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SHIPBUILDING AND SHIPPING RECORD

A JOURNAL OF SHIPBUILDING, MARINE ENGINEERING, DOCKS, HARBOURS AND SHIPPING

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American Developments.

At the moment, unusual interest attaches to shipping developments in the United States, and, as a matter of fact, it is probable that this will prove to be the case for some time to come. That American legislators have not given up hope of providing an adequate mercantile marine for the foreign trade of the country is very evident, legislation on the subject being again promised by the Wilson Administration during the next session of Congress. The Bill has not yet, however, been drafted but it would create no surprise if the Government ownership plan received most support. Meanwhile, it is understood that a test case has been brought on the Pacific coast to determine the power of the coastwise navigation laws to prevent foreign-built vessels from entering the trade, the object of this move being to place, if possible, more tonnage on the Panama Canal route, so as to increase transport facilities between eastern and western ports. By an Act of August 18, 1914, ships built abroad are admitted to American registry for foreign commerce. That measure was strongly opposed by the shipbuilding interests, which, in fact, nearly succeeded in defeating it, and it may be safely assumed that even more vigorous action will be taken now. The law on the subject appears, indeed, to be clear, and there is said to be little chance of the coastal companies succeeding in their latest effort. Another case of unusual interest to British shipowners is expected to arise from the decision of the Secretary of State, Washington, to grant American registry to a number of steamers which, until recently, were said to have been the property of a wealthy American. Three of the vessels are at present detained on this side of the Atlantic, at British and French ports, and have yet to come before the Prize Courts. Naturally, there s a good deal of conjecture as to the steps that will be taken in regard to them. It is, of course, certain that proceedings will not be obviated by their transfer to the Stars and Stripes, but the question of their ownership will, doubtless, be investigated thoroughly, and the result will, in all likelihood, have an important bearing upon subsequent procedure.

German Ships in Australia.

A suggestion that Australia should be permitted to retain, as compensation in part for its war expenditure, the German steamships which were interned in the Commonwealth ports at the outbreak of hostilities is being seriously discussed by members of the Federal Labour Party. The temporary use of these ships by the local Navy Board for transport and other purposes has given rise to an idea that if taken over permanently they would provide the Government with a ready-made mercantile fleet for the shipping business in which it is anxious to engage. All attempts made by opponents of State trading to dissuade the Government from entering the ocean transport business have failed; the project is to be definitely proceeded with as early as possible, at any rate according to repeated statements made by Mr. Fisher and his colleagues. Those who favour it made a rough calculation some time ago that a line of fast steamships suitable for carriage of mails to London, as well as passengers and cargo, could be established for £400,000, but less optimistic estimates put the amount at from £700,000 to £800,000. As regards the German ships which the Australian Navy Board is now using, it may be assumed that the question of their future disposal will have to be referred at the proper time to the Imperial Government. The international law, or usage, relating to such property is well known.

Cargo Insurance Rates.

When war closed the markets of the Central Empires to British insurances, it was hoped that cargo rates would stiffen with the removal of the keen competition that has always been a feature of the Teutonic business campaign. This hope was at first fulfilled, to an extent, but as business became more normal a downward tendency was evident and, at the time of writing, rates are in many cases appreciably less than a year ago. The market has not felt the draught caused by the withdrawal of a large competitive re-insurance market to the extent that was anticipated. Fresh companies have sprung up, and some of the fire companies have extended their operations to include marine business. An instance of the decline of rates can be found in the Institute Tariff rate for goods "F.P.A." to the East. Twelve months ago this business was fixed at 7s. 6d. per cent., but it is now done at 6s. 3d. per cent. in the tariff market, and considerably lower than this has been accepted elsewhere. A curious anomaly can be found in the combined war and marine risk insurance on steamers other than liners from North Atlantic ports home. The marine risk "F.P.A." is done at 6s. 3d. per cent. to 7s. 6d. per cent., and the war risk rate is 20s. per cent. The combined war and marine risk, however, can be done at 22s. 6d. per cent., though there is some justification for this reduction in the fact that a loss cannot occur under both risks.

Increased value of Steamers.

The increased value of steamers which has become so marked of late is not without interest in its effect on the insurance market. The fact that underwriters insist on a clause limiting the amount of insurance done on disbursements to 15 per cent. of the insured value, has compelled owners to increase the value in their "Hull and Machinery" policies if they wish to be fully compensated in the event of loss. The usual practice is to endorse the current policy with an agreement augmenting the value to the desired extent, the average increase being 20 per cent. A policy for the balance of the period to run on the endorsed policy is then issued for the increased amount, underwriters signing lines *pro rata* of those originally accepted. In some cases, however, the current policies have been cancelled and a fresh

policy issued from the date of cancellation, with the insured value increased to the necessary figure. The effect of these increases is that though receiving a greater premium, the underwriters' liability for particular average is identical with that under the old valuation, and so they get an "all risks" premium for an increase which applies to a "F.P.A." basis only. As a set-off against this, a "constructive total loss" is less likely to occur under the new valuation, and a "total loss only" re-insurance costs more (in view of the increased line), and is less easily arrived at under the valuation clause. Thus in the case of a vessel which has had a serious casualty underwriters may find that they have to pay a heavy claim, which under the old value would have rendered the vessel a constructive total loss, collectable on their T.L.O. re-insurance.

The "Royal Edward."

The loss of the *Royal Edward*, which the Press Bureau tells us was torpedoed by an enemy submarine while carrying troops in the Ægean Sea, has removed a fine steamer from our Register. Although engaged on Government work at the time she was sunk, she was till recently well known in the North Atlantic passenger trade, making the trip between Avonmouth and Montreal, in conjunction with her sister ship, the *Royal George*, on behalf of the Canadian Northern Railway. Both vessels were built by the Fairfield Company, Ltd., the *Royal Edward* in 1908. She was a turbine steamer of 11,117 tons gross register, designed for a speed of 19 knots, and luxuriously fitted for passenger accommodation. She carried wireless and submarine signalling installations and a refrigerating plant. The *Royal George*, built a year earlier, is a similar vessel. Originally known as the *Cairo*, she ran for a season in the passenger service of the Egyptian Mail Company between Marseilles and Cairo, with her sister ship, which was then known as the *Heliopolis*. On the collapse of this concern both vessels were laid up for some time. They were then acquired by the Canadian Northern Steamships, Ltd., re-named, and after being specially strengthened to withstand Atlantic weather, were put into commission as stated above. Both vessels are insured against marine risks in the London market on a value of £175,000, which, being about £16 per ton, is a low valuation for this class of steamer. It is interesting to note in this connection that the *Royal George* stranded near Quebec in November, 1912, and was floated after three weeks' operations in a seriously damaged condition, after 55 guineas had been paid on her against the risk of total loss. The claim for this casualty has not yet been finally adjusted, but will probably amount to about 75 per cent. of her value.

Depreciation and Income-Tax.

In the current report of the British Steamship Owners' Association it is pointed out that some years ago the alternative methods of applying depreciation to steamers either by deducting 4 per cent. each year from the original value, or 5 per cent. each year from the preceding years, depreciated value was abandoned and the employment of the former method was alone sanctioned. The question then arose as to the period of years over which this mode of applying depreciation could be permitted, for in some cases it was carried on so long that owners were getting depreciation allowed after the whole original cost had been reached. To meet this anomaly the Legislature enacted in the Act of 1907, Section 26, as follows:—"No deduction for wear and tear or repayment on account of any such deduction shall be allowed in any year if the deduction when added to the deductions allowed on that account in any previous years to the person by whom the concern is carried on will make the aggregate amount of the deductions exceed the actual cost to that person of the machinery or plant, including in that actual cost any expenditure in the nature of capital expenditure on the machinery or plant by way of renewal, improvement or reinstatement." The income-tax authorities then sought to limit the aggregate depreciation to 96 per cent. of the original value, *i.e.*, after applying the principle of 4 per cent. deduction for 24 years they declined to allow further depreciation, contending that as the steamer was still in existence it must have some value. The section above quoted, however, does not support this contention, and the shipowners' view that they were not to be so limited was upheld in the case of the *Zephyrus*, reported in the Association's circular for April, 1913, in which case the owners succeeded in carrying their depreciation in the particular circumstances of that case to a little over 97 per cent. Notwithstanding this decision the income-tax authorities in the Sunderland district in a recent case insisted upon the 96 per cent. limit. The owners therefore appealed, and on appeal the Commissioners allowed the further depreciation claimed by the owners, making the aggregate allowance in this case 97·2 per cent.

Continental Shipbuilding.

As readers are aware, the shipbuilding industries of most of the European countries which are not at war are busier than they have ever been before. That their abnormal activity is profitable need not be doubted. Before the war no Continental shipbuilding industry, except that of Germany, had much money behind it. Few of them, therefore, could afford to take risks, and none of them has, as a matter of fact, taken any. We have seen the particulars of several contracts which are in progress, and frankly are astonished by the prices. With the state of the British industry normal we should not, perhaps, have much difficulty in beating them. But in every one of the cases we examined the price was so low that, in the exceptional circumstances of the moment, no British shipbuilder would have been able to look at it. We have only, that is to say with the conditions normal, to carry a peckload of work in hand in order to find some Continental firms running us uncomfortably close for cargo steamer contracts. While, however, the prices were low the deliveries were very bad. So bad were they, indeed, that we marvelled at shrewd shipowners doing business on the basis of them. In view of them, we no longer wonder why instead of waiting for the end of the war in order to give vessels out to United Kingdom builders, British shipowners did not order vessels abroad. Still, it need not be ignored that an effect of their current prosperity may be considerably to speed up these Continental industries. They are not slow because their directors like to be slow, but simply because there has been no inducement in the shape of steady and profitable employment to be quicker. That this spell of abnormal activity will enable them to excel or even to equal our speed of production is unlikely. But it will not need to last much longer in order to carry them along some way in the right direction, and that ought to be a fact of some importance to British shipbuilders.

U.S.A. Shipbuilding Prices.

Notwithstanding the rush of orders, American shipbuilders do not seem to be exactly making hay while the sun shines, to judge by the prices at which recent contracts have been booked. For a shelter-deck cargo steamer building to a very elaborate specification to carry 13,000 tons deadweight, the contract price works out at just $54·50 per ton deadweight. A boat of equal capacity for the same owners building at another yard has been placed at a figure which works out at about $55·75 per ton deadweight. These two boats are three-deckers intended to take highest rating at Lloyd's. In the case of large single-deck colliers being built at a Delaware River shipyard, it is reported that the contract price works out at about $57 per ton deadweight, while smaller colliers ordered on the Great Lakes for coastwise service are being built at a much lower price. For two very large tankers built last year, an oil company paid in the neighbourhood of $65 per ton deadweight, which certainly cannot be called excessive,

and it is reported on good authority that the only American shipyard in a position to book an order for similar vessels has asked exactly $100 per ton deadweight. Those in a position to judge estimate that very few of the American yards are now engaged in anything like profitable work. The contracts accepted by them were obtained in the face of bitter competition at a time when yards were almost idle and the owners were really hard pressed for ships, and it is obvious that the only yards that will realise handsome profits out of the so-called shipbuilding boom of the moment are those that spurned the cheap offers made by owners a few months ago and kept some of their berths free for the orders which are still pending and which must, of necessity, go to some American shipyard. Perhaps this phase of the situation will strike critics as due not altogether to efficient management, but the fact is that the commercial side of the shipbuilding industry seems to have been altogether neglected in the organisation of the leading American shipyards, a failing which they share with those of Germany.

Engineers and Machine Tools.

In his election address a candidate for a seat on the Executive Council of the Amalgamated Society of Engineers, discusses the machine question in a distinctly maladroit way. Readers need hardly be told that trade unionists strongly object to the employment on certain machines of semi-skilled men or women. "Our officials and the Government tell us," says this candidate, "that after the war is over the unskilled and women labour will be forced to get out of the engineering trade. That is," he declares, "all nonsense. The sub-division of labour and the simple machinery that has been introduced into our trade has made possible the increased employment of unskilled and female labour, and we might as well try to put back the hand of time as try to drive it out of the trade after the war." He thinks the better plan will be to "organise" the unskilled men and women so that they may be able to fight side by side with the skilled men. The statement that the simplification of machinery and the sub-division of labour have made possible the employment of unskilled men and women is, of course, pure common sense. But it is not sound trade unionism if the policy of the Amalgamated Society of Engineers is orthodox, for the ground of the opposition to the Terms of Agreement 1907 was based on exactly the contrary considerations. We have not the space for a review of the machine question, and we suspect that few readers would have the patience to study one if we had. The point of this note may, in any case, be made without going into the larger question. It is that there must be something wrong with the so-called orthodox view of the Amalgamated Society of Engineers on the machine question when a candidate for the Executive Council and an avowed Socialist to boot should publicly endorse the employers' view of the subject.

Strain Meters.

It has been customary to assume that the greatest strain which a ship could experience was met with when she was either supported in the middle by the crest of a wave of the vessel's length, or when the ends were supported by the crests and the hollow came amidships. Accordingly strength calculations have been made on this basis, and the scantlings have been determined from the amount of bending moment ascertained in these extreme positions. The introduction of the Foster and other strain meters make possible the actual measurements of the strains experienced by ships under any condition, and a considerable quantity of valuable information has already been obtained, in this and other countries, of the strains experienced during launching, loading, and when at sea. It is necessary to obtain by calculation the point where the greatest strain will come on certain ships during launching so that provision will be made to rivet up as much of the structure as possible where this will be experienced. This point has also been determined by strain meters in actual launching. From these it was found that the greatest strain occurred on the upper deck when the stern lifted and the amount was accurately measured. Strain gauge measurements have been made on the American steamer *Ancon* during loading and when at sea. These were taken by an extensometer designed by Mr. Howard of the U.S. Bureau of Standards. The highest stress observed at sea was on the bulwark rail where a stress of 5·500 lb. per sq. in. was found. It was also ascertained that rapid changes of temperature caused considerable changes in the stress to which the plates were subjected. Thus a change in temperature of 30 deg. caused a 900 lb. per sq. in. tension strain to be changed to 1,650 lb. compression. The accumulation of a large amount of valuable data is possible from a general adoption of these for determining strains, and this could be of great use to shipbuilders and those responsible for the determination of ships' scantlings.

United States Navy Specification.

According to our contemporary the *American Machinist*, the new specifications of the United States Navy indicate a changed opinion as to the extent to which sulphur is detrimental in steel castings. Former specifications allowed a maximum of 000·05 per cent. sulphur in all carbon castings of the grades known as A, B and C, and 0·04 per cent. in nickel steel castings designated as "special grades." In the new specifications, however, grades A and B are subdivided into two classes, A and D to high carbon and B and E the medium carbon respectively. A and B maintain the old limit of 0·05 per cent. sulphur, and D and E permit castings to go as high as 0·07 per cent. in sulphur. The two sub-classes include castings of less importance than the others. For castings in grade C the limit is changed from 0·05 to 0·07 per cent. in sulphur. The nickel steel or special grade castings now have 0·05 per cent. instead of 0·04 per cent. sulphur as the limit. The requirements for tensile strength are reduced from a minimum of 90,000 lb. per sq. in. in nickel steel to 85,000 lb. The elastic limit stipulation is 45 per cent. of the tensile strength in carbon castings instead of a definite limit in pounds. The elongation requirements have been advanced from 20 to 22 per cent. in the special or nickel steel grade, and the bending bar required is 120 deg. instead of 90 deg. It is anticipated that these changes will exert a very great influence for good on the performance of the respective grades of metals.

Choice of Machinery.

