 14 1/2"

" Bolts in each

2

Diar. over Thread

4"

Threads per inch

5

Material

I.P.

" Holding Down Bolts, each Engine

85

Diar.

1 3/8"

No. of Metal Chocks

85

Are the Engines bolted to the Tank Top or to a Built Seat?

Built seat. Tank top.

Are the Bolts tapped through the Tank Top and fitted with Nuts Inside?

yes.

If not, how are they fitted?

Connecting Rods, Forged by

Blair Co (1926) Ltd.

Piston " "

Crossheads,

Hadfields Ltd.  
Blair Co Ltd.

Connecting Rods, Finished by

Piston " "

Crossheads,

Date of Harbour Trial

6-4-28

" Trial Trip

21-4-28.

Trials run at

In North Sea.

Were the Engines tested to full power under Sea-going conditions?

yes.

If so, what was the L.H.P.?

2442

Revs. per min. 77

Pressure in 1st I.P. Receiver,

65 lbs., 2nd I.P.,

lbs., L.P., 11.25", Vacuum 26.5" ins.

Speed on Trial

11.93 knots.

If the Conditions on Trial were such that full power records were not obtained give the following estimated

data:—

Builders' estimated L.H.P.

Revs. per min.

Estimated Speed



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## SHAFTING

Are the Crank Shafts Built or Solid?

built.

No. of Lengths in each

3

Angle of Cranks

120°

Diar. by Rule

13.72

Actual

14 1/2"

In Way of Webs

15"

" of Crank Pins

15"

Length between Webs

15"

Greatest Width of Crank Webs

28 3/4"

Thickness

9 3/4"

Least

" "

24 1/2"

"

9 3/4"

Diar. of Keys in Crank Webs

2 1/2"

Length

8 3/4"

" Dowels in Crank Pins

2 1/2"

Length

8 3/4"

Screwed or Plain

Plain

No. of Bolts each Coupling

9

Diar. at Mid Length

3"

Diar. of Pitch Circle

1-8 1/8"

Greatest Distance from Edge of Main Bearing to Crank Web

1/8"

Type of Thrust Blocks

Kanseshae.

No. " Rings

6

Diar. of Thrust Shafts at bottom of Collars

15"

No. of Collars

6

" " Forward Coupling

15"

At Aft Coupling

15"

Diar. of Intermediate Shafting by Rule

13.07

Actual

13 3/4"

No. of Lengths

7

No. of Bolts, each Coupling

8

Diar. at Mid Length

3"

Diar. of Pitch Circle

1-8 1/8"

Diar. of Propeller Shafts by Rule

14.57

Actual

16"

At Couplings

15"

Are Propeller Shafts fitted with Continuous Brass Liners?

yes.

Diar. over Liners

17 9/16" + 1 1/2"

Length of After Bearings

5 1/8"

Of what Material are the After Bearings composed?

Magnesium

Vital.

Are Means provided for lubricating the After Bearings with Oil?

no.

" " to prevent Sea Water entering the Stern Tubes?

no

If so, what Type is adopted?

open to sea.

No. of Blades each Propeller *4* Fitted or Solid? *solid fitted.*  
 Material of Blades *bronce* Boas *bronce C.S.*  
 Diam. of Propellers *18'-0"* Pitch *17'-9"* Surface (each *104* S. ft.)  
 Coefficient of Displacement of Vessel at  $\frac{3}{4}$  Moulded Depth

Crank Shafts Forged by	<i>Darlington Forge Works.</i>	Material	<i>I.S.</i>
„ Pins „	„	„	„
„ Webs „	<i>Blair Co. Ltd.</i>	„	<i>I.S.</i>
Thrust Shafts „	<i>Darlington Forge.</i>	„	<i>I.S.</i>
Intermed. „ „	„	„	„
Propeller „ „	<i>Blair Co. Ltd.</i>	„	<i>I.</i>
Crank „ Finished by	„	„	„
Thrust „ „	„	„	„
Intermed. „ „	„	„	„
Propeller „ „	„	„	„

