

LIQUID FUEL.

A TRIAL RUN ON THE "HALIOTIS."

On the invitation of Messrs. Syme & Co., the Singapore Agents of the Shell Transport and Trading Co., Ltd. (Messrs. M. Samuel & Co.) a party of gentlemen went out in the newest steamer of the Company yesterday to witness the trial of liquid fuel. Among those on board were Messrs. Kidd (Lloyd's), Swan (Tanjong Pagar Dock Co.), Kitching (Holt's), Macdonald (New Harbour Dock Co.), Jackson Millar (Riley Hargreaves), and J. Graham (Syme & Co.).

The *Haliotis*, Capt. Blair, is a vessel of 2200 tons and is specially built on the well-known lines of the Shell Transport boats to carry bulk petroleum. She has three tanks or compartments for carrying oil, and a couple of holds for cargo, separated from the oil tanks by a cofferdam, to be filled with water as occasion may require. Aft of the oil tanks, (which have a capacity of 92,565 cu. ft., or 2,057 tons) is an oil fuel bunker, in which is carried the heavy oil to be used as fuel. Still further aft are cross bunkers which can be used for either oil or coal, additional coal-bunkers being provided on either side of the stoke hole, in case that kind of fuel is to be used. The engines, compound triple, are well aft, and are of the ordinary type. To trim the ship a water ballast tank is provided at stem and stern. Here it may be said that the pumping appliances for dealing with the cargo of the vessel are most complete. A duplicate set of Worthington pumps in the pump-room drive the oil from tank to tank, or deliver it ashore, or take it in, the arrangement of pipes and valves—to the layman very bewildering—enabling the most perfect control to be exercised over the oil. The *Haliotis* has a special 7 inch pipe for delivery over the stern, for use at Madras, where the vessel could not of course go alongside a wharf.

It may also be mentioned that she is provided with the newest steam steering gear—the Sentinel, by Allen and McLellan of Glasgow—and Lord Kelvin's latest compass with spring gimbals to avoid vibration. Throughout the ship, except under the most exceptional circumstances, no illuminating agent is used but the electric light, even the sidelights and the compass lamps being thus lit. The cables are so arranged as to give full control from the chart room.

The principal interest in the *Haliotis* is, of course, centered in the stoke hole and the arrangements for supplying liquid fuel to the furnaces. There are four boilers of the ordinary Scotch type. Near to the front of each furnace is a pillar of fire-brick, upon which the spray of liquid fuel plays and is broken up. The atomising agency on the *Haliotis* is steam and the "sprayer" is, externally at least, simply a nozzle inserted in a hole in the furnace door, and capable of being swung back. Two pipes at the top and bottom supply the steam and fuel, the former first circulating outside to heat the oil and then passing through the centre at pressure and dispersing the fuel, in the form of spray mixed with steam, through an annular nozzle of about two inches in diameter. When the furnaces are going a sheet of flame plays round the brick pillar and the furnace arches with a deafening roar, the supply being capable of very ready adjustment. Looking into the furnace the other end of the boiler could be easily seen, a tribute to the completeness of the combustion. When the vessel had "got into her stride" yesterday, a few miles out eastward, very little smoke issued from her funnel. It is obvious, however, that feeding the furnaces to the most economic advantage is an art to be acquired. Every cubic foot of smoke escaping from the funnel means so much power lost, and although it may not be possible to avoid this loss in firing up—and, during a short trip such as that of yesterday, when the furnaces are not thoroughly heated, almost impossible—enough was seen of the system employed on the *Haliotis* to convince practical men that great strides have been made recently in appliances for making oil fuel available for marine engines. Whether the steam sprayer, or the method of atomising the fuel by compressed air, or by mechanical means (as in some of the Dutch oil-boats) will eventually be found most economical, is a question for experience and time to show. The steam sprayer used yesterday certainly answered its purpose admirably, as far as could be seen, a turn or two of the controlling wheel being all that was needed. All the concomitants of the usual stoke-hole were absent, no army of men laboriously shovelling in dirty coal, deadening the fire and checking steam production, and no buckets of ashes to be hauled to the surface. A full head of steam, 92lb. to 100lb. was maintained easily. And on returning into harbour a couple of the furnaces were turned off, until again required for use.