Up till a comparatively short time ago shipowners had little or no choice as to the type of machinery to adopt in new vessels. In ships other than the largest liners triple-expansion engines and Scotch boilers were invariably fitted and good service was undoubtedly obtained from these. Quadruple-expansion engines were frequently adopted in the larger and faster ships, which with Scotch boilers and Howden's forced draught, were then the last word in marine engineering. Further changes have, however, taken place. The adoption of direct-acting turbines in various cross-Channel steamers and fast liners was the first step towards the wider choice now available. Parsons' tooth gearing opened up a wide field for the adoption of high-speed turbines and made possible the economical application of turbines to all types of ships. Other systems of gearing have also been invented, notably the Föttinger hydraulic transformer which may yet have a wide field of application, and the electric drive which is making distinct headway in the United States. For each of these systems a high degree of efficiency is claimed. Parsons' gearing shows a smaller loss in transmission than either of the other systems, but these in turn have advantages which Parsons cannot lay claim to, notably that they dispense with astern turbines. Oil engines of various types are also available, but meantime their application is confined to vessels which trade on routes where oil can be had cheaper than it is possible to obtain there. Reliability and trustworthiness

have yet to be proved for these, for although many oil engines have been very successful others have given considerable trouble. Water-tube boilers have been adopted in several merchant ships, notably in Germany and America, but the British owner still holds to the old and reliable Scotch type. The use of superheaters is also becoming more commonly adopted. There is thus available a considerable variety of types of propelling machinery, and many interesting comparisons will doubtless be forthcoming as the adoption of the more modern methods becomes more general.

INTERNATIONAL MERCANTILE MARINE REORGANISATION.

THE scheme under which it is proposed to reorganise the International Mercantile Marine Company follows very much upon the lines of most schemes of reorganisation emanating from the United States. This means, as in so many other instances with which the British investor in American "combines" is familiar, that there is a re-shuffling of the preferred and common capital by which some of the speculative "watered" stock of the original company is utilised for the purpose of compensating bondholders for a loss of capital. We may recall that when the International Mercantile Marine Company was formed in 1902 it was anticipated in America that it would revolutionise the history of the sea and "prove to the world that America's financial monarchs reign as supreme on water as they do on land." Its formation brought about the financial relationship of the Cunard Steamship Company with the British Government, by which that company pledged itself to remain a purely British undertaking for a period of years. Events have since proved the wisdom of that action.

Whilst the dislocation of Atlantic passenger traffic caused by the war is assigned as the reason for the failure of the International Mercantile Marine to meet its financial obligation at due dates it has long been apparent that some form of capital reorganisation would be necessary before the preferred stockholders could anticipate the regular payment of dividends. Thanks to the profits brought into the general pool by the Oceanic Company, the largest of the subsidiaries owned by the combination, the annual net earnings have been considerably increased during the past 10 years, amounting as they have in recent years to an average of over $8,000,000, in comparison with $4,000,000 in 1903. On the other hand, the amounts written off for depreciation have not kept pace with the developments of the company's fleet, and it has been obvious for some time that the smallness of these allowances would ultimately create serious trouble. On balance, the deficits in revenue since the formation of the company have exceeded in amount the surplus sums carried forward.

The scheme of reorganisation must be regarded as the inevitable outcome of the company's over-capitalised condition since inception rather than an emergency measure to meet the present temporary dislocation of trade. There are comparatively few shareholders on this side, the British companies only being affected by the scheme as far as the American company has an interest in them. It is proposed to organise a new company which will be capitalised so as to permit the scheme of exchange to be carried out, and an amount to be reserved "under suitable restriction" to be used only for increasing the properties of the new company and its subsidiary companies. Holders of 4½ per cent. bonds will be given 50 per cent. of new 5 per cent. convertible bonds and 50 per cent. of new 6 per cent. non-cumulative preferred stock. Holders of the 5 per cent. bonds will be given 50 per cent. of the new 5 per cent. bonds and 20 per cent. of new 6 per cent. non-cumulative preferred stock and 30 per cent. of the new common stock. The preferred stockholders will receive 2½ per cent. in new 5 per cent. convertible bonds and 20 per cent. in new common stock. The common stockholders will receive 2½ per cent. of new 5 per cent. convertible bonds and 5 per cent. of new common stock.

The terms of the reorganisation are by no means generous to the bondholders. A 2½ per cent. assessment on the capital will raise about £500,000, and it is apparently assumed that it will be possible to make fresh issues of stock later as required. There are certain points in the scheme which do not appear quite clear to us. We do not understand for what reason any part, however small, of the new 5 per cent. bonds is being given in part exchange for the preferred and common stock. It is now generally admitted that the company was grossly over-capitalised, and a good deal of the capital stock was water. That stock is now to be exchanged partly for bonds, and although the proportion is very small it is not calculated to encourage bondholders who find their bond security is cut down by one-half.

GEARED TURBINES AND PROPELLER PROBLEMS.

WITH direct-driven turbines a compromise is effected between the most desirable rotary speed of the turbines and propellers to something which is neither the best for the one nor the other. The revolutions of the turbine are too low to ensure the highest economies, whilst those of the propellers are too high for greatest efficiencies. With the adoption of gearing, however, it is possible to have turbines of small dimensions and high revolutions, and screws more suitable for the particular conditions of power and speed which are to be fulfilled. It is not possible, even with gearing, to adopt in all vessels screws of the highest efficiencies, for certain limitations enter into almost every case, bringing about the adoption of screws which experiment has shown to fall short of the best. From the experiments of Froude and Taylor with model propellers it is shown that the highest efficiencies are obtained by screws of about 1·5 pitch ratio and about ·3 disc area ratio. Froude's experiments showed these to have an efficiency of almost 75 per cent., whilst Taylor's indicated a still higher efficiency, viz., 78·5 per cent. Unfortunately these high efficiencies are obtained at low slips where the thrusts given out are small, accordingly were this type employed in the propulsion of ships the screws would require to be of very large diameter and revolve very slowly. Their practical application to ship work is therefore impossible. As an illustration of what is meant consider the following example. If it were desired to adopt the screws of maximum efficiency in a cross-Channel steamer of 23 knots speed developing 12,000 horse-power delivered through two shafts, screws of 18 ft. diam., about 26 ft. pitch, and revolving about 100 revolutions per minute would be required. It is clear that the diameter of these propellers is much greater than could be allowed, as the majority of cross-Channel steamers run at about 12-ft. draught. In that case the limiting diameter would be about 10 ft., allowing for sufficient immersion. For the same conditions of speed and power and allowing for a 10 per cent. wake, the propellers giving the greatest efficiency would be about 11-ft. pitch and the requisite number of revolutions would be about 260 per minute. The experimental efficiency of such propellers would be about 68 per cent. against the 78 per cent. mentioned above as being the highest obtained by any propeller. Were it possible to increase the diameter to 12 ft. the efficiency of the screws would be bettered and the revolutions would fall considerably.

It becomes apparent, therefore, that the introduction of gearing may effect the efficiency of the propellers in certain types of ships only to a slight degree, since the limitations imposed by draught curtail the diameter and keep up the revolutions. Were the *Mauretania* to be fitted with geared turbines, instead of direct-driven propellers of about 16 ft. diameter revolving at 180 revs., she might carry screws of about 21 ft. in diameter revolving at 100 revs. per min. with a 5 per cent. increase in efficiency. It is more than probable that such a diameter would be too great to carry on wing shafts and practical considerations would cause the revolutions

to be decreased only slightly from what they are at present. In high speed craft such as cross-Channel steamers and first-class liners the adoption of gearing will therefore not affect the propeller efficiency greatly, but it must bring about a considerable saving in size and weight of the turbines themselves, and a consequent economy in space, in fuel and in steam. While the effect of geared turbines on propeller efficiency in certain classes of ships is distinctly limited, their adoption in other types makes turbine machinery practicable. This chief field is the slow cargo-carrying merchant ship. In the *Cairnross*, for example, 1,600 s.h.p. was transmitted through mechanical gearing to a single propeller shaft at 63 revs. per minute. In that case, however, the problem was not how the propeller efficiency might be improved by the adoption of geared turbines but how the efficiency of fast running turbine machinery with gearing would compare with ordinary reciprocating machinery. Gearing has been adopted in destroyers also, and in this type with considerable success from the propeller point of view. It has permitted the adoption of twin screws with consequent increase in diameter of propeller and decrease in area ratio. Whilst the adoption of geared turbines does not allow of the adoption of propellers of the highest experimental efficiency it does permit of the adoption of the best screws which are possible under the conditions of draught, speed and power, which are imposed.

MARINE BOILER CORROSION.

IN our last issue we published an article dealing with the subject of corrosion in marine boilers forming an abstract from a paper entitled "Notes on Corrosion," which appeared in the July issue of the "Transactions of the Institute of Marine Engineers." The author, it will be remembered, gave as the main causes of such corrosion four separate and distinct actions, namely, those of sea water, animal and vegetable oil, air and galvanic action. In the previous article we reproduced that portion of the paper which dealt with sea water alone and the means which may be adopted for neutralising its corrosive effects within the boiler, and it is interesting on the present occasion to deal similarly with the other causes named and the methods proposed for neutralising their effects.

The first of these agents are the animal and vegetable oils. These may be conveyed to the feed water after being used in the steam cylinders, the exhaust steam from which carries the oil to the condensers. Such oil, containing as it does fatty acids, will decompose and cause pitting wherever the sludgy deposit can find a resting place in the boiler. The preventive measures suggested for combating this effect are that only the highest grade of hydrocarbon oil should always be used in the steam cylinders, and of this the least possible amount. Also in lubricating piston rods and valve stems the same oil should be used.

The reason for limiting the quantity of such oil to the utmost extent is that the carbon deposited upon the heating surfaces is most harmful, as a thin film of this deposit forms a complete non-conductor, thereby preventing the heat from passing through to the water, and causing the surfaces to burn, blister and crack. The feed water should be purified on its way to the boiler by passing it through an efficient filter, which must be kept clean. A large proportion of oil and impurity may be thereby caught, and the condition of the feed-water improved.

Graphite can be used in place of oil as a cylinder lubricant with equally satisfactory results. In fact, graphite is generally superior to oil, and especially so when the steam pressure is as high as, say, 275 lb., which corresponds to a temperature in the neighbourhood of 400° Fahr. Many steam vessels are running without a particle of internal cylinder lubrication save that brought in by the swabbing of the piston rods with pure hydrocarbon oil.

The next point raised is that of air in the feed water. Air has been a well recognised cause of corrosion for many years, and many instances of rapid corrosion have been proved to have been caused by the feed pumps sucking air from the hot-well, and the feed being delivered at a level considerably below the water line of the boilers.

Small bubbles of air expelled from the water on boiling attach themselves tenaciously to the heating surfaces. The oxygen in the air at once begins war on the iron or steel and forms rust, making a thin crust or excrescence which, when washed away by the circulation or dislodged by expansion and contraction, leaves beneath a small hole or pit. "Pitting" once started, progresses rapidly, as the indentations form ideal resting-places for the bubbles of air, and at the same time present increased surfaces to be attacked.

The means of preventing this action, suggested in the paper from which we quote, is that where possible the hot-well water should be pumped to a filter tank situated 8 to 10 ft. above the feed-pump suction valves. By this means a large amount of air rises and is liberated from the surface of the water, and a head of water at the suction valves of the pump is assured.

In the design of the piping, care should be taken to avoid any spraying of the water discharged by the air pumps, or any possible spraying of the water in the feed system before it is pumped into the boiler. All delivery pipes should therefore be carried well down into the tank so as to be water-sealed. All tanks containing feed-water should be kept closed in order to prevent any avoidable access of air in the water surface, and vapour pipes fitted to allow of any air which frees itself to escape. As a means of freeing air from the feed water, it is desirable to fit a large air escape pipe on the air pump discharge, as very frequently, owing to the action of the air vessel on the air pump, large quantities of air are forced into solution in the feed-water which, to a considerable extent, can be got rid of. Care should be taken to keep the pump glands tight and to efficiently entrap free air in air vessels.

The final point dealt with is that relating to galvanic action. Formerly nearly all corrosion in boilers was attributed to this cause, and zinc slabs were suspended wherever possible within the water space. The position of the zinc relative to that of iron in the scale of electro-positive metals causes it to be attacked instead of the metal of the boiler when galvanic action takes place, but as zinc is only attacked when the boiler water contains salt this is merely another evidence of the presence of sea water, and the fitting of zinc is only an expedient to minimise the action of the objectionable sea water. If the latter is prevented from entering the boiler the zinc will not readily act and there will be little necessity for using it in large quantities, thus reducing a very expensive item in the working of marine boilers. To afford efficient protection, however, there should be metallic contact between the zinc and iron. Its suspension in drums, and at points within the boiler near the entrance of the feed, is recommended as of positive benefit, and, indeed, as long as zinc slabs continue to disintegrate and oxidise in a boiler, they are active in lessening corrosion. Testing the boiler water at frequent and regular intervals for chlorine contents is of the greatest importance.

PUBLICATIONS RECEIVED.

[*A short notice of any publication does not necessarily preclude the subsequent appearance of a longer review.*]

The Journal of the Institute of Metals. No. I. Vol. XIII. Edited by G. Shaw Scott, M.Sc., Secretary of the Institute. 1915. London: The Institute of Metals, Caxton House, Westminster, S.W. $8\frac{1}{2}$ in. × $5\frac{3}{4}$ in. × $1\frac{1}{4}$ in. pp. 462. Cloth boards. Price 21s. net.

At a period like the present, when the country is absorbed in the manufacture of shells, it is timely that there should appear a new volume of the "Journal of the Institute of Metals" containing matter that cannot fail to be of interest and value to all engaged in the working of copper, brass, bronze, aluminium, nickel and other of the non-ferrous metals and alloys that are so largely used in the manufacture of shell and other munitions of war. Though published in the midst of the world's greatest war the present

Journal, the 13th of a half-yearly series, is one of the largest and most important that has ever been issued by the Institute of Metals. It contains 471 pages, as well as 10 full-page plates and numerous illustrations in the text. For the most part the volume is a record of the papers read at the recent London meeting of the Institute, and of the discussion that took place then, and subsequently by correspondence on these papers. In addition, there is an important communication on "Bronzing Processes Suitable for Brass and Copper" which was read before the Birmingham section of the Institute. The section of the book containing international abstracts of scientific and practical papers dealing with copper, brass and other non-ferrous metals is remarkably complete, bearing in mind the difficulty of obtaining access to Continental technical and scientific papers. Nevertheless, the editor appears to have been able to secure a good collection of abstracts from German technical papers published during the war, and this information cannot fail to be of considerable value to British manufacturers. The membership list, which includes 636 names, is noteworthy, in that it contains no names of German or Austro-Hungarian members, who in the past were strong supporters—for, possibly, not disinterested reasons—of the Institute of Metals. Besides losing these members the Institute is also affected temporarily by the patriotism of 12 per cent. of its members, whose names are appropriately included in a Roll of Honour which is printed in the Journal.

LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by Correspondents.]

DEADWEIGHT DISPLACEMENT RATIO.

The William Froude National Tank,
Teddington.

To the Editor of Shipbuilding and Shipping Record.

The following notes have some bearing on the subject discussed in Mr. Simpson's letter in your issue of August 5, and may interest some of your readers.

Increased deadweight in a design may be attained by cutting down the weight of equipment, machinery or coal. Very little can be done with the former, and reduction in this direction would generally mean inefficiency in the working of the ship. Much has been done with the weight of hull, reduction being obtained mainly by the proper distribution of material to meet the various stresses brought upon the ship. Machinery has also been greatly improved, although the effect of this upon the cargo capacity and deadweight is seldom noted. But apart from good "girder" and machinery design, the possible ratio of deadweight to displacement depends upon two things which are not often considered, viz., the ratio of the speed of the vessel to its length, and the shape of the immersed part of the hull.