## STAMP MARKS ON SHAFTS.

<i>Crank Shaft:</i>	<i>B.C.</i> <i>Nº10540</i> <i>20-6-28</i>
<i>Thrust Shaft:-</i>	<i>B.C.</i> <i>Nº10541</i> <i>20-6-28</i> <i>J.D.S.</i>
<i>of Tunnel Shafts:-</i>	<i>B.C.</i> <i>Nº10542</i> <i>20-6-28</i> <i>J.D.S.</i>
<i>Sail Shaft-(working)</i>	<i>B.C.</i> <i>Nº10539</i> <i>18-6-28</i> <i>J.D.S.</i>
<i>Sail Shaft-(chase)</i>	<i>B.C.</i> <i>Nº10543</i> <i>20-6-28</i> <i>J.D.S.</i>

No. of Air Pumps *On 1* Diar. *24"* Stroke *34"*  
 Worked by Main or Independent Engines? *main.*

No. of Circulating Pumps *1* Diar. *14"* Stroke *34"*  
 Type of *Double-acting, worked by main engine.*  
 Diar. of *"* Suction from Sea *10 1/2"*  
 Has each Pump a Bilge Suction with Non-return Valve? *Yes.* Diar. *"*  
 What other Pumps can circulate through Condenser? *Ballast doukey.*

No. of Feed Pumps on Main Engine *✓* Diar. *✓* Stroke *✓*  
 Are Spring-loaded Relief Valves fitted to each Pump? *✓*  
 Can one Pump be overhauled while the others are at work? *✓*

No. of Independent Feed Pumps *1. main.* Diar. *4"* Stroke *21"*  
 What other Pumps can feed the Boilers? *Auxiliary Feed pump.*

No. of Bilge Pumps on Main Engine *2* Diar. *5"* Stroke *34"*  
 Can one Pump be overhauled while the others are at work? *Yes.*  
 No. of Independent Bilge Pumps *✓*  
 What other Pumps can draw from the Bilges? *Ballast doukey.*

Are all Bilge Suctions fitted with Roses? *Yes.*  
 Are the Valves, etc., so arranged as to prevent unintentional connection between Sea and Bilges? *Yes.*  
 Are all Sea Connections made with Valves or Cocks next the Ship's sides? *Yes.*  
 Are they placed so as to be easily accessible? *Yes.*  
 Are the Discharge Chests placed above or below the Deep Load Line? *above.*  
 Are they fitted direct to the Hull Plating and easily accessible? *Yes.*  
 Are all Blow-off Cocks or Valves fitted with Spigots through the Hull Plating and Covering Plates or Flanges on the Outside? *Yes.*

BOILERS.

Works No. *1946*

No. of Boilers *3* Type *Cylindrical multitubular single.*

Single or Double-ended

No. of Furnaces in each *3*

Type of Furnaces *Wrighton.*

Date when Plan approved *9-2-28*

Approved Working Pressure *180 lbs.*

Hydraulic Test Pressure *320 "*

Date of Hydraulic Test *20-6-28*

" when Safety Valves set *6-7-28*

Pressure at which Valves were set *185 lbs.*

Date of Accumulation Test *6-7-28*

Maximum Pressure under Accumulation Test *185 lbs.*

System of Draught *C.A.*

Can Boilers be worked separately? *Yes.*

Makers of Plates *D. Colville Sons Ltd.*

" Stay Bars

" Rivets *Blair Co Ltd.*

" Furnaces *Leeds Forge Co.*

Greatest Internal Diam. of Boilers *15'-9 1/2"*

" " Length " *11'-5"*

Square Feet of Heating Surface each Boiler *2631 sq ft*

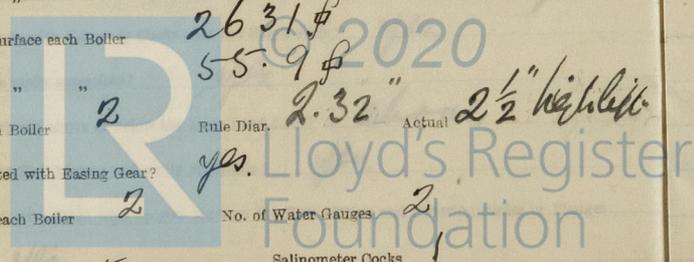
" " Grate " " *55.9 sq ft*

No. of Safety Valves each Boiler *2* Rule Diam. *2.32"* Actual *2 1/2" high lift*

Are the Safety Valves fitted with Easing Gear? *Yes.*

No. of Pressure Gauges, each Boiler *2* No. of Water Gauges *2*

" Test Cocks " " *✓* " Salinometer Cocks *1*



Are the Water Gauges fitted direct to the Boiler Shells or mounted on Pillars?