As we have said the Borneo liquid fuel is a heavy dark-coloured crude oil, with the high flashing point of 284° Fah., and a specific gravity of 913. Petroleum with a lower flashing point than 80° is not allowed to be sold and it is probable that the result of the recent Petroleum Commission in England will be to raise the flash point of ordinary petroleum to 100°, cutting out the lighter American oils. The high flash point of the liquid fuel is an advantage as regards safety, and is not too high to prevent ready ignition under furnace conditions. The all-important point is that of cost: Is the liquid fuel able to compete with coal from a commercial point of view? Messrs. Syme & Co. say they can supply the fuel at \$15 a ton, and that a ton of the fuel (39 cu. feet) is as effective as 2½ tons of Japanese coal at \$13 (at present). If this be so, there is an ample margin of saving to pay interest on the cost of converting the furnaces so as to burn liquid fuel. It should not be forgotten that, particularly on large ships, there will be a large economy in labour in the stokehold, although in order to efficiently control liquid fuel more skilful labour is required. There is also a large saving in handling. The vessel has but to run alongside the wharf, connect with the storage tanks, and the pumps speedily do the rest. There is a very large saving in storage room over Welsh coal, it is true, but there is the advantage that liquid fuel never requires trimming.

On Sept. 9th, when the *Haliotis* went on her trial trip at Home and had on board to watch the working some of the most eminent marine authorities of the day, the engines developed 1,900 horse power, the fuel being 1.7 lb. per indicated horse power, equal to 16.3 tons per day, and giving a speed of 10 knots. The following is from the *Times* report of the run.—

Among those on board were Sir John Durston, K.C.B., Engineer-in-Chief of the Admiralty, Sir K.C.B. Samuel, Mr. Fortescue Flannery, M.P., under whose direction the work has been executed,

Colonel Swan, Mr. G. W. Manuel, chief engineer of the P. and O. Company, together with representatives from many of the leading steamship companies trading to the East. The *Haliotis*, which is 248½ ft. long, with a beam of 40 ft., was built by Armstrong, Whitworth, & Co. and designed specially for the oil-carrying trade from Borneo. Being constructed on the trunk-deck system, she presents a somewhat unusual appearance, but her most noteworthy feature consists in the circumstance that her furnaces are fitted with an arrangement for burning refuse petroleum. They are, however, available for coal in the ordinary way, if required, it being possible to make the necessary alterations for a change of fuel in about 12 hours. From the bunkers, which are so constructed that they can be used either for oil or coal, the oil is pumped to a service tank above the boilers, whence it flows by gravity to a device at the furnace doors, where by means of a steam jet it is "pulverized" or broken into spray. Its combustion is carried out without any layer of incandescent coal such as sometimes employed with liquid fuel. Several advantages are claimed for this method of firing the boilers of steamers. In the first place a given weight of oil develops more heat than the same weight of coal, which means a reduction in the dead weight of fuel that must be carried for a voyage. In trials with the *Haliotis* it has been found that 2.27 lb. of ordinary north country coal were used for each indicated horse power per hour as compared with 1.67 lb. of oil, and in the Eastern trade, where steamers have to rely on inferior Japanese and Indian coals, the comparison must work out still more in favour of the liquid fuel. For example, a boat requiring a minimum of 500 tons of coal for her voyage from Aden to Singapore would have an ample fuel supply with 300 tons of oil, thus largely increasing her cargo capacity. Another advantage is the speed with which fuel can be taken on board. While the rate at which coaling is performed does not as a rule exceed 60 or 80 tons an hour, 400 tons of oil can be pumped into the bunkers in the same space of time. Then, again, an immense saving of labour is claimed with the use of oil fuel. Once the burners are regulated, the supply goes on automatically, and it is said that a whole voyage may be performed without once opening the furnace doors. Hence the necessary number of stokers is greatly reduced, and, it may be added, those that are required work under much more pleasant and healthy conditions owing to the absence of coal dust in the stokeholds. When the furnace is in full blast there is very little, if any, smoke produced—a point which might commend the system for use in men-of-war, while the fact that oil can be stowed in places which are not practicable for coal bunkers, suggests that its use might ease matters a little in the closely-packed interiors of torpedo-boat destroyers. Of course, liquid fuel has its disadvantages. The steam used in the burners involves a serious loss of fresh water—an important item on an ocean going steamer—and it is not pretended that the direct cost in this country under present conditions is so low as that of coal, whatever may be the case in regions like that of the Caspian, where the steamers are all fired with petroleum refuse burnt in much the same way as on the *Haliotis*. And in connexion with its use for the Navy one fact of supreme importance must be remembered. None of the great petroleum fields of the world are on British territory or under British control, and it would obviously be sheer folly to make our ships depend on a fuel the supply of which could not be absolutely assured.