It is a curious fact that for the last 50 years "tramps" in general have worked at a speed of 8 to 10 knots, irrespective of their length. The shorter vessels, therefore, are working at relatively high speeds, and will have a higher value of $\frac{\text{I.H.P.}}{\Delta^{\frac{2}{3}} V^3}$, and will require relatively heavier machinery and larger coal bunkers. The large vessel will always gain in deadweight ratio in this respect, as long as it works at the same speed as the smaller one. But—and this is an important point—the attainment of high deadweight in a large vessel by the use of a low speed is *not* always good for profit earning. A low speed means greater time on a voyage, *i.e.*, fewer voyages with approximately the same establishment charges, &c., and there is always a speed for any conditions and length of voyage which gives better results (financially) than other speeds.

Lastly, shape of hull affects the power required for propulsion and the capacity of the holds at the ends. The possible loss of deadweight owing to bad shape of hull is of increasing importance the smaller the vessel, and there is little doubt that the deadweight ratio of "tramps," particularly those of moderate speed-length ratio, could be increased by that same scientific care in the design of the immersed form as is now given to the design of the hull. This has been more fully recognised in Germany and America than in England, and in those countries tank-testing of these vessels is not nearly so uncommon as it is in England.

G. S. BAKER.

"Westholm,"
Stocksfield-on-Tyne,
Northumberland.

To the Editor of Shipbuilding and Shipping Record.

The ratio of deadweight to displacement in cargo tramp steamers, or what has been aptly termed load efficiency, has produced some interesting letters from your correspondents, and has undoubtedly exercised the ingenuity of naval architects and shipbuilders and been the cause of more changes in ship construction than any other factor, and is a subject which should have considerable interest to shipowners and superintendents. The following stages in the increase of this ratio are worth recording:—

1. The adoption of mild steel in place of wrought iron.
2. Larger size of plates, longer lengths of sectional material, together with more efficient forms or sections, such as channels.
3. Improvements in shipyard machinery, whereby we dispense with packing and liners.
4. Improvements in the design of the structure of a ship, such as the adoption of web framing and deep framing in lieu of lower decks and hold beams, also better distribution of material.
5. Fuller midship section and greater block coefficients.
6. Improvements in the design of propelling machinery in its various stages, *i.e.*, compound to triple expansion, greater boiler pressures, forced draught, and geared turbines.

We are now waiting for our experts in metallurgy to produce cheaply a metal or alloy of metals equal in strength to mild steel, but with a lower specific gravity. Until then I venture to say we have reached the maximum load efficiency of the cargo tramp steamer.

On looking at the figures or ratios of deadweight to displacement quoted in the letters of your correspondents, one feels tempted, like the little schoolboy, to go one further. The case which I am going to mention is one which none of your correspondents seem to have put forward so far, and that is a vessel of the single deck with shelter deck built on the Isherwood system of framing, in which the shelter 'tween deck is *not* exempted from the tonnage measurement, commonly called an awning-deck vessel with freeboard. The vessel is 390 ft. in length between perpendiculars, 52 ft. breadth moulded, and 27 ft. 6 in. draught (mean), with a freeboard assigned according to the Board of Trade rules, so that the stress per square inch upon the material of the hull amidships shall not exceed that of a standard vessel of the same dimensions and form and having scantlings equal to the requirements for awning-decked vessels provided by Lloyd's rules (year 1885) for 100A awning-deck class.

This vessel carries a deadweight of 9,712 tons on a displacement of 12,400 tons, which gives a ratio of deadweight to displacement or load efficiency of ·783. The vessel has a good plain specification, and the propelling machinery is the ordinary triple-expansion with Scotch boilers and Howden's forced draught, with speed of about $10\frac{3}{4}$ knots on trial, or an average speed of 10 knots per hour on service. This load efficiency is 2·8 per cent. greater than the best quoted by your correspondents and 6 per cent. greater than the efficiency given by Mr. Simpson. It would be interesting to know of any cargo tramp vessel in which this efficiency has been exceeded.

As pointed out by Mr. Herbert Rowell, there are other factors besides those quoted which affect the load efficiency considerably, such as ratio of length to beam, length to depth, and beam to depth, speed of vessel, size of vessel, number of decks, length of erections, and classification society by whom the vessel is surveyed during construction.

The next best vessels in point of load efficiency are undoubtedly the single decker, with poop bridge and forecastle or shelter deck

(exempt from tonnage measurement) built on the Isherwood system of framing, and the vessel built on the "Arch" principle of construction, both of which attain values as high as ·757 in vessels of ·78 block coefficient to ·764 in vessels of ·82 block coefficient.

N. H. BURGESS.

To the Editor of Shipbuilding and Shipping Record.

I have read the correspondence referring to the ratio of deadweight to displacement with interest, as this has naturally been a matter of first importance in connection with the design and construction of "Arch" ships. I am sorry that, owing to being in the Army at present, I am unable to deal with the subject in an extensive manner, as I should otherwise have done, but as a matter of interest I send a diagram compiled from figures I have with me showing the increased ratio of deadweight/displacement which "Arch" vessels have gained over three-island ordinary vessels, in reply to Mr. Simpson's request.

It should be strongly pointed out when discussing the carrying efficiency of vessels that comparisons of the different ratios are

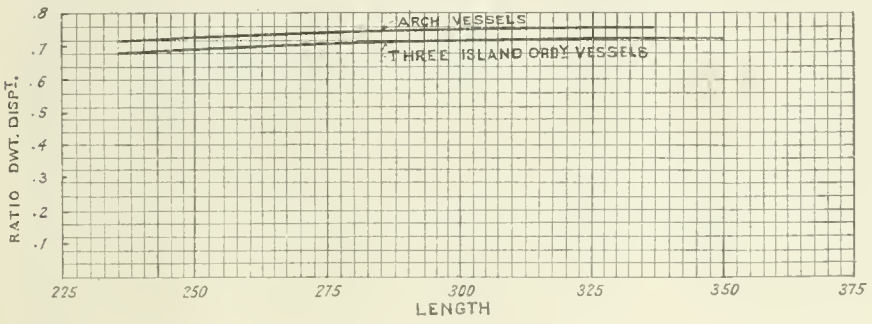


Diagram Showing Increased Deadweight Displacement Ratio of "Arch" Vessels.

probably futile to other than the shipbuilder himself, and only of value in his case after careful investigation. It is misleading to an owner and can readily lead to conclusions the reverse of actual facts. The reason for this lies in the different specification and power of the vessels compared, for rarely are vessels' similarity sufficient to permit of the variations being neglected. This applies generally to all forms of ship comparisons, and too great caution cannot be exercised.

The curves given, however, may be relied upon, as the comparisons have been gone into as closely as can possibly be done, and they illustrate the advance made in the direction of carrying efficiency of "Arch" ships.

The ratio, of course, varies with dimensions as well as draft and other factors. Mr. Simpson asks for the highest ratio, but in view of the preceding remarks, it is not much use giving examples for comparison. I think, however, it may be of interest to state that in one "Arch" vessel now trading of 240 ft. length only and ·790 block coefficient, a deadweight displacement ratio of ·723 has been achieved on Lloyd's class and a moderately plain specification. For these dimensions this is the highest ratio I have yet heard of.

I do not agree with Mr. Liddell's remarks. Experience has shown that the calculation of stresses is sufficiently understood and utilised, so that scantlings are now probably at their limit of reduction for practical reasons, and to improve the deadweight/displacement ratio is therefore a matter for the development of design, which Mr. Liddell regards as intangible, but which the accompanying curves, I think, afford ample justification. I do not further agree that the normal conditions should be assumed; the preceding factors are of infinitely more importance.

In passing, Mr. Liddell states that to alter the design of the three-island type, &c., would be to take unwarrantable liberties with the laws of nature, and that the various factors of the design have resulted from selection and have good reasons for existence. I differ considerably in views on this respect. There are so many elements of design and proportions which are, as every builder and owner knows, solely the result of evasion of either Board of Trade regulations and other rules as to exercise the predominant control in the design of all ordinary types of cargo vessel. An instance of the reverse of Mr. Liddell's law of nature which he cites is sheer. In itself sheer in the modern cargo steamer is a means of obtaining draft at the expense of scantlings. It is unscientific and increases bending moments, and while a moderate amount may be desirable in ordinary types of vessel, "Arch" vessels, which have a reverse sheer, have proved themselves to be as dry as any ordinary vessels.

I quite disagree with the closing remarks of his letter. It is true that design cannot vary by a large figure the ratio in question, but speaking with knowledge of the difficulties of effecting savings nowadays, I consider those made by the "Arch" design are really substantial. His suggestion, however, to tackle the longitudinal bending moments, has, however, already been done in the "Arch" type, with the given results. How Mr. Liddell would suggest such other than by a new design I do not understand, and certainly, in my opinion, it can only be by new designs utilising scientific principles in a practical fashion, as I think examination of the "Arch" type will show has been done, that savings and reductions in weight, and consequent increased carrying power per displacement ton can now be achieved.

MAXWELL BALLARD, A.M.I.N.A.

ADMIRALTY BAN ON NAVAL BOOKS.

The current issue of the *Publishers' Circular* contains a notice "for the information of booksellers and others" in the following terms:—

"The Admiralty find it necessary to issue a warning that books containing profile outlines, drawings, photographs, or silhouettes of His Majesty's ships, as, for instance, Jane's 'Fighting Ships,' Jane's 'British Naval Recognition Book,' Jane's 'The World's Warships,' Jane's 'Warships at a Glance' (all pubished by Sampson Low, Marston & Co.), 'The Fleets of the World' (Eveleigh Nash), 'The Naval Pocket Book' (Thacker & Co.), Brassey's 'Naval Annual' (Wm. Clowes & Sons), &c., must in future be regarded as coming under Regulation 18 of the Defence of the Realm Regulations.

"This regulation forbids the collecting, recording, publishing, or communicating of any information with respect to the description or condition of any of His Majesty's ships of such a nature as is calculated to be or might be directly or indirectly useful to the enemy, and likewise forbids any person to have in his possession without lawful authority or excuse any document containing any such information.

"It is important, therefore, that all persons having copies of such books in their possession for purposes of sale should withhold them from sale, and that no dealings in copies of such books, whether by way of sale or otherwise, should take place during the continuance of the war.

"New editions of such books should omit all drawings, &c., respecting His Majesty's ships, and, subject to this condition, may be sold as usual."

Boston-Charlottetown Services Resumed. — The service between Boston, Hawkesbury and Charlottetown, which was recently abandoned by the Plant Line because of dull business, is to be resumed. The schedule will be the same as before it was dropped a few weeks ago. It was announced by the steamship officials, however, that owing to the slack business, the new steamer *Evangeline* will be withdrawn and the steamer *Halifax*, which has recently been out of commission at Halifax, will maintain the service. The steamer will make one trip each week. The *Evangeline* has been making two trips weekly between Halifax and Boston since the service to the other ports was discontinued.

THE CARRIAGE OF FERRO-SILICON ON SHIPS.

The Board of Trade, in a notice recently issued, state that, after prolonged inquiry, no facts have been ascertained indicating that low grade ferro-silicon made in a blast furnace is dangerous, and they are not aware of any reason why it may not be safely carried on board ship as ordinary cargo without any special precautions, excepting that a certificate be produced with each shipment stating that the ferro-silicon does not contain more than 15 per cent. of silicon, and has been made in a blast furnace.

The Board are also advised that ferro-silicon produced in the electric furnace and containing not more than 30 per cent. of silicon and the grade produced by the same method containing not less than 70 per cent. of silicon may be shipped under deck either in foreign-going cargo vessels or passenger vessels other than emigrant ships, but subject to the following conditions:—

1. Each consignment must be accompanied by a certificate from the maker or shipper stating the percentage of silicon it contains, and that, after manufacture, it was broken into pieces of a size in which it is usually sold (about 2 to 3 in. square), and so stored under cover, but exposed to the air for not less than 10 days before being dispatched from the works.

2. It must be packed in strong wooden cases or barrels and not in iron or steel drums.

3. The packages must be clearly marked with painted or branded letters with the word "Ferro-Silicon," the percentage of silicon, the words "To be stowed in a dry, well ventilated space," and the name of works and name and address of agent in the United Kingdom.

4. Ferro-silicon must not be stowed under deck immediately beneath a living space, or in any compartment which is not separated by a watertight bulkhead from parts of the vessel occupied by passengers or crew, or containing explosives, or foodstuff or other cargo liable to damage by poisonous gases.

In wooden vessels and small home trade vessels where the conditions of Clause 4 cannot be carried out, the packages containing ferro-silicon must be carried on deck.

Shipowners are warned that the carriage of ferro-silicon with a percentage of more than 30 and less than 70 per cent. (*i.e.*, of grades between 30 per cent. and 70 per cent.) of silicon is dangerous, and they should take steps to ensure the accurate marking and description of the ferro-silicon sent for shipment.

The notices issued by the Board of Trade with regard to ferro-silicon in September, 1907; March, 1909; February, 1910; and July, 1912, are hereby cancelled.

DECK CARGOES OF DRUMS OF OIL, FAT, &c.

At an official inquiry held into the foundering of a vessel in heavy weather in the Bay of Biscay, it appeared that the vessel carried a deck cargo of drums of oil, and casks of tallow and other fats of the total weight of 55 tons, and that, before the vessel foundered, this cargo broke adrift, the oils and tallow rendering the decks slippery and dangerous to work on, and eventually choking the pumps.

The following are extracts from the report of the Court with regard to the deck cargo:—

"The barrels on deck were stowed on their heads. The Court is satisfied that the ship was supplied with the necessary wires, screws, and ropes for lashing the deck cargo, and the evidence is to the effect that they were used. But the Court is of opinion that it is impossible effectually to secure deck cargo of such a nature from shifting, for when heavy seas break on board the barrels and casks will lift under their lashings, and, by continually working, will eventually break adrift.

"The deck load was not excessive in the sense that it impaired the stability of the ship, but the Court cannot but condemn the lack of wisdom which leads those concerned to run the risks of carrying such cargoes in the winter, when fully laden, and severe weather may be expected. In these matters owners might well enlarge the margin of safety upon which the law insists. The Merchant Shipping Acts lay down certain *minimum* requirements, but it is not to be supposed that a bare compliance with them relieves those responsible from their duty of seeing that everything possible is done to secure the safety of the lives and goods entrusted to them.

"The Court desires to indicate its disapproval of a system which, while employing a number of officials in a supervising capacity, apparently makes no one of them responsible for seeing that the company's ships go out in a seaworthy condition as regards such matters as deck cargo. It would be more satisfactory if deck cargoes were secured before the vessel sails, to the satisfaction of some responsible person."