*on pillars.*

Are the Water Gauge Pillars fitted direct to the Boiler Shells or connected by Pipes?

Are these Pipes connected to Boilers by Cocks or Valves?

*values.*

Are Blow-off Cocks or Valves fitted on Boiler Shells?

No. of Strakes of Shell Plating in each Boiler

*one.*

Plates in each Strake

*2*

Thickness of Shell Plates Approved

*1 1/4"*

in Boilers

*1 1/4"*

Are the Rivets Iron or Steel?

*steel.*

Are the Longitudinal Seams Butt or Lap Joints?

*butt.*  
*double.*

Are the Butt Straps Single or Double?

Are the Double Butt Straps of equal width?

*yes.*

Thickness of outside Butt Straps

*3 1/32"*

inside

*1 3/32"*

Are Longitudinal Seams Hand or Machine Riveted?

*machine.*  
*treble.*

Are they Single, Double, or Treble Riveted?

No. of Rivets in a Pitch

*5*

Diar. of Rivet Holes

*1 5/16"*

Pitch

*9/16"*

No. of Rows of Rivets in Centre Circumferential Seams

Are these Seams Hand or Machine Riveted?

Diar. of Rivet Holes

Pitch

No. of Rows of Rivets in Front End Circumferential Seams

*2*

Are these Seams Hand or Machine riveted?

*machine. hand.*

Diar. of Rivet Holes

*1 3/8"*

Pitch

*4 3/8"*

No. of Rows of Rivets in Back End Circumferential Seams

*2*

Are these Seams Hand or Machine Riveted?

*hand. machine.*

Diar. of Rivet Holes

*1 3/8"*

Pitch

*4 3/8"*

Size of Manholes in Shell

*16" x 12"*

Dimensions of Compensating Rings

*2'-8" x 2'-4" x 1/4"*

Thickness of End Plates in Steam Space Approved

1 1/32"

capillan

" " " " " in Boilers

1 1/32"

Pitch of Steam Space Stays

19" x 2 1/2"

Diar. " " " " Approved

3 3/8"

Threads per Inch

6

" " " " " in Boilers

3 3/8"

6

Material of " " "

steel.  
double-nuts & washers.

How are Stays Secured ?

12" x 1"

Diar. and Thickness of Loose Washers on End Plates

" " Riveted " " "

Width " " Doubling Strips "

Thickness of Middle Back End Plates Approved

" " " " " in Boilers

Thickness of Doublings in Wide Spaces between Fireboxes

~~14" x 9"~~

Pitch of Stays at

" " " "

14" x 9"

Diar. of Stays Approved

1 7/8"

Threads per Inch

8

" " " in Boilers

1 7/8"

8

Material "

steel.

Are Stays fitted with Nuts outside ?

yes.

Thickness of Back End Plates at Bottom Approved

3 1/32"

" " " " " in Boilers

3 1/32"

Pitch of Stays at Wide Spaces between Fireboxes

14" x 9" hand

Thickness of Doublings in " "

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Thickness of Front End Plates at Bottom Approved

15/16"

" " " " " in Boilers

15/16"

No. of Longitudinal Stays in Spaces between Furnaces

1

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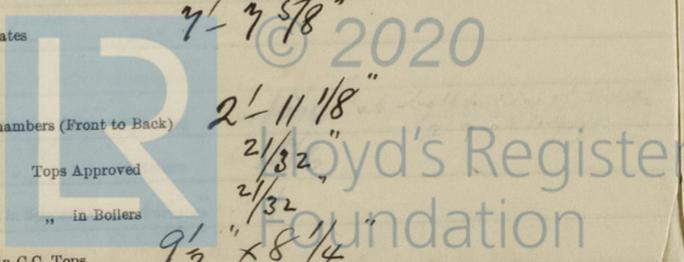
Diar. of Stays Approved  $2 \frac{3}{4}$  " Threads per Inch 6  
 " " in Boilers  $2 \frac{3}{4}$  " 6  
 Material ,, *stab.*

Thickness of Front Tube Plates Approved  $1 \frac{1}{16}$  "  
 " " " " in Boilers  $1 \frac{1}{16}$  "  
 Pitch of Stay Tubes at Spaces between Stacks of Tubes  $14 \frac{1}{2} \times 9 \frac{1}{2}$  "  
 Thickness of Doublings in " " "  $5 \frac{1}{16} \sqrt{r} \frac{3}{8}$  "  
 " Stay Tubes at " " " "  
 Are Stay Tubes fitted with Nuts at Front End? *no.*