As to the last point, the supply of the liquid fuel, M. Samuel & Co. are not the people to shrink from a big thing. Stores of the fuel are to be established at all important shipping centres east of Suez. The supply at the wells in Borneo is believed to be practically inexhaustible; with sufficient storage capacity, merely a matter of cost, at all the ports, ships should be able to rely as surely on getting a supply of the liquid fuel, as of coal.

The *Haliotis* after her successful run yesterday went over to Pulau Bukom, whence she will sail for Kotei.

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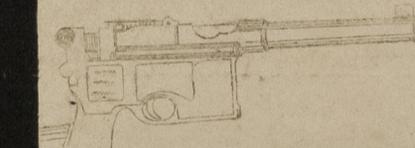
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VESSELS EXPECTED.

Giving port of departure, and (where known) date due here, and name of Agents.

MEN-OF-WAR.

BUFFALO, U.S., New York, due Nov. — ;
CATINAI, IT.
EDGAR, H.M.S., Devonport.
GHILIAK, Russ., Constadt.
GOVERNORO Ital. Spezzia,
HAI-LUNG, Chin. Steitin, due Oct. — ;
KASAGI, Philadelphia,
ST. PATRICK, H.M.S., dredger, Portsmouth,
SUPERB, H.M.S., Sheerness,
TOKIWA, Jap. Newcastle,

MAIL STEAMERS FROM EUROPE.

SALAZIE, due Nov. 26; M. M.
PARRAMATTA, due Dec. 3; P. & O.
P. HEINRICH, due Dec. 8; N. D. L.
INDUS, due Dec. 10; M. M.
CHUSAN, due Dec. 17; P. & O.
LAOS, due Dec. 24; M. M.
BENGAL, due Dec. 31; P. & O.

MAIL STEAMERS FROM HONGKONG.

CALEDONIEN, due Nov. 24; M. M.
BENGAL, due Dec. 1; P. & O.
OCEANION, due Dec. 3; M. M.
BAYERN, due Dec. 11; N. D. L.
BALLARAT, due Dec. 15; P. & O.
MELBOURNE, due Dec. 22; M. M.
COROMANDEL, due Dec. 30; P. & O.

STEAMERS.