An official inquiry has also been held recently into the foundering of a vessel off Rathlin Island, and it appeared from the evidence that the vessel was laden with a general cargo including a deck load of barrels and drums of oil, extracts and syrup, and that the foundering was due to water getting into the hold as shown in the following extracts from the report of the Court:—

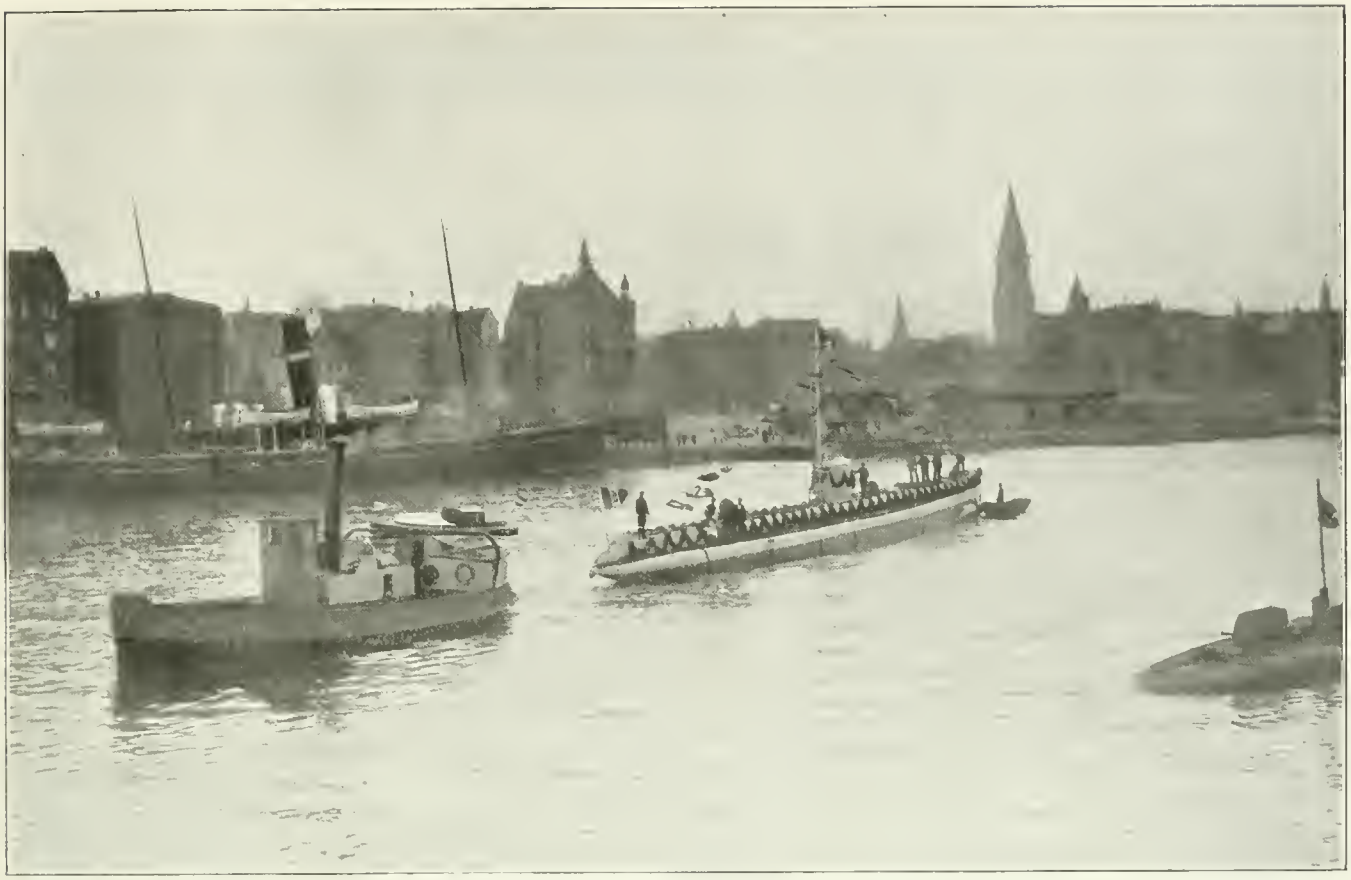
"The immediate cause of her foundering was the fact that the seas poured into the hold through the hatchway in the after well deck, which had become broken through the deck cargo carried there getting adrift and tearing off the covering tarpaulins. This state of affairs was due to the fact that a cargo of casks and drums of oil was carried in the after well, notwithstanding the fact that the vessel was loaded to within 4¼ in. of her winter draught and was 4 ft. by the stern on leaving Liverpool.

"The Court desires to say that this is, in its opinion, a striking illustration of the danger of fully laden vessels, in winter time, carrying deck cargo (especially barrels and drums of oil which it is almost impossible to effectually secure) in spaces from which, in the event of it breaking adrift in bad weather, it cannot be jettisoned, or where it is impossible to get at it to secure it, without endangering life and limb."

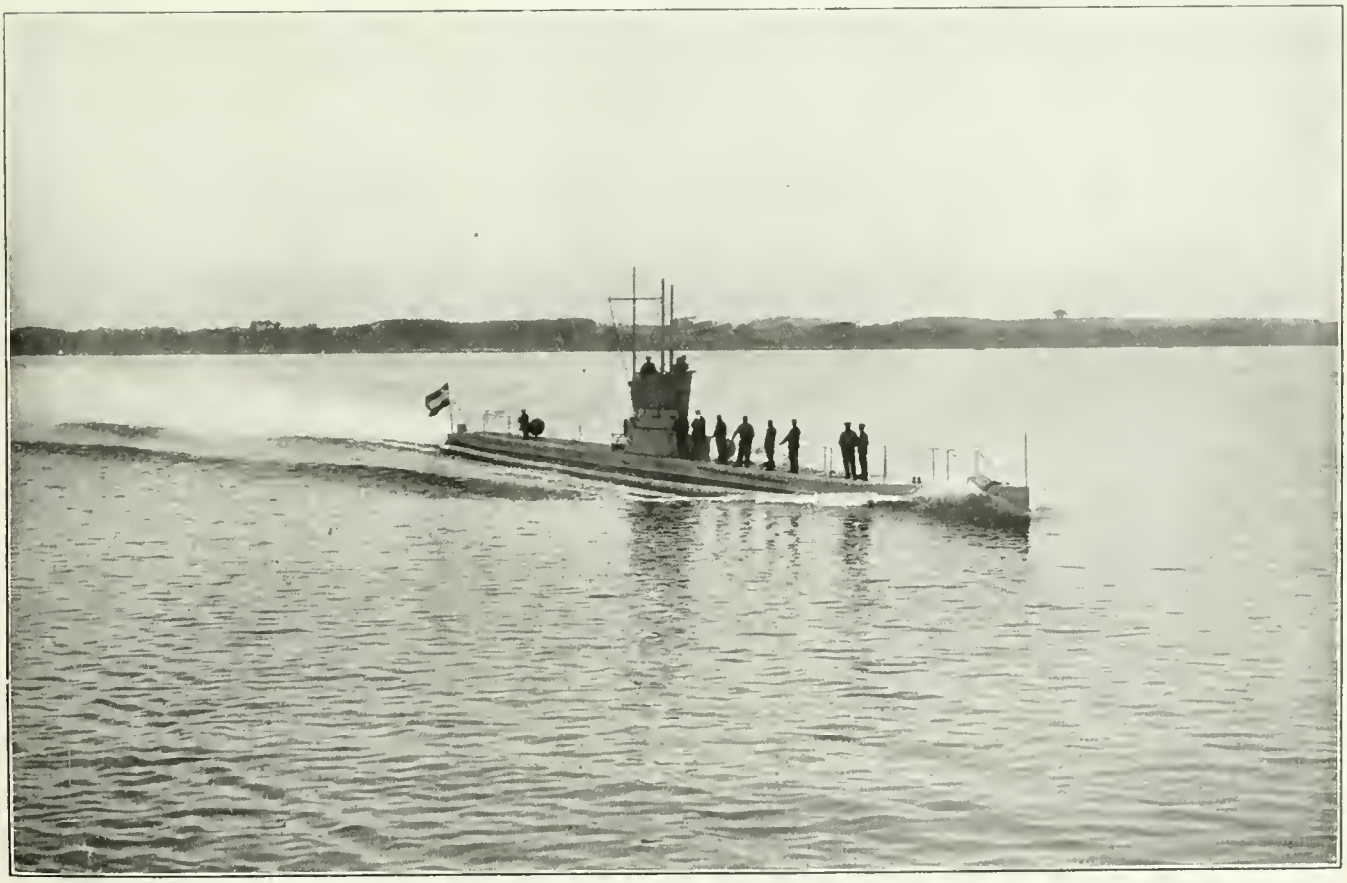
The Board of Trade, in a notice containing the above particulars, call the special attention of owners and masters of vessels to the danger of carrying deck cargoes insufficiently secured, and to urge on them the necessity of seeing that the utmost care is taken in the stowage of such cargoes.

A GERMAN-BUILT SUBMARINE FOR THE ITALIAN NAVY.

The Krupp-Germania yard at Kiel is—or was before the war—the only private shipbuilding establishment in Germany devoted to the construction of submarines and the accompanying photographs illustrate the submersible boat *Atropo*, built at Kiel for the Italian Navy. The *Atropo* has a length of 146 ft., a beam of 14 ft. 5 in., and a submerged displacement of 320 tons. The *Atropo* is of interest by reason of being the first Diesel-engined submersible built in Germany. When the vessel is run on the surface, her two propellers are driven by two-cycle oil engines of Messrs. Krupps' own type and aggregating 600 h.p. When navigating in submerged condition she is driven by two electric motors, as is the case with all submarine boats. The torpedo armament consists of two tubes and four torpedoes. Her radius of action on the surface is 1,300 miles and under water 40 miles. The designed speeds were 12·5 and 8 knots respectively but in the course of official trials off Eckenfoerde, near Kiel, the *Atropo* is reported to have twice covered the measured mile at a speed of 14·7 knots. The first photograph shows the vessel being towed back to the yard after having been launched, and the second is an illustration of the vessel running trials on the surface.



Italian Submarine "Atropo" going on Trials at Kiel.



Surface Trials of the Italian Submarine "Atropo." (*See page* 148.)

SOUTH AFRICAN HARBOUR DEVELOPMENTS.

The shipping interests in South Africa have for some time occupied themselves with rendering their ports and docks more up to date and ready to cope with the increased size of modern steamers. At Cape Town the harbour and wharfage accommodation is greatly improved. The same applies to Port Elizabeth, whilst at East London the harbour is being enlarged, longer breakwaters are being built, and the quays are being equipped with more up-to-date appliances to facilitate loading and discharging.

The inner harbour at Table Bay comprises two basins, 64 acres and 8½ acres respectively, with 2½ miles of quayage, the greater portion of which is situated to accommodate vessels drawing up to 27 ft. of water, while at some berths there are over 30 ft. of water at low water ordinary spring tides. The South Pier, 1,666 ft. to the south of the breakwater, extends 2,060 ft. in an easterly direction.

Thirty-two electric cranes, varying from 3 to 7 tons capacity, are installed on the quays, with sufficient rake to plumb the hatches of the largest vessels afloat. There are also three Temperley transporters.

The docks are provided with commodious warehouses replete with every convenience facilitating the quick and safe handling of cargo; and they are lit throughout with electric light.

The port possesses a graving dock with the following dimensions:

Length on keel blocks	500 ft.
Width at coping	90 ft.
Width at entrance top	68 ft.
Depth of water on sill, high water ordinary spring tides	25 ft.

The charges for the use of the graving dock, are:—

Docking and undocking, vessels of 500 tons and upwards, for repairs	1s. per ton gross.
500 tons and upwards for cleaning and painting	9d. per ton.
Rent charge per diem	3d. per ton gross.
Minimum charge	One day's rent.

A patent slip is also available for the repairing, cleaning or painting of smaller craft up to 400 tons, the tariff for which is the same as that shown below for graving docks, with the exception, however, that the minimum charge is £2.

An abundant supply of excellent fresh water is always available, the charge for which is 7s. 6d. per 1,000 gallons delivered on board vessels in docks.

The rate of bunkering at Cape Town averages from 100 to 200 tons per hour, according to facilities on board the steamer and the rate of trimming in bunkers.

The entrance to Buffalo harbour, East London, is protected by a solid breakwater and training walls affording protection to vessels in the river, and enabling vessels drawing up to 24 ft. of water and of over 8,000 tons gross register to enter the river and discharge cargo alongside wharves. The channel is being deepened and the entrance enlarged. The port equipment has been specially designed to expedite the handling of all classes of cargo goods being handled between ship and railway truck direct. There are 5,523 ft. of wharves equipped with 13 electric cranes of from 3 to 20-ton capacity. Other lifting appliances include a steam crane of 50 tons capacity, 30-ton electric gantry, and several steam fixed and travelling cranes. A patent slip is available for accommodating vessels up to 1,000 tons deadweight.

Buffalo River and Harbour, East London.

The works in progress at this port include the extension of the south breakwater for a length of 500 ft. An extension of 100 ft. was commenced on the west quay wall some time ago. The quay is equipped with eight 3-ton and one 20-ton electric cranes, and has a shed 600 ft. by 100 ft. giving ample accommodation for large cargoes.

The additions to the east bank equipment consist of two 5-ton and two 3-ton electric cranes erected on the Hely Hitchinson quay in the place of hydraulic appliances.

In order to provide suitable accommodation for the shipping industry, it has been found necessary to provide a wharf equipped with a hood to permit of the handling of fish being done under shelter. This gives an additional wharfage of 225 ft.

OCEAN-GOING LAKE STEAMERS.

The Lake-built steamer *Matoa*, which is one of those which have been sold for ocean-going purposes, was purchased by the George Warren Transportation Company, Boston, Mass., for the coastal coal trade. The vessel was too long to pass the Canadian canal locks and she was cut in two, the two parts being towed from Port Huron through the Welland Canal. This work was executed by the Reid Wrecking Company, Port Huron. The *Matoa* is 321 ft. long and the locks are 248 ft.

Within the past four years, a number of vessels have been built on the Great Lakes for coastwise and ocean service. This new element of competition has proved a boon to shipowners, inasmuch as the more simplified construction methods that prevail at Lake yards, as compared with those on the Atlantic coast doing naval work, have enabled the former to turn out cheaper vessels than the coast builders. The chief handicap under which Great Lakes shipbuilders are working, when competing for the construction of sea-going boats, is the natural restriction imposed by arduous weather conditions making it impossible for vessels to leave the Lakes during the winter months. Therefore, Great Lakes builders when bidding for orders on the coast are handicapped to the extent of having to provide against the contingency of a vessel being delayed for months beyond the time set for delivery, should anything happen to detain the vessel at the time of the closing of navigation. Furthermore, the length of the locks through which vessels must pass in order to reach the coast limits the dimensions of ships for coast service, the construction of which is possible on the Great Lakes. As in the case just cited, there have been instances in which vessels exceeding the dimensions of the locks were transferred to the coast, and it was necessary to cut the vessels into sections before passing the locks and putting them together again on this side of the locks. This operation has not been attempted with new vessels and has been resorted to only when second-hand boats were purchased on the Lakes for conversion into deep-sea traders. The vessels now in operation on this coast which were specially built on the Great Lakes for ocean service have been turned out within recent years by the Great Lakes Engineering Works, operating plants at Detroit, Ecorse, Mich., and Ashtabula, O. The first steamers built by that concern for coast service were single-deckers with machinery aft, specially designed for the coal trade between Virginia or Baltimore and New England ports. Some of them have been despatched across the Atlantic with cargo to ports at which the American flag had not been seen since the days of wooden sailing ships. It is reported that when some of the Lake-built boats arrived at Portuguese and Spanish ports, the natives were very much astonished to learn that vessels which had come from overseas had originally been built so far inland by men, many of whom have never seen salt water. It is also of interest to note that the Great Lakes Engineering Works are now building at Ashtabula a collier of about the same dimensions as those built by them four years ago, which is also intended for the Atlantic coast coal trade and is expected to be ready by November 1 next, in order to leave the Lakes before the close of navigation. Three small steamers for general freight service are also building at the Ecorse plant of the same builders for the Clyde Line.