Thickness of Back Tube Plates Approved  $1 \frac{3}{16}$  "  
 " " " in Boilers  $1 \frac{3}{16}$  "  
 Pitch of Stay Tubes in Back Tube Plates  $9 \frac{1}{2} \times 9 \frac{3}{4}$  "  
 " Plain "  $4 \frac{3}{4} \times 4 \frac{2}{8}$  "  
 Thickness of Stay Tubes  $5 \frac{1}{16}$  "  
 " Plain " *8 w.l.*  
 External Diar. of Tubes  $3 \frac{1}{2}$  "  
 Material ,, *Iron.*

Thickness of Furnace Plates Approved  $1 \frac{9}{32}$  "  
 " " " in Boilers  $1 \frac{9}{32}$  "  
 Smallest outside Diar. of Furnaces  $3' - 9 \frac{3}{16}$  "  
 Length between Tube Plates  $7' - 7 \frac{5}{8}$  "

Width of Combustion Chambers (Front to Back)  $2' - 11 \frac{1}{8}$  "  
 Thickness of " " Tops Approved  $2 \frac{1}{32}$  "  
 " " " in Boilers  $2 \frac{1}{32}$  "  
 Pitch of Screwed Stays in C.C. Tops  $9 \frac{1}{2} \times 8 \frac{1}{4}$  "



Diar. of Screwed Stays Approved

$1\frac{3}{4}$ " Threads per Inch 8

" " " in Boilers

$1\frac{3}{4}$ "  
steel.

Thickness of Combustion Chamber Sides Approved

$2\frac{1}{32}$ "

" " " " in Boilers

$2\frac{1}{32}$ "

Pitch of Screwed Stays in C.O. Sides

$9\frac{1}{2}$ " x  $8\frac{1}{2}$ "

Diar. " " Approved

$1\frac{3}{4}$ " Threads per Inch 8

" " " in Boilers

$1\frac{3}{4}$ "  
steel.

Thickness of Combustion Chamber Backs Approved

$2\frac{1}{32}$ "

" " " " in Boilers

$2\frac{1}{32}$ "

Pitch of Screwed Stays in C.O. Backs

$9\frac{1}{8}$ " x 9"

Diar. " " Approved

$1\frac{7}{8}$ " x  $1\frac{3}{4}$ " Threads per Inch 8

" " " in Boilers

$1\frac{7}{8}$ " x  $1\frac{3}{4}$ "  
steel.

Are all Screwed Stays fitted with Nuts inside C.O.?

yes.  
 ~~$1\frac{3}{16}$ "~~  $1\frac{3}{16}$ "

Thickness of Combustion Chamber Bottoms

No. of Girders over each Wing Chamber

4

" " " Centre "

Depth and Thickness of Girders

$8\frac{3}{8}$ " x  $1\frac{3}{4}$ "

Material of Girders

steel.

No. of Stays in each

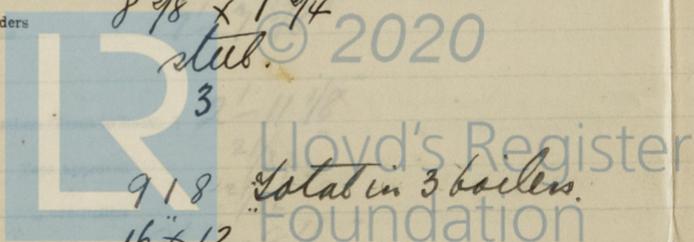
3

No. of Tubes, each Boiler

918 total in 3 boilers.

Size of Lower Manholes

$16$ " x  $12$ "



## MAIN STEAM PIPES.

No. of Lengths

Material

Brazed, Welded or Seamless

Internal Diam.

Thickness

How are Flanges secured?

Date of Hydraulic Test

Test Pressure

5  
Stub.

S.D.

5"

1/4"

Screwed.

9/5/28

540 W.P.

Made by Scottish Tube Co.

No. of Lengths

Material

Brazed, Welded or Seamless

Internal Diam.

Thickness

How are Flanges secured?

Date of Hydraulic Test

Test Pressure

No. of Lengths

Material

Brazed, Welded or Seamless

Internal Diam.

Thickness

How are Flanges secured?