ADRIA, Hamburg, due Nov. —; B. M. & Co.
ANCHISES, Amsterdam, due Nov. 18; Mansfield.
ANDALUSIA, Kobe, due Nov. 20; B. M. & Co.
ARABIA, Hamburg, due Dec. 17; B. M. & Co.
ARMENIA, Hamburg, due Nov. 15; B. M. & Co.
ASTURIA, Hamburg, due Nov. —; B. M. & Co.
BINGO M., Kobe, due Dec. 6; P. Sinous.
BENGLOBE, London, due Nov. 26; P. S. & Co.
BR-EMER, Hongkong, due Dec. 20;
CANTON, Hongkong, due Nov. 12; P. & O.
CANDIA, Hongkong, due Nov. 22; P. & O.
CALABRIA, Hamburg, due Nov. 30; B. M. & Co.
CERES, Bally, due Nov. —;
CEYLON, Hongkong, due Dec. 21; P. & O.
CHING WO, Hongkong, due Nov. —; Born Co.
CONCH, Batcum, due Nov. —; Syme Co.
CYCLOPS, Amsterdam, due Dec. —; Mans.
DEAN, Bombay, due Dec. —; Born Co.
DIOMED, Hongkong, due Nov. —; Mans.
GLENGYLE, Hongkong, due Dec. 15; G. Wood.
GLAUCUS, Hongkong, due Nov. —; Mans.
HILDEBERG, Hamburg, due Nov. —; B. M.
HIROSHIMA M., Bombay, due Dec. 14; P. S.
HONGKONG M., Sun, Ireland, due Nov. —; Bous.
INABA M., Southampton, due Nov. 23; P. S. & Co.
I. DE LUZON, Manila, due Nov. —; Hin'kdt.
JAPAN, London, due Dec. 2; P. & O.
JAVA, Hongkong, due Dec. 7; P. & O.
JOHN SANDERSON, H'kong, due Nov. 26; G.W.
KAGOSHIMA M., Kobe, due Dec. 5; P. S. & Co.
KAMAKURA M., Antwerp, due Dec. 5; P. S.
KAWACHI M., Kobe, due Dec. 17; P. S.
KARRAKATTA, W. Australia, due Dec. 12; Bous.
KOSTER, Odessa, due Nov. —; Born Co.
LETIMBRO, Bombay, due Nov. 26; B. M. & Co.
LEON XIII, Barcelona, due Nov. —; Hin'kdt.
MADRAS STEAMER, due Nov. 30; Bouscad.
MALACCA, London, due Dec. 16; P. & O.
MAZAGON, Bombay, due Nov. 22; P. & O.
MORAVIA, Kobe, due Nov. 22; R. S. & Co.
MOSKWA, Odessa, due Nov. —; Born Co.
MYRMIDON, Hongkong, due Dec. 4; Mans.
NESTOR, Liverpool, due Dec. 3; Mansfield.
NIJINI NOVGOROD, Vladivostock, due Nov. Born.
OPIUM STEAMER, Calcutta, due Nov. 21; Bous.
OPIUM STEAMER, Calcutta, due Nov. 26; Moses.
OPIUM STEAMER, H'kong, due Nov. 21; Moses.
OPIUM STEAMER, H'kong, due Nov. 28; Bous.
PAKLING, Liverpool, due Nov. 29 Born Co.
PATROCLUS, Liverpool, due Dec. 28; Mans.
PYRRHUS, Hongkong, due Nov. 24; Mans.
RADNORSHIRE, Liverpool, due Nov. —; Bous.
QUEEN MARGARET, New York, due Nov. —;
SARLEDON, Hongkong, due Nov. 29; Mansfield.
SALADIN, W. Australia, due Dec. —; Mans.
ST. MARY, Batoum, due Nov. —;
SAVOIA, Yokohama, due Nov. —; B. M. & Co.
SIBERIA CORDON, Penzth, due Nov. —;
SOCOTRA, London, due Nov. —; P. & O.
STOLBERG, Kobe, due Nov. 23; B. M. & Co.
SULTAN, W. Australia, due Dec. —; Mans.
TASTALUS, Liverpool, due Dec. —; Mans.
TOSA M., Antwerp, due Dec. 23; P. S.
TSINTAN, Hamburg, due Nov. —;
TITAN, Amsterdam, due Nov. 21; Mans.
TROCAS, Batoum, due Nov. —; Syme & Co.
VE-ONLI, Vladivostock, due Nov. —; Born.
VINDABONA, Trieste, due Dec. 6; R. Sch.
VLADIMIR, Odessa, due Dec. —; Born Co.
YAROSLAVL, Vladivostock, due Nov. —; Born.

SAILING VESSELS.

MAZALEMA, New York, due —;

Passengers for Straits, China & Japan.

Per *Salazie*, from Marseilles, due Nov. 26 ;
Mr. W. Hemsing, Mr. F. Belheld, Mr. Mitchell
Innes, Mr. Velhagen, Mr. Van Gestel, Mr. A.
Harten, Mr. H. Schulte, Mr. W. G. Greig, Mr.