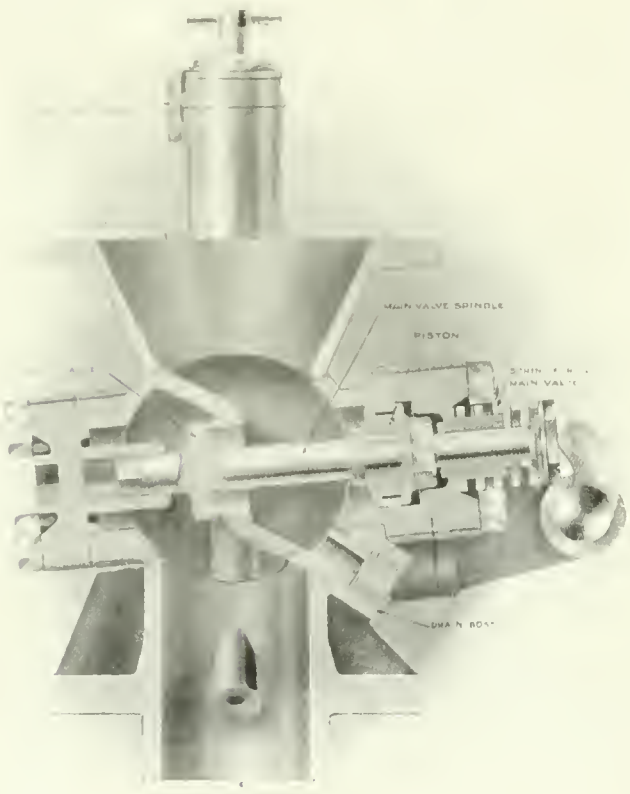
Transporters for Coaling at Cape Town Docks.

STEAMSHIP APPLIANCES.

FULL BORE SAFETY VALVE.

In a paper read before a meeting of the Institution of Engineers and Shipbuilders, in Scotland, some time ago, the author, Mr. MacNicoll, referred to a patent full bore safety valve, the construction of which incorporates some interesting and special features. We are enabled by the courtesy of Messrs. Cockburns, Ltd., of Clydesdale Engineering Works, Cardonald, near Glasgow, the sole manufacturers of the appliance, to illustrate and describe it herewith. The valve has been designed on the following lines:—(1) To reduce weight; (2) economy of space; and (3) the reduction of leakage from distortion, &c., to a minimum.

In connection with the reduction in weight and space effected by this safety valve, it may be stated that in a 24,000 s.h.p. destroyer



Full Sectional View of Cockburn's Full Bore Safety Valve.

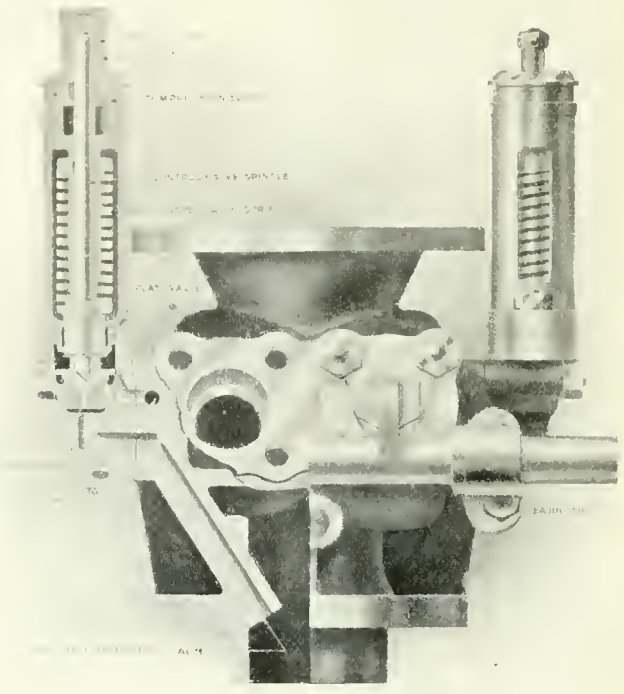
with four boilers there is a total saving in weight of 2 tons on the top of the boilers, and also the space taken up is less than one-fourth of that occupied by the old type of valve. Approximately, the size of valve is 3-in. double full bore against $3\frac{3}{4}$-in. sextuple ordinary type. This, of course, has led to the adoption of the valve for every type of war vessel.

With the advent of oil fuel it was found that, owing to the higher calorific value of this fuel, the size of the old type of safety valve, based on a formula only taking coal into consideration, was far too small. The increased proportions were making a valve of this type altogether too cumbersome. At the same time the valve only lifted approximately one twenty-fourth of its diameter, consequently only giving an edge area of one-sixth of the disc area of the valve. Here, it was seen at once that if a valve could be got to lift to an amount to give an edge area equal to its disc area, the disc area could be reduced to one-sixth of what it previously had been. As the lift of one twenty-fourth of the diameter of the ordinary safety valve is due to the building up of resistance in the spring, it was thought advisable in designing a new type of valve, to make two distinct valves, one more or less an ordinary type of safety valve, with its small lift, but which merely controlled a second or main valve which would lift the full amount. After considerable experimenting the valve illustrated was found to give the most satisfactory results.

With the full bore safety valve, the main valve is loaded by the steam pressure, the higher the pressure, the greater the pressure of contact.

The control valve is of small diameter and is in a separate chest, so that in the first instance any little distortion in the main valve is overcome by the steam pressure loading this valve, and in the second case the control valve is of a diameter which reduces leakage to a very small quantity, if any.

The action of the valve is as follows:—Referring to the illustrations, steam from the boiler exerts a pressure on the underside of the control valve; when a predetermined pressure is reached, this valve lifts and steam passes into the chamber directly above. The flow of steam past the enlarged part of the spindle through small holes to the atmosphere carries the plate valve against its seating



Part Sectional View of the Valve.

on the underside of the casing; steam then passes to the piston on the main valve and opens up same. On pressure dropping, the control valve shuts down and in doing so, the enlarged part of the spindle carries the plate valve from its seating, when steam escapes to the atmosphere as described, which causes the boiler pressure on the back of the main valve to shut same, the main valve closing, the spring assisting in this action.

Payment of Panama Tolls.—Hitherto it has been the practice of owners, agents and brokers to make deposits to cover tolls and other expenses at the Panama Canal for individual ships, and upon the transit of the ship through the Canal the unexpended balance is automatically remitted to the depositor. In general, this custom will still be followed, unless such depositors request that the unexpended balance be retained and applied to cover tolls on other vessels specified by name. If they so desire, steamship lines and firms, which send their vessels at frequent intervals through the Canal, may make a lump sum deposit, specifying by name the vessels to which such deposit is to apply, and keep an open account with the Panama Canal.

GENERAL NEWS SECTION.

PERSONAL.

Mr. John Hay Clark, shipmaster, of 271, Great Western Road, Aberdeen, who died on June 15 last, left £7,318 gross.

Mr. James Percy, of Hotspur Lodge, Ealing Common, W., steamship owner, who died on May 17 last, left estate valued at £52,813 gross, with net personalty £44,070.

Lieutenant Harold Gordon Allen, 16th Waikato Regiment, son of Mr. George Allen, who for many years was on the engineering staff of the White Star Line, has been killed in action at the Dardanelles.

The death is announced in Newcastle-on-Tyne of Mr. Thos. Harrold, Consulting Engineer, and for many years associated with the late Mr. Alex. Taylor and with Messrs. Fisher, Renwick & Co., the building of whose steamers he usually superintended.

The Committee of Lloyd's have elected, as underwriting member, Lieutenant Cecil Rowe English, of the 10th Battalion King's Royal Rifles. Lieutenant English is a brother of the late Captain R. E. English, who was killed in action near Ypres in May last, and who was a member of Lloyd's.

Lieutenant William Black Noble, 6th Northumberland Fusiliers (T.F.), of West Denton Hall, Northumberland, and Akenside House, Quayside, Newcastle-upon-Tyne, a partner in the firm of Messrs. Cairns, Noble & Co., and a director of the Cairn Line of Steamships, Ltd., who was killed in action at St. Julien on April 26 last, left unsettled property, £11,000.

Mr. Wm. Rea, for 14 years one of the leading trade union officials in Belfast shipbuilding circles, enlisted last week in the Army Service Corps of the Ulster Division. He was secretary of the Amalgamated Society of Carpenters and Joiners, a number of the men of which have also recently enlisted owing to scarcity of their classes of work at the shipyards.

M. L. Didier, the London Agent of the Suez Canal Company, has been killed in France. M. Didier left London on the outbreak of war. He had received the Croix de Guerre and the Medaille Militaire, and had been twice mentioned in despatches. He entered the service of the Suez Canal Company in 1909 and succeeded M. Henri Chevassus on his retirement as manager for the London inquiry office on January 1 of last year.

His Majesty the King has been pleased, on the recommendation of the President of the Board of Trade, to award the silver medal for gallantry in saving life at sea to Arsène Eugène Blonde, skipper of the Belgian steam trawler *Jacqueline*, of Ostend, in recognition of his services in rescuing the crew of the steamship *Morwenna*, of Montreal, which sank in the North Atlantic Ocean, while on a voyage from Cardiff to Sydney, Cape Breton, on May 26, 1915. The Board of Trade have awarded a piece of plate to the skipper of the *Jacqueline* and the sum of £2 to each member of her crew in recognition of their services on the occasion.

Lieutenant T. W. Moore, R.N.R., Secretary of the Imperial Merchant Service Guild, has received a message from Captain Allen, of the Ellerman liner *Assiout* which was seized by the Turks. Captain Allen, in referring to the interned British merchant seafarers in Turkey, states as follows:—"I am very pleased to say we are all well and in the best of spirits with the exception of Alexander Hutton, second cook of the *Assiout*, whose mind has become affected. He is being taken to a hospital in Smyrna for treatment and we hope he will get better." Out of their War Fund the Guild have arranged to send out to Turkey a further sum of £30 for the benefit of these prisoners.

Lord Pontypridd on Friday laid the foundation stone of the Welsh National School of Medicine at Cardiff, an institution made possible by the generosity of Sir William James Thomas, the Welsh colliery owner, who contributed £90,000 to the fund.

Supplementing a large number of members of the Imperial Merchant Service Guild, upon whom honours have already been conferred in recognition of distinguished war service, the following members' names figure in the list of honours now announced in connection with the Patrol Service:—Commander E. Outram, R.N.R., Lieut.-Commander H. P. Basden Smith, R.D., R.N.R., and Lieut.-Commander F. M. Main, R.D., R.N.R., have been made Companions of the Distinguished Service Order, and Lieutenants S. Bolton, R.N.R., B. H. Symms, R.N.R., Herbert Spencer, R.N.R., C. W. Cartwright, R.N.R., E. A. Stuart, R.N.R., Robert Hobson, R.N.R., and C. T. Nettleingham, R.N.R., upon each of whom has been conferred the Distinguished Service Cross.

Midshipman Geo. L. Drewry, R.N.R., is the second member of the Imperial Merchant Service Guild to receive the Victoria Cross, the first being the late Flight Sub-Lieut. Reginald A. J. Warneford, R.N., V.C., who was an officer in the merchant service prior to the outbreak of the war. Midshipman Drewry, V.C., was formerly in the P. & O., and resides at Forest Gate, London. Other members of the Guild whose names figure in the latest honours list are Lieut. B. T. Cox, R.N.R., of North Kilworth, Rugby, on whom has been conferred the Distinguished Service Order; Lieut. S. A. Bayford, R.N.R., Portswood, Southampton; and Lieut. Arthur C. Brooke Webb, R.N.R., Sevenoaks, Kent, have been awarded the Distinguished Service Cross; and Lieuts. J. H. Pitts, R.N.R., of Hull, A. G. Brown, R.N.R., and A. W. Bromley, R.N.R., of Lewisham, are specially "commended for service in action."

The death of Sir John Barwick, at the age of 75, at Thimbleby Hall, Northallerton, removes a commercial magnate of considerable influence in the North of England, where he was associated with many shipping and industrial undertakings. He was Chairman of the Broomhill Collieries, the Easington Coal Company, and the Weardale Steel Coal & Coke Company, and Vice-Chairman of the Cargo Fleet Iron Company and the Seaham Harbour Dock Company. He was a director of the Northumberland Shipbuilding Company, and was for many years associated with the late Lord Furness in a number of enterprises. He was a director of Lloyd's British Testing Company, and in the course of his career he was a member of the River Wear Commission, the Wear Pilotage Board, the River Wear Watch Committee, the Sunderland Local Marine Board and the Sunderland Chamber of Commerce. He was created a Baronet in 1912.

TENDERS INVITED.

The Commissioners of Irish Lights are prepared to receive tenders for the purchase of the lightship *Osprey*. Particulars are given in the official notice on page 159.

Tenders will be received at the Sydney Harbour Trust Offices up to October 25 for the supply and delivery of six electrically-operated wharf capstans for handling railway freight cars, &c., on Berths Nos. 19 and 21, Pyrmont.

The Ministerio de Marina, Estado Mayor Central, 2a Seccion, Material, Negociado 5°, Madrid, invite tenders for the construction and delivery to the Spanish Royal Navy of a dredger intended for the Royal Dockyard of La Carraca, San Fernando, Cadiz, Spain. The opening of the tenders will take place before the Special Board of Auctions at the Ministry of Marine, Madrid, on October 17.

The Melbourne Harbour Trust Commissioners are inviting tenders (closing on Tuesday, September 7) for the supply and delivery of 103 tons of chain, for dredging plant. Tenders must be on prescribed blue form, and addressed to the Melbourne Harbour Trust Commissioners, Market Street, Melbourne, and endorsed, "Tender for Chain for Dredging Plant." The latest date has been extended from July 6 to September 7.

CLYDE SHIPYARD DISPUTE.

Fairfield Coppersmiths and Plumbers.

The demarcation dispute which led to a strike of coppersmiths in Fairfield Shipyard a few weeks ago has now been settled by an arbitrator appointed by the Board of Trade. As reported in *Shipbuilding and Shipping Record* of August, the dispute arose because the Fairfield Company, who were unable to obtain a sufficient number of coppersmiths, engaged plumbers to do certain work usually performed by the former class of workmen. The coppersmiths then came out on strike, and for this action they were tried before a Munitions Tribunal in Glasgow and fined 2s. 6d. each. The men went back to work and the points in dispute were referred to arbitration. The arbitrator's award is as follows:—

"Whereas a dispute arose between the North-West Engineering Employers' Association and the National Society of Coppersmiths, as to whether the Fairfield Shipbuilding & Engineering Company (Ltd.), Govan, a member of the said Association, was entitled to employ plumbers in its copper shop and on ships on the work of bending and setting steel pipes, contrary to a rule or custom, not having the force of law, existing in the Govan district, which required that the work of bending and setting steel pipes should be performed by coppersmiths; and whereas by order made by the Minister of Munitions, under the Munitions of War Act, 1915, the Fairfield Shipbuilding & Engineering Company (Ltd.) has been declared to be a controlled establishment; and whereas the Board of Trade, to whom the said dispute was referred, appointed me, the undersigned Alastair Oswald Morrison Mackenzie, Sheriff of Inverness, Elgin, and Nairn, as arbitrator to decide the same and to settle whether the rule or custom above referred to is a rule or custom which tends to restrict production or employment; and whereas I sat at Govan on the ninth and tenth days of August, in the year nineteen hundred and fifteen, and heard the evidence and arguments submitted by parties; now, therefore, having considered the said evidence and arguments, I find and decide:—

"(1) That the Fairfield Shipbuilding & Engineering Company (Ltd.) has been for some months, and is now, unable to obtain the services of a sufficient number of coppersmiths for its requirements in connection with the work which it has in hand for the Government;

"(2) That plumbers are able to do the work of bending and setting steel plates for ships, and their employment for that purpose by the Fairfield Shipbuilding & Engineering Company (Ltd.) in its copper shop and on ships would expedite the Government work upon which the said company is engaged;

"(3) That in view of the shortage of coppersmiths, and the importance of expediting work being done for the Government at the present time, the said company is entitled to depart from the rule or custom above referred to and to employ plumbers in its copper shop and on ships to bend and set steel pipes; and

"(4) That the rule or custom above referred to is a rule or custom which tends to restrict production and employment."