Date of Hydraulic Test

Test Pressure

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## SPARE GEAR

No. of Top End Bolts	No. of Bot. End Bolts	No. of Cylinder Cover Studs
2	2	
" Coupling Bolts 8	" Main Bearing Bolts 2	" Valve Chest "
" Junk Ring Bolts	" Feed Pump Valves	" Bilge Pump Valves 2
" H.P. Piston Rings 6	" I.P. Piston Rings	" L.P. Piston Rings 1 set.
" " Springs	" " Springs	" " Springs
" Safety Valve " 2	" Fire Bars 150	" Feed Check Valves
" Piston Rods	" Connecting Rods	" Valve Spindles 2 main. 2 Aky.
" Air Pump Rods	" Air Pump Buckets	" Air Pump Valves 2
" Cir. "	" Cir. "	" Cir. "
" Crank Shafts	" Crank Pin Bushes	" Crosshead Bushes
" Propeller Shafts 1	" Propellers	" Propeller Blades
" Boiler Tubes 14	" Condenser Tubes 3	" Condenser Ferrules 100

## OTHER ARTICLES OF SPARE GEAR:—

6 Bars, iron (assorted)  
 3 Plates, iron (assorted)  
 6 sheets tin  
 2 sheets copper, each 12' sq.  
 24 Pricker Blades  
 42 Gauge Glasses  
 12 assorted studs for Glands & Cover  
 6 assorted studs & nuts (brass for pumps etc)  
 8 side bar for main boilers  
 84 Gauge Glass Rings

## REFRIGERATORS

Patterns for Furnace Gear as follows:  
 Front Bearer  
 Renewable Back Bridge Plate  
 Plain Fire-bars  
 Side Fire-bars  
 Furnace Front Baffles

Spare Furnace Castings to be supplied  
 1 Front Bearer  
 3 Renewable Back Bridge Plates  
 1 set of Front Baffles for one boiler.



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ELECTRIC LIGHTING.

Installation Fitted by

Clarke Chapman & Co. Ltd.

No. and Description of Dynamos

One compound wound  
Clarke Chapman & Co. Ltd.

Makers of Dynamos

Capacity " 68 Amperes, at 110 Volts, 450 Revols. per Min.

Current Alternating or Continuous

Continuous.

Single or Double Wire System

Double-wire

Position of Dynamos

Starboard side Starting Platform.  
near Dynamo.

Main Switch Board

No. of Circuits to which Switches are provided on Main Switch Board 4

Particulars of these Circuits:—

Circuit.	Number of Lights.	Candle Power.	Current Required. Amps.	Size of Conductor.	Current Density.	Conductivity of Conductor.	Insulation Resistance per Mile.
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*Same as 4's "Ashby"*

Total No. of Lights

No. of Motors driving Fans, &c.

No. of Heaters

Current required for Motors and Heaters

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GENERAL CONSTRUCTION.

Have the Machinery and Boilers been constructed in accordance with the requirements of the Rules and the

Approved Plans? *yes.*

If not, give details of the points of difference, and state when these were sanctioned by the Chief

Surveyor,

and

Have Tests been made to prove that the condition has been satisfactorily fulfilled?

Has the Installation Inspection over the whole system been taken?

What does the Installation amount to?

Is the Installation complete with a Viewpoint?

Date of Trial of complete Installation

Have all the requirements of Section 12 been satisfactorily carried out?

Are the Materials used in the Construction of Engines and Boilers, so far as could be seen, sound and

trustworthy? *yes.*

Is the Workmanship throughout thoroughly satisfactory? *yes.*

The above correctly describes the Machinery of the S.S.

" CRAG POOL "

as ascertained by <sup>me</sup> from personal examination

*J. D. Stephenson*

Engineer Surveyor to the British Corporation for the Survey and Registry of Shipping.

Fees—

MAIN BOILERS.

		£	s.	d.
H.S.	4893 Sq. ft.	:	:	:
G.S.	167.7	:	:	:

DONKEY BOILERS.

H.S.	✓ Sq. ft.	:	:	:
G.S.	✓ "	:	:	:
		£	:	:

ENGINES.

L.P.C.	116.2 Cub. ft.	:	:	:
		£	:	:
Testing, &c. ...		:	:	:
		£	:	:
Expenses ...		:	:	:
		£	:	:
Total ...		£	:	:

It is submitted that this Report be approved,

*W. Foster King*  
Chief Surveyor.

Approved by the Committee for the Class of M.B.S.\* on the 12<sup>th</sup> December 1928

Fees advised

Fees paid



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