Per *Japan*, from London, due Dec. 2 ; Mr.
and Mrs. Craddock and two children, Mrs. and
Miss Vernon, Mr. and Mrs. Cosgrave, Mr. and
Mrs. Orr Ewing and three children, Mrs. Bremner
and two children, Mr. C. E. Cornford, Miss Prout,
Sub-Lt. V. D. English, Mrs. J. Serle, Mrs. A. J.
Johnstone.

Per *Parramatta* : from Colombo, due Dec. 3.—
Miss M. C. Edwards, Mrs. Crawford, Misses
Crawford (two), Mrs. Win. Cameron and two
children, Mrs. R. Cameron, Mr. G. Cameron,
Rev. and Mrs. L. Eyrde, Mr. J. Cameron, Miss
Anstie, Mr. J. H. Scott, Mr. L. Dick, Mr. M.
Arnott, Capt. W. M. Daubeny, Mr. A. Robert-
son, Mr. R. H. Robertson, Mr. Mussel, Mr. Betts,
Mr. and Mrs. J. Cook and two children, Mr.
Mackintosh, Capt. J. H. P. Parker, Mr. F. A.
de St. Croix, Rev. W. and Mrs. Musson, Mr.
Donald Watson, Mr. and Mrs. Cole, Rev. G. A.
Bunbury, Mrs. J. M. Duncan, Mr. S. Codrington,
Capt. F. D. Parry, Mr. J. Richmond, Mr. P. M.
Skene-Knox, Mr. F. Henderson, Lieut. Charring-
ton.

Per *Malacca*, from London, due Dec. 16.—Capt.
and Mrs. Roach, Mr. and Mrs. Taylor and two
children, Mr. and Mrs. H. Hogge, Miss M. A.
Palmer, Mr. Kay, Mr. C. H. Blason.

Per *Chusan*, from Colombo, due Dec. 17.—
Miss Goulden, Mr. Findlay, Mr. J. Wright, Miss
F. E. Lightfoot, Mr. and Mrs. A. L. Stewart, Mr.
and Mrs. Burder, Mr. F. Henderson, Mr. and
Mrs. D. W. Lovell, Surg.-General Hamilton,
Mrs. Hamilton, Mr. H. Kenwick, Mr. Nutter, Mr.
and Mrs. T. Lynes, Mr. Carmichael.

Per *Indus*, from Marseilles, due Dec.—Mr. and
Mrs. F. Donath and child, Mr. Johnson, Mr. de
Grunberghe, Mr. Ryckervorsel, Mr. Aimé Morot,
Mr. and Mrs. J. Mackenzie, Mrs. N. J. Olivier,
Mr. F. Lamboy, Mrs. (alkoen and child, Mr. and
Mrs. Hauffman, Miss Fisher, Mr. C. Thorne.

Per *Bengal*, from Colombo, due Dec. 31 ; Lt.-
Col. Sir C. Mitchell, G.C.M.G., Lady Mitchell, Dr.
and Mrs. Freer and child, Miss Wyllie, Mr. W.
D. P. Watson, Miss Annie F. Napier, Mr. L.
Hirsch, Col. and Miss Wood, Miss Elam and
friend, Mr. R. B. Scott, Mr. Raeburn Scott, Mr.
Killingworth Hedges, Mr. and Mrs. Massingberd,
Mr. F. W. Barker, Sir C. R. S. Payne, Lady
Payne.

Per *Manila*, from London, due Jan. 13.—Mr. and
Mrs. Stuart-Smith and child.

Per *Inaba Maru*, from Southampton, due Nov.
—; Mr. E. Craydon, Mr. W. E. Abbott, Mr. J.
S. Willes, Mr. S. F. Carlisle, Mrs. Johnston, Mr.
G. A. Lind, Mr. A. Lind, Master H. Lind, Miss
M. Lind, Miss Florence Lind, Miss A. Lind,
Master O. Lind, Miss Fanny Lind, Master E.
Lind.

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