Voicetube Fittings.—Messrs. Durham, Churchill & Co., Grimesthorpe, Sheffield, inform us that they have in hand at the present moment orders for Voicetube fittings to the order of Messrs. C. & T. T. Pattison, Naples, which are to be fitted to vessels for the Royal Italian Navy.

New U.S. Destroyers.—The designs for the six torpedo-boat destroyers authorised by the last Naval Appropriation Act have just been completed in the Bureau of Construction and Repair of the Navy Department. Tenders for the work of constructing these vessels will be opened on October 6 next. In the design of these vessels a special effort has been made to utilise the information available as the result of the European war. The design marks a distinct departure in many respects from that of preceding classes. The maximum sustained sea speed has been made 30 knots, while a large radius of action at cruising speed has been maintained. Those guns located in the waist on previous vessels have been mounted on the superstructure amidships to increase their efficiency in rough water conditions. In addition, the initial stability has been increased to guard against the tendency to pitch and roll. The vessels will be 310 ft. long, with a displacement of 1,125 tons. They will carry four 4-in. quick-firing guns, two 1-pdr. anti-aircraft guns and four triple-torpedo tubes. The vessels will be propelled by steam turbines with oil-firing and water-tube boilers.

FROM OUR CORRESPONDENTS.

CLYDE AND DISTRICT.

(From Our Own Correspondent.)

Glasgow.

Employers of shipyard and engineering labour on the Clyde are, as a rule, quite satisfied with the restrictions placed on the sale of intoxicants by the Liquor Control Board set up by the Government to deal with the drink problem in shipbuilding and munition producing areas. When the Board held a sitting in Glasgow several leading shipbuilders strongly advocated that public-houses should be closed altogether for the period of the war. Although the Control Board has not given effect to these representations they have cut down by more than one-half the hours during which intoxicants can be sold. The working of the new regulations, when they come into force at the beginning of next week, will be watched with great interest by all parties.

Restaurants in Shipyards.

A good deal has been heard recently about the question of establishing canteens and restaurants in shipyards and engineering shops, but on the whole shipbuilders have not been favourable to the proposal to sell intoxicating liquors within their yard gates. Messrs. Barclay, Curle & Co. have, however, tried the experiment of establishing a restaurant at their new yard at Scotstoun. The restaurant is intended for the provision of food only, no intoxicants being allowed on the premises. The buildings, utensils and general equipment of the place, have been provided by the firm, and the concern is managed by a committee. The restaurant, which was opened a few weeks ago, has proved very popular with the shipyard workers, and doubtless other firms will follow the example of Messrs. Barclay, Curle & Co.

New Harrison Liners.

The passenger and cargo steamer *Governor*, which Messrs. D. & W. Henderson launched on Friday, is the second vessel which has been built on the Clyde within recent months for Messrs. T. & J. Harrison, of Liverpool. In May last Messrs. Charles Connell & Co. launched the *Defender*, a vessel of 8,450 tons, fitted with quadruple-expansion engines by Messrs. Dunsmuir & Jackson, for the same firm. The *Governor* is the smaller vessel of the two, being of 5,500 tons gross. She is being fitted by the builders with triple-expansion engines. Passenger accommodation is provided on the bridge deck amidships. The vessel and machinery have been constructed under the supervision of the owners' superintendent, Mr. R. C. Richardson, assisted by Mr. Arthurson.

Reconstruction of Kingston Dock.

The Clyde Trustees are pressing forward the work of reconstructing Kingston Dock as rapidly as possible in view of the congestion of traffic which sometimes arises at other parts of the harbour. It will be some considerable time before the dock will be fully completed, but the quay walls at the west end and for some distance at the south and north sides, have been almost finished, so that it may be possible to utilise at least a portion of the dock in the near future. The shed at the west end has also been erected and only requires to be roofed to be ready to receive goods.

THE NORTH-EAST COAST.

(From Our Own Correspondent.)

Newcastle-on-Tyne.

Hardly has work on Tyneside and Wearside resumed its normal after the August Bank Holiday but that there comes a breakage in the Tees district. Here the chief annual holiday is the third week in August, known as the Stockton Race Week. Although the races are abandoned, yet it has been considered advisable to observe the holiday much as usual, and, consequently the leading shipbuilding yards, marine engineering works and plate mills are closing, some for three days and others for the whole week. This arrangement is claimed to have the double advantage in that whilst affording the men a rest, it enables various renewals and repairs to machinery and plant to be carried out much more expeditiously than would be possible under full working conditions. There is little fresh that may be reported concerning shipbuilding developments, and conditions remain practically unaltered. Material continues at its old rates, and early deliveries cannot be obtained. Iron ship plates are £10 per ton, iron ship angles £11, iron ship rivets £13 10s., steel

ship plates £10, steel ship angles, £9 15s., and steel boiler plates £11 per ton. Ship-repairing has improved, there being a somewhat greater volume of miscellaneous work on Government account occupying the Tyne graving docks. Two of the most interesting contracts in hand are the extensive damage repairs to the ss. *Delmira*, owned by Messrs. Bicket & Co., of Liverpool, which are being executed by Messrs. Swan, Hunter & Wigham Richardson, Ltd., Wallsend, and the American steamer *Gulflight*, which was torpedoed by an enemy submarine, and the repairs to which are now nearing completion by Messrs. Smith's Dock Company, Ltd., North Shields. On page 31 of the July 8 issue of *Shipbuilding and Shipping Record* particulars were given of the adventures of the *Delmira* in the English Channel preparatory to her being towed by the French naval authorities to Cherbourg. The repairs have practically been completed, and the vessel is now being converted from an ordinary cargo carrier into a molasses steamer, and upon completion of these alterations she will be towed to Sunderland, where the reconstructed machinery will be fitted by Messrs. George Clark, Ltd.

MERSEY SHIPPING AND SHIPBUILDING.

(From Our Own Correspondent.)

Liverpool.

The congestion trouble at Liverpool seems to be shifting to Garston Docks. While the waiting turn at Liverpool and Birkenhead has been brought down from 70 vessels to about 12, the number requiring berths to discharge and load at Garston is increasing, and now exceeds 20 vessels.

The news cabled from Montreal that from October next the Allan Line and the Canadian Pacific Company's fleets will be operated by one company, to be known as the Canadian Pacific Ocean Services, Ltd., only serves to give official confirmation to the close working arrangement that has existed for some time between these two companies. The Allan services will be continued as hitherto under its old name, but it is conceivable that in days to come there will be some efforts made to concentrate the departmental management of the two lines at this port, although that does not seem to be immediately contemplated.

SOUTH WALES NOTES.

(From Our Own Correspondent.)

Cardiff.

On more than one occasion reference has been made in these columns to the demands of Cardiff traders for increased dock accommodation at the Bute Docks, Cardiff, or failing this to expand the shipping facilities of the port. There is now every prospect of the wishes of the traders being fulfilled after the war, for the Cardiff Railway Company and the various bodies representing traders are discussing proposals with the object of developing the facilities of the docks. The Marquis of Bute has signified his willingness to lay out £250,000 in new siding accommodation and new equipment which will provide for the storage of an additional 100,000 tons of coal which would require about 30 miles of new railway lines. This in conjunction with the existing lines constructed by the other companies serving the docks, should be sufficient to enable the loading appliances to be kept working at their full capacity which, with the new hydraulic plant, would increase the shipping facilities by 50 per cent., thus making it possible to deal with about 5,000,000 tons more per annum. In order to carry out the scheme additional land will be required, and it is suggested that terms might be arranged with the Rhymney Railway Company and by filling in the foreshore. Coal for shipment would then be brought to the sidings and taken to the tips by the Bute Company's locomotives, and the empties returned to the sidings. By the traffic being under one control, it is expected to increase the loading facilities materially, As Parliamentary sanction might be necessary for carrying the scheme into effect it is hoped that there will be no opposition to the project. An official statement of the trade of the Bute Docks during the past six months shows that there was exported and imported 6,012,968 tons or 606,234 tons less than in the corresponding period of 1914, which, by the way was a normal half-year, when the total trade reached 6,619,902 tons. Exports alone totalled 5,121,309 tons against 5,691,659 tons, a decline of 570,350 tons, of which coal and coke, the principal item, aggregated 4,754,553 tons compared with 5,182,707 tons, a drop of 428,154 tons. Patent fuel, at 261,560 tons, decreased by 98,853 tons, iron and steel rails and ironwork, at 47,009 tons by 33,996 tons, and general merchandise, at 58,187 tons, by 9,348 tons. Imports, at 891,059 tons compared with 927,543 tons, were 35,884 tons less. Iron ore, at 322,275 tons, decreased by 66,692 tons, but pitwood and mining timber, at 222,794 loads and tons, increased 78,437, while general merchandise, at 169,543 tons, also marked an improvement of 1,045 tons. Live cattle, iron and steel, timber and deals and grain and flour all showed declines. Shipping, at 4,174 vessels, showed a decrease of 135 vessels, but their net register, at 3,085,448 tons, marked an advance of 198,916 tons. Thus the trade of the Bute Docks during the past six months cannot be said to have been of an unsatisfactory character, while if the rumours that arrangements are being made to import live cattle into Cardiff, where there is already accommodation, be realised, the year should in the circumstances close with an increased trade return.

Swansea Tippers Strike.

No settlement has yet been arranged among the Swansea tippers and the railway companies who are the owners of the tips. In fact, the stoppage has spread and nine tips are now idle. That such a stoppage should continue during the greatest conflict in which Britain has ever been engaged is deplorable. Swansea is suffering from these constant labour troubles, and the secretary of the Harbour Trust has warned the men that the finances of the Trust are not inexhaustible. The traders, too, view the situation with increasing anxiety and bitterly complain that trade is being driven away from the port by the unreasonable attitude of the men. In fact shipowners are in many instances deliberately steering clear of the port, and in one case has acknowledged that they are afraid of sending their boats to Swansea and that where they have the option choose to send their tonnage to other ports even at lower freights. It is significant that while coal exports from Swansea have decreased by over 200,000 tons during the past seven months the shipments from the adjacent port, Port Talbot, have considerably advanced. In fact, Port Talbot is the only Welsh port to record an advance in trade during the current year when compared with last year's business. The Board of Trade have the trimmers' dispute in hand and it is hoped that early intervention will take place on their part.

BELFAST SHIPBUILDING AND SHIPPING.

(From Our Own Correspondent.)

Belfast.

The first mercantile launch on the Lagan for three months took place on August 12 when Messrs. Workman, Clark & Co., Ltd., sent afloat from their South yard the ss. *San Pedro* built to the order of the Tropical Fruit Steamship Company for their fruit-carrying and passenger traffic in the United States, Central America and West Indian waters. The *San Pedro* does not differ very greatly from the *San Pablo*, launched on May 15, and the *San Mateo*, launched on April 28. She is a handy sized boat of about 4,000 tons and, like the other ships, has been greatly delayed in construction. The *San Pablo* is still uncompleted, but the *San Mateo* was delivered some time ago. It is a curious fact that every merchant ship launched in Belfast this year has been for the fruit trade; the others, in addition to the three mentioned, being the *Cavina* and *Coronado* for the Elders & Fyffes West Indian service. There are several other vessels of this class still on hand. The *San Pedro* is registered in New York.

New Canadian Liners.

It was expected that the first of the new liners for the Canadian Pacific Ocean Services, Ltd., formerly the Canadian Pacific Line, would have been in Belfast ere this for engines which are being constructed at Harland & Wolff's. The hulls are being built at Messrs. Barclay Curle's yard on the Clyde and the engines in Belfast. Like other merchant work, these vessels have been greatly delayed owing to the war. They will be named *Melita* and *Minnedosa*, and are over 500 ft. long with 67-ft. beam, and a depth from bridge to keel of 46 ft. They are wider and deeper than the *Missanabie* and *Metagama*, but the length is the same. They will have the combination of turbine and reciprocating engines driving three screws, which is a feature of most Queen's Island liners, and will accommodate over 2,000 passengers.

Death of Mr. S. Feary.

A well-known figure in Irish shipping circles has been removed by death in the person of Mr. Stephen Feary, Manager of the Dublin Silloth and Isle of Man Steamship Company since about 1885. He had been in failing health for nearly a year. Originally in the service of Messrs. Robt. Henderson & Son, the greater part of his business career was spent in Ireland. He was a Yorkshireman by birth.

THE COAL MARKETS.

The coming into operation on August 13 of the new regulation, under which licences have to be obtained for the export of coal to Allied countries has, perhaps been the most outstanding event in the coal industry of the past fortnight. In the South Wales market, as at other coal shipping centres, there was, quite naturally, anxiety to get as much coal away as possible before August 13. As a result prices for prompt shipment were kept up. There can be no doubt that the control of the Government is absolute, and the tendency is against negotiating for forward business. It would seem to be the wiser plan to have as few contracts on hand as possible. As a matter of fact the class of coal available for shipment from the Welsh port is limited, practically the only sorts available a few days ago for export in any quantity being Eastern and Western Valleys.

Another phase of the business calling for attention is the proposed suspension of the Miners (Eight Hours) Act, with a view to increasing production. Before these lines appear in print a joint meeting of representatives of the Government, the coalowners, and the miners will have been held in London to discuss the proposal.

Approximate quotations include:—Second Cardiff large steam, 26s.-28s.; ordinary large steam, 25s.-26s.; best drys, 28s.-29s.; best Monmouthshire Black Veins, 28s.-29s.; Western Valleys, 26s.-27s.; Eastern Valleys (best), 25s.-26s.; best small steams, 21s.-21s. 6d.; and pitwood, 24s.-25s.

There has, unfortunately, been delay in carrying through the negotiations over the new wage agreement. Admittedly the points at issue between coalowners and men present numerous difficulties, but, in the interest of the whole industry, it is certainly to be hoped that a perfect understanding will be arrived at ere long.

North-East Coast.

From Newcastle-on-Tyne it is reported that the coming into operation of the Government order rendering obligatory the obtaining of licences for export to Allied countries had practically no effect upon the market. The explanation was the full loading turns, and a scarcity of coal for prompt shipment. However, owing to licence refusals, values were, in several cases, easier, and a certain amount of coal was thus thrown on the market for disposal. Last week closed with a quiet market, a certain amount of forward business being negotiated, and inquiries for bunkers to be shipped over next year were received. An inquiry from Chili for 30,000 tons of best steams, to be shipped in six 5,000-ton cargoes between September and February, came on the market. It is understood, however, that the collieries were more disposed to treat for shipment from September to December only.

Approximate quotations are:—Best steams, 20s.-21s.; Tyne primes, 18s. 6d.-19s.; second steams, 17s. 6d.-18s.; second small steams, 12s. 9d.-13s.; best bunkers, 18s. 6d.-18s. 9d.; ordinary bunkers, 17s. 6d.-17s. 9d.; and special bunkers, 22s.

The Scottish Trade.

In the Scottish coal market firmness of tone has prevailed, and orders have been well booked for August loading. The West of Scotland collieries report a quite satisfactory output. A gratifying feature is the practical certainty that the miners will consent to work six, instead of five days per week, as in the past. Last week the price for best splints advanced to 22s. and 23s. for September. Ordinary grades of splints stood at 17s.-18s. 6d. Prices for navigation coal ranged from 21s. to 23s. 6d. A certain amount of business was done in steams at from 14s. 6d. to 17s. 6d. Hartleys were in better request, with prices inclined to harden.

The Thames.

Business in the London coal market has been on the quiet side, the attendance on 'Change on some days being small. There has been a scarcity of offerings of most kinds of coal, and merchants have not displayed pronounced anxiety to lay in stocks, being content largely to rely upon contract deliveries. Quotations for rail-borne households have, to a great extent, been nominal, owing to the dearth of offerings of both Yorkshire and Derbyshire sorts. Steams have been firm and not easy to procure. Smalls, too, have been scarce.

The Demand from Genoa.

According to advices from Genoa there has been a steady inquiry for most classes of coal, and, on the whole, prices have been well upheld. There is a comparative scarcity of prompt coals, whilst consumers are sending in their orders steadily. Newport and Cardiff coals are in good demand, with Cardiff seconds worth about 50s. For a cargo of Tredegar 18s. 3d. was obtained, and 16s. 3d. was realised for a shipment of Rose Merthyr. There is a limitation in the sale of anthracite, due to their scarcity. In Newcastle gas coals there has been some little weakness; 13s. 9d. was the price at which a cargo of New Pelton-Holmside found buyers. A cargo of second options changed hands at 12s. 3d. A shortage of railway wagons has impeded the delivery of coals. This trouble should, however, be over by the end of the month.

American Exports.

Undoubtedly the American coal operators are making the best of their present opportunity. If severe restrictions are put upon the shipment of coal from this country to the coaling depôts, the stocks at these stations will have to be replenished from the United States. The export of such well-known grades of American coal as New River and Pocahontas is already so large that it has had a pronounced effect upon their values. For forward shipment the f.o.b. prices for such American steam coal has appreciably advanced, and this advance will certainly be continued if the near future brings a more pronounced demand.

THE FREIGHT MARKETS.

(From Our Own Correspondents.)

London.

Slowness continues to be the chief characteristic of the various sections of the freight market. The Gulf is steady for late September, the Eastern market keeps steady but quiet, whilst in the Plate quietness prevails. There has been a certain amount of activity in time chartering. The *Kilwinning* has been taken up at 14s., delivery Philadelphia, to the Mediterranean and back. For delivery Australia, re-delivery United Kingdom, 16s. has been paid to another vessel. For a 4,500-tonner, 16s. is offered in the Newfoundland wood trade to the United Kingdom and back. A slightly easier tone prevails in connection with coal shipments from the United States, and vessels have been taken up for this business to Mediterranean destinations at lower figures. From Virginia to Marseilles, to a 6,500-tonner, 36s. 6d. has been paid, whilst to Plate ports a 6,800-tonner has been fixed at 34s. The *Evandale*, 5,500 tons, has been conceded 39s. from Virginia to West Italy. The *Roxburgh*, 7,000 tons, is fixed to load at Calcutta and Chittagong at 70s. one, 71s. 6d. two ports Mediterranean, or United Kingdom, on deadweight. From up-river Plate ports 65s. to 67s. 6d. seems to be the limit of charterers, for vessels to give September loading to the United Kingdom, with French options at 2s. 6d. extra, and Mediterranean options 5s. extra. One or two vessels of a handy size have been taken up at 70s. to Holland, with the option of United Kingdom and French ports at the same rate. These vessels are for relief purposes. The *Erroll*, 5,400 tons, 10 per cent., has been closed at 52s. 6d., San Lorenzo to North Pacific ports, with September 30 cancelling. From Montreal, a 20,000-quarter, 10 per cent. boat has been closed at 10s. 6d. one, 10s. 9d. two West Italian ports, September 10-25. From the Northern Range a prompt steamer, 22,000, 10 per cent., gets 8s. 9d. to Bordeaux. Outward coal freights from the Tyne are advancing. There are, as a matter of fact, none too many boats for this business. The rise is most pronounced in the Mediterranean direction, and 24s. 6d. represents the rate to Genoa as compared with 22s. 6d., paid a short time ago. Port Said stands at about 13s. 6d.–13s. 9d. The London rate also shows a slight advance at 7s. 3d. The Cardiff market shows new activity and is characterised by strength. Recent representative figures are:—Bordeaux, 22 fr.; Dieppe, 14s.; Rouen, 15s. 3d.; and Nantes, 21 fr. Swansea to Cagliari has paid, for a 1,500-tonner, 23s. coal and 23s. 9d. fuel. Liverpool to Bordeaux has paid 15s. to the *Harelda*.

Newcastle-on-Tyne.

There has been very little business transacted on the local freight market during the past week. It would appear that, preparatory to bringing into force the new regulations regarding the exportation of coal and coke to Allied countries, the War Trade Committee took a tighter hold of licences for shipment to neutral countries, and the result has been a great dearth of such documents. Whilst at the commencement of the week rates continued on their downward path, an improvement has now set in, and prices are fully steady with, in some cases, advances recorded. So far as arrivals are concerned, steamers have been plentiful, but owners have taken concerted action with a view to preventing further reductions of rates, and tonnage has been offered very sparingly. The demand has been very small and, with loading turns lengthening out, rates would

probably, in the ordinary course of events, have shown a decline. Coasting is steady on the basis of recent rates. North France is improving and Havre shows advances of from 3d. to 6d., with all other ports steady. For the Bay a stronger tone prevails, and Bordeaux at 16s. 9d. represents an increase of 3d. on last week's prices. The Mediterranean is much improved, with Genoa at 1s. advance. Port Said, however, is easier at 23s., 1s. lower. Fixtures arranged since last report include the following:—Algiers, 3,000, 17s. 6d.; Bordeaux, 1,700, 16s. 9d.; Catania, 2,000, 24s.; Caen, 1,400, 12s. 9d.; 400, 13s.; 1,200, 14s.; Carthagena, 1,500, 22s. 6d.; Dunkirk, 900, 13s.; Fecamp, 1,600, 12s. 9d.; 1,500, 13s.; Genoa, 4,500, 23s.; 2,500, 24s.; 4,500, 24s.; Havre, 800, 12s. 3d.; 1,650, 12s. 9d.; La Rochelle, 1,700, 16s. 9d.; London, 1,650, 7s.; La Palliee, 1,700, 16s. 9d.; Lisbon, 2,700, 17s.; Nantes, 1,700, 16s. 9d.; Oporto, 1,500, 19s. 3d.; 2,100, 19s. 3d.; Port Said, 5,000, 23s.; Rouen, 1,600, 13s. 6d.; 2,000, 13s. 3d.; 1,750, 13s. 9d.; 650, 18s., coke; Rochefort, 1,600, 16s. 6d.; St. Nazaire, 1,800, 16s. 6d.; Trouville, 700, 13s. 6d.

Glasgow.

Business on the Glasgow freight market has been quiet during the week, but rates have shown a tendency to advance in most trades. Especially was this the ease in the outward coal trade from Scottish ports and from Wales, though there would probably have been more fixtures recorded but for the difficulty and delay in securing licences. The rates were about 19s. to West Italy and 22s. 6d. Port Said. A later fixture to West Italy was reported at 20s. Another strong market was the homeward trade from the River Plate, owners holding for 70s. for up river loading. In other markets there was little change to report. A Glasgow steamer was fixed for Cape coals to Bahia Blanca at 22s. 6d. early loading, and another for nitrate to the United Kingdom-Continent, with options, at about 75s. American coals were fairly active on the basis of 34s. 6d. Rio, 37s. Marseilles, and 40s. West Italy or Alexandria. Several time charter fixtures were reported, including the following:—Time charter, Transatlantic trade, delivery and re-delivery, States, four-six months, 14s. 6d.; time charter, Transatlantic trade, 14s., seven months. Eastern markets were dull.

Liverpcol.

Outward freights on this market have improved within the last week, and there are indications of a scarcity of tonnage, which some hold will probably lead to some further recovery in values, and notably so from the coal ports to the Mediterranean. Coal tonnage, moreover, continues to be booked freely in the States, and Virginia to South America is now worth 34s., to West Italy 39s., and to Alexandria 40s. In the general cargo trades there is also ruling a better tone, due to larger shipments offering, and on the whole the outlook is much brighter than for some weeks past. Time chartering continues on recent basis, but suitable boats are difficult to get. Several boats have been taken up for Archangel rounds at 26s. In homeward directions, no market at the moment is particularly active. River Plate indicates more inquiry for tonnage, but there is no change in values to be reported. American freights are steady, but prompt business is mainly in coals to Europe and South America. Business prospects for September are encouraging, and better rates are indicated for that month from the Gulf and Northern Range for grain, the former is presently doing spot business to West Italy at 11s. Range quotes 10s. 3d. to 10s. 6d. to same destination. Eastern markets continue slow, though rice ports indicate some firmness for higher values. East Indies are dull at 52s. 6d. on deadweight from Bombay, and 40s. to 41s. from Karachi. Mediterranean homewards very quiet, but unchanged. North Pacific has some inquiries for tonnage. Nitrate rates steady, and 80s. paid to French Atlantic and 82s. 6d. to Mediterranean. There is a poor market for outward sail tonnage, but homeward sail tonnage continues to be booked in the North Pacific and Gulf trades at steady rates.

Hull.

The Humber freight market is firmer in all sections largely through the influence of other markets and also to some extent through the extension of the Order in Council requiring that licences must be obtained for coal cargoes for Allied destinations as well as neutral destinations. In the Mediterranean direction 22s. 6d. was paid for Genoa from Hull and 22s. 6d. for Alexandria from Hull, and the demand is stronger with an expectation of advances on these rates. In the River Plate market rates are steady on the basis of 24s. 6d. for Buenos Aires from Hull. In the coasting market the strong draw on tonnage and the high rates offering in the South Wales market has stiffened rates here. Quotations are 14s. 6d. for Rouen from Hull, 13s. for Dieppe from Hull, 13s. 6d. for Dieppe from Goole, 13s. 6d. for Honfleur from Hull, 14s. for Honfleur from Goole, and 13s. for Calais from Hull. There are strong indications of coasting rates advancing.

Cardiff and Swansea.

Business was much brisker on both markets during the past week and, as we anticipated, rates jumped appreciably. In fact, in some cases they advanced 50 per cent., and in one instance over 100 per cent. It must, however, be remembered that previously rates were at the lowest levels touched during the current year, and that generally the abnormal rise recorded does not make current freights equal to the top figures reached during the year. The extent of the rise is clearly shown below:—

Cardiff to—	Highest Rate week ending Aug. 9.	Aug. 16.	Rise.
Bay and Coast.			
Bordeaux	11½ fr.	24 fr.	12½ fr.
Caen	9/-	14 6	5 6
Havre	8/6	14 -	5 6
Rouen	10/9	15'3	4/6
Mediterranean.			
Barcelona	17/6	20 -	2/6
Genoa	18/-	22/6	4/6
Lisbon	10 3	12,3	2/-

Even with the new coal export order restricting inquiries the demand was considerably in excess of tonnage supplies and thus owners were in a position to command materially higher freights. The Bay and Coast markets were particularly strong and daily advances were recorded as will be noted from the following details of fixtures concluded, viz., Bordeaux at 20 and 24 fr. (twice), 22½ and 22 fr. (twice); Caen, 12s. 6d. and 14s. 6d.; Havre, 12s. and 14s. (three); Honfleur, 12s. and 14s. 6d.; Nantes, 16 and 21 fr.; Rouen, 13s., 14s., 15s. (three) and 15s. 3d.; and Sables d'Olonne, 22 fr. The Mediterranean did not advance proportionately, the inquiry not being so great as it was for the Bay and Coast, but even so there was a distinct improvement in rates, Algiers fixing at 21, 25 and 26 fr.; Barcelona, 20s.; Cadiz, 13s.; Genoa, with options, 22s. and 22s. 6d.; Lisbon, 12s. 3d.; Marseilles, 25 fr.; Port Said, 23s., 22s. 6d. and 24s.; Palma, 18s.; and Palermo, 24s., all of which rates were substantially above those obtainable a fortnight ago. The South American section was the weakest spot, owing to an almost insignificant inquiry. River Plate was fixed at 29s. and 22s. 6d., and Rio de Janeiro at 23s. Altogether tonnage of a carrying capacity of 106,280 tons was fixed to load at Cardiff, Penarth, Barry or Newport, against 69,200 tons in the preceding week. Chartering was also brisker at Swansea, despite the fact that nine tips were at a standstill through a dispute between the tippers and the tipowners. Tonnage to carry 27,490 tons was fixed against 20,980 tons in the previous week. Rates on account of the scarcity of tonnage and an expanding demand substantially appreciated, Caen fixing at 11s. 6d. and 15s., as compared with 9s. and 10s. 6d. a fortnight ago; Dieppe, 12s. 6d.; Havre, 11s. and 14s., against 8s. 6d.; and Rouen, 11s. 6d., 13s. 6d., 15s. 3d. (twice) and 15s., against 9s. (twice), 11s. (twice) and 11s. 3d. Mediterranean charterings were confined to Cagliari at 23s. and Maranus at 16¼ fr.

COMPANY MEETINGS.

Hain Steamship Company, Ltd.—The annual general meeting was held at St. Ives, Cornwall, on August 11, Sir Edward Hain in the chair. In moving the adoption of the report he said that from the commencement of the war a large number of their ships had been engaged upon Government service, at one time 50 per cent. in number and about 75 per cent. in tonnage. Early this year a satisfactory arrangement was made with the Director of Transports as to the rates of hire for requisitioned ships, and regular monthly payments were now being made. In order to give practical effect to their appreciation of the services of the officers and men they had set aside the sum of £10,000 as a special war bonus among masters, officers and engineers, whose wages have not risen in proportion to other grades, and upon whom had rested the responsibility for carrying out important instructions. In regard to the general rise in the price of all commodities in which shipowners had had very largely to share, he might state that wages, the cost of material, in fact the price of everything necessary for a ship, had advanced by 50 per cent., while the cost of war risk insurance had been an additional charge upon shipping amounting in their own case to as much as £40,000. The Government scheme for war risk insurance had been considerably extended during the year, and had been most ably administered with Government

assistance by the mutual war risk clubs. With reference to the taxation of war profits—i.e., of profits due or mainly due to war conditions—it now appeared to be certain, in view of the urgent necessity for raising a large national revenue for war purposes, that a tax upon such profits would be imposed, and no reasonable objection could be taken, provided there was no selection of any particular industry for exceptional treatment. Otherwise a sense of injustice would have been created. Shipowners desired to bear their full share of the national burdens, and having quite legitimately made considerable profits during the war, they would, he was sure, raise no objection to a war tax upon any profits made in excess, say, of the average of the previous three years. In anticipation of special war taxation, his company had placed £25,000 to the credit of income-tax account. There was nothing new to report in respect to their steamers *Treptow* and *Preußen*, interned in Germany at the commencement of the war, but from information which occasionally filtered through, he gathered that the ships were being kept in good condition. What their ultimate fate might be could not yet be determined. The English portion of the crews were confined in the camp for civilian prisoners at Ruhleben, where, owing to the benevolent exertions of the American Minister, conditions had greatly improved. Allotments continued to be paid, and certain other dependents received assistance under the Government scheme. During the year five new steamers, each 7,800 tons deadweight, had been added to the fleet owned by the company. These vessels, contracted for some time ago, were delayed in delivery, but now formed a valuable addition to the fleet, their cost bringing the book value, as shown on the balance-sheet, to over one million sterling, which, after deducting the £150,000 set aside for depreciation, worked out on the total deadweight tonnage of their fleet at £3 6s. 6d. per ton—a sum very far below the actual value of the ships. Reverting to the accounts, the profits on completed voyages amounted to £311,232, and after providing for income tax paid during the year, debenture interest to June 30, 1915, and the interim dividend of 5 per cent. paid in March last, there remained an available balance of £277,616. It had not been thought necessary to increase the amount of invested reserve, but it was proposed to place £150,000 to depreciation, devote £10,000 to writing down investments, credit income-tax reserve with £25,000, set aside £10,000 as a war bonus to officers and engineers, pay a final dividend of £1 10s. per share, making 20 per cent. for the year, and to carry forward a balance of £7,681. Only steamers' voyages concluded by June 30 had been taken into account.

The report was adopted, and a motion that a sum at the discretion of the directors be set aside during the current year to be devoted to the support of such war charities or funds as the directors in their judgment might think fit was carried.

COMPANY REPORTS.

London & Edinburgh Shipping Company, Ltd.—A Leith correspondent telegraphs: Dividend of 10 per cent., free of tax, on the ordinary shares.

Penarth Pontoon, Slipway & Ship Repairing Company, Ltd.—Interim dividend of 5 per cent. per annum, less income-tax, for the half-year ended June 30.

C. K. Hansen.—The half-yearly report of this Danish shipping concern shows its half-yearly earnings to be 46 per cent. of the whole share capital. The total earnings amounted to 3,842,000 kroner.

Redcroft Steam Navigation Company, Ltd. (Cardiff).—Interim dividend of 10 per cent. per annum, together with a bonus of 10 per cent. per annum, both free of income-tax, for the half-year ended July 31.

Cardiff Junction Dry Dock & Engineering Company, Ltd.—The directors have declared an interim dividend of 10 per cent. per annum, free of income-tax, for the past half-year. An extraordinary general meeting of shareholders has confirmed a special resolution passed at an extraordinary meeting on July 13 last to the effect that "each of the 200 fully-paid £50 shares should be sub-divided into 10 fully-paid shares of £5 each, and that each of the 1,000 £50 shares, £40 paid, be sub-divided into 10 shares of £5 each, with £4 per share credited as paid up.

Flensburger Schiffsbau Gesellschaft.—Following the judgment of the Supreme Court in the action relating to the floating dock *Vandalia* collision, and in accordance with the resolution of the ordinary general meeting of September 30, 1914, an extraordinary general meeting of the company was held on August 7 to distribute a balance of £89,100 from the financial year 1913-14. The Court's decision is said to have been entirely favourable to the company. On the other hand, the judgment given by the Hansentischen Oberlandesgericht (Hamburg) against the towers for two-thirds of the damage is confirmed. Owing to the accident the tug was seized, and in accordance with the towing contract the company was obliged to go bail for £15,800, which amount is now being claimed. This loss is said to have been covered by insurance in London, but cannot be collected under existing conditions and has therefore been written off provisionally. The profit and loss account shows receipts £188,000 (£152,000 for previous year). Charges and interest required £98,500 (£101,500), leaving a surplus of £89,500 (£50,000). After deducting £37,700 (£24,800) depreciation, there remained approximately £51,500 (£25,400) for distribution as net profit, from which, however, the above-mentioned £15,800 must be deducted, leaving £35,700 to be allocated as follows: Management fund, £9,800 (£7,300 reserve in previous year); shares, £2,700 (£1,880); welfare fund, £3,960 (£1,680); dividends, 12 per cent., *i.e.*, £19,400 (8 per cent., *i.e.*, £12,960). Bank credit and cash is shown at £239,000 (£5,700). Stock material and ships under construction are valued at £296,000 (£335,000).

NEWS PARAGRAPHS.

Atlantic Fruit Company and German Ships.—The Atlantic Fruit Company denies the report that it has purchased the German steamers *Prinz Joachim* and *Prinz August Wilhelm*. The company states that it has no intention of taking over any German or other vessels.

Suspension of French Flag Monopoly.—His Majesty's Consul-General in Algiers (Mr. B. Cave, C.B.) calls attention to the recent French Presidential decree, which suspends for the period of the war the law of April 2, 1889, under which goods in transit between France and Algeria could only be shipped under the French flag. The object of the decree is to facilitate the export of Algerian products to France.

The C.P.R. and Allan Line.—With reference to the announcement we made last week concerning the fusion of interests between the Canadian Pacific Railway steamers and the Allan Line it is now stated that each will continue to operate under the present name. So far as the services in which the public are interested are concerned, these will be conducted as formerly under the management of Allan Bros. & Co. in Great Britain and H. & A. Allan in Canada. The new arrangement will come into force October 1.

Reported Shipbuilding Extension.—According to reports circulated in Atlanta, Ga., a large shipbuilding concern which already owns and operates a plant in a New England port has perfected plans for the establishment of a new and extensive shipbuilding yard at Savannah. The plan, it is understood, hinges upon the success or failure of a Bill introduced in the Georgia Legislature by State Senator L. R. Akin, to amend the constitution so as to exempt from taxation for a period of 10 years the shipbuilding corporation which has arranged for an initial capitalisation of approximately $3,000,000.

Freight Rates and Gas Companies.—Speaking at the half-yearly meeting of the Gas Light and Coke Company recently, Sir Corbet Woodall, M.Inst.C.E., said that the influence of the war upon the whole range of their operations was very early felt. In September they raised the price of gas from 2s. 6d. to 2s. 8d. per thousand cubic feet in order to meet the enormous increase of East Coast coal freights to London, which rose almost at a bound from 3s. to 13s. and more per ton. Had their contracts been duly fulfilled the small increase in the price of gas would have carried them through, but deliveries fell more and more into arrear, and they were constrained to replenish their vanishing stocks by purchasing such coal as they could at extravagant prices, with freights conforming thereto. They discovered that it was impossible to carry on the business upon ordinary lines, and had purchased certain steamships, knowing that with those steamships their coal would be delivered more economically. They had now good, indeed abundant, stocks of coal at the several works. As a result of Government action in the two respects of regulating exports of coal and limiting the pit-head price, the home supply of that necessity of their industry was rendered more abundant, and, at the same time, freights had fallen to one-half of what they were, while the threat of famine prices had been repressed.

OFFICIAL NOTICES AND SHIPS FOR SALE.

COMMISSIONERS OF IRISH LIGHTS.

Lightship "Osprey" for Sale.

THE Commissioners of Irish Lights are prepared to receive Tenders for the purchase of the above wooden Light-vessel, together with such of her gear and fittings as are now on board.

The *Osprey* was built in 1868 ; is oak-framed, with elm, oak and teak planks fastened with copper and metal bolts. Dimensions, 96 ft. × 23 ft. × 10½ ft.

Applications to inspect the vessel at her moorings in Kingstown Harbour, County Dublin, should be made to the undersigned, from whom inventory and full particulars can be obtained.

Offers, sealed and endorsed "Tender for *Osprey*," must be posted in time to reach this office on or before Thursday, 9th September, 1915.

By Order,
H. G. COOK,
Secretary.

Irish Lights Office, Dublin.
16th August, 1915.

OFFICIAL NOTICES AND SHIPS FOR SALE.

OFFICIAL ADVERTISEMENTS intended for insertion on this page should be sent in as early in the week as possible. The latest time for receiving official advertisements for this page for the current week's issue is noon on Wednesday.

All advertisements should be addressed to—
Shipbuilding and Shipping Record,
Queen Anne's Chambers,
Westminster, London, S.W.

"SHIPBUILDING AND SHIPPING RECORD" TABLE OF LAUNCHES.

Date of Launch.	Name of Vessel and Type.	Owners.	Builders.	Approx. Dimensions. L × B. × D.	Propelling Machinery and Builders of Machinery.	Remarks.
—	**Gambia River**, ss. (cargo)	British Empire S.N. Co., London	Irvine's S.B. & D.D. Co., W. Hartlepool	400′ × 52′ × 29½′	Tr. Exp. 25, 40, 68 × 48 (Richardsons, Westgarth & Co.)	8,000 tons gross.
Aug. 3..	**Carmen**, ss. (cargo) ..	J. Lainitzen, Copenhagen ..	Kjobenhavns Flydedok & Skibsværft, Copenhagen	240′ × 35′ 6″ × 17′ 3″	Tr. Exp. 15, 24, 40 × 27. About 350 i.h.p.	D.w. about 1,950 tons on 15′ 6″ draught.
Aug. 12	**San Pedro**, ss. (fruit carrier)	Tropical Fruit SS. Co., Ltd., New York	Workman, Clark & Co., Ltd., Belfast	—	Workman, Clark & Co., Ltd. ..	Central American and West Indies service.
Aug. 13	**Governor**, ss. (pass. and cargo)	T. & J. Harrison, Liverpool	D. & W. Henderson & Co., Partick	410′ × 52′ × 32½′	Tr. Exp. 24½, 42½, 72 × 54 ..	5,500 tons gross.
Aug. 16	**Macedon**, ss. (cargo)	Australian SS., Ltd. ..	Wm. Hamilton & Co., Port Glasgow	378′ × 51½′ × 28½′	Tr. Exp. 25½, 42, 70 × 48 (D. Rowan & Co., Glasgow)	D.w. cap. 6,650 on draught 23½′. 10½ kts.

"SHIPBUILDING AND SHIPPING RECORD" TABLE OF SHIP SALES.

Name and type.	Tonnage.	Dimensions. Draught in ( ).	Sold by, to	Builders, hull and year.	Machinery and builders.	Remarks.
Barbara, ss. (spar dk.)	3,740 gr. 2,444 net. 6,500 d.w.	340′ × 47′ × 19½′	Freshfield SS. Co. (J. Esplen, Mgr.), to British buyers	Furness, Withy & Co., W. Hartlepool (1897)	25, 40, 66 × 45 (W. Allan & Co., Sunderland)	Price about £45,000.
Elmville, ss. (well dk.) (renamed **Eric Calvert**)	1,862 gr. 1,173 net.	270′ × 37′ × 18½′	Elmville SS. Co. (Plisson S.N. Co., Mgrs.), Sunderland, to Calvert SS. Co. (A. Calvert, Mgr.), Goole	W. Gray & Co., W. Hartlepool (1889)	20, 31½, 53 × 36 (C'en. Mar. Engine Works)	—
Glenmay, ss. ...	2,485 gr. 1,571 net.	310′ × 44′ × 20½′	R. Livingston & Co., W. Hartlepool, to Morgan & Cadogan, Cardiff	Ropner & Son, Stockton (1905)	23, 37½, 61½ × 39 (Blair & Co., Stockton)	Price about £31,500.
Grantala, ss. ...	3,655 gr. 1,787 net. 3,350 d.w.	350′ × 45½′ × 27½′	Adelaide SS. Co., Adelaide, to British buyers	Armstrong, Whitworth & Co. (1903)	32, 51½, 84 × 54 (Wallsend Slipway Co., Newcastle)	—
Holland, ss. (turret dk.)	3,828 gr. 2,438 net. 6,650 dw.	350½′ × 50′ × 22½′	F. Drughorn, London, to buyers not stated	W. Doxford & Sons, Sunland (1906)	25, 41, 66 × 45 (W. Doxford & Sons)	—
Northfield, ss. ...	2,099 gr. 1,329 net.	288½′ × 43′ × 18½′	Field Line, Cardiff (E. Jones & Co.), London, to buyers not stated	Tyne Iron S.B. Co., Newcastle (1901)	21, 35, 57 × 39 (N.E. Mar. Eng. Co., Newcastle)	—
Pontop, ss. ...	3,042 gr. 1,971 net.	325′ × 47′ × 22½′	Pearetli SS. Co. (Beckingham & Co., Mgrs.), Newcastle	Furness, Withy & Co., W. Hartlepool (1901)	23½, 38, 64 × 42 (Richardsons Westgarth & Co., Hartlepool)	—
Rio Tiete, ss. (ex *Knight Errant*)	7,104 gr. 4,779 net. 12,000 d.w.	470′ × 57½′ × 31½′	London-American Maritime Trading Co. (Petersen & Co.), London, to Russian buyers	Chas. Connell & Co., Glasgow (1898)	27, 46, 78 × 51 (Dunsmuir & Jackson, Glasgow)	—
Tina, ss. (spar dk.), ex *Perm*, ex *Sangari*, ex *Tiberius*	4,243 gr. 2,757 net.	360′ × 48′ × 20½′	E. Lutken, Copenhagen, to foreign buyers	Northumberland S.B. Co. (1903)	26, 42, 72 × 48 (Richardsons, Westgarth & Co., Sunderland)	Price about £40,000.
Waterville, ss. (well dk.)	1,968 gr. 1,242 net.	271½′ × 38′ × 17½′	Balls & Stansfield, N. Shields, to Richard Mackie & Co., Leith	J. Readhead & Sons, S. Shields (1891)	20½, 33½, 55 × 36 (J. Readhead & Sons)	Price about £19,000.

SHIPPING SHARE MARKET.

The stock markets concerned in transactions in steamship and shipbuilding companies' securities continue to possess many very satisfactory features. Reports which reach the London market from various provincial centres are characterised by considerable optimism and dealers do not overlook the significant fact that buyers are always about in this market for any stocks that appear to be going at attractive prices. Royal Mails and P. & O.'s receive satisfactory support, but the greatest interest appears to centre in some of the more popular lower-priced stocks. Members interpret this as meaning that there has been a substantial growth recently in the number of small investors who are drawn from the skilled industrial class that is benefiting from the war. One of the developments of the present great upheaval is expected to be the birth in Great Britain of a mass of small investors similar to the *rentier* class in France. They are to be observed by brokers in small new clients who send buying orders for ten shares of this company and 50 of that undertaking, the higher rates of interest, ranging from 5 to 6 per cent., yielded by the well-known steamship companies possessing considerable attractions to the man who wants to make the most of his few hundreds of pounds of saving. Companies such as Furness, Withy & Co., the Court Line, Cunard, Lamport & Holt, have all experienced a considerable accession to their list of shareholders during the past six months despite the war. The tendency towards the spreading of capital over a large number of shareholders follows the wider distribution of money during the war period. Members of the Stock Exchange are glad to welcome these small orders in these hard times, and those who speculate upon the future of the investment markets foresee a much wider use of the Stock Exchange for solely investment purposes. Similarly in the great shipbuilding centres there is evidence that a good deal of money which is being saved out of the high wages now received is being invested, not only in the War Loan, but also in the shares of the companies in which they are interested as employees.

SHIPPING, SHIPBUILDING, ENGINEERING AND MARINE INSURANCE SHARE LIST.

SHIPPING AND DOCKS.

Name.	Share and paid.	Extreme quotations, 1913.	Last ann. div. % or per share.	Yield. %	Quotation, July 30, 1914.	Cash price during week.
	£					
African S.S.	20	21⅜—19⅛	7	7¼	18—20	—
Allan Line ... ... Deb.	100	95—89	4	4½	93½—95½	—
Anchor Line ... Cum. pref.	10	10¼—10	5⅛	5⅛	10—10⅜	10⅜
Do. ... ... Deb.	Stk.	98⅛—98½	4½	4½	104—106	104⅜
Argentine Nav. ... Cum. pref.	1	29/6—25/6	3	4½	⅝—1⅛	⅝—1⅛
Do. ... ... Deb.	Bds.	104½—100½	6	6⅛	98—100	91⅝
Australasian Un. S. Nav. Deb.	Stk.	84⅜—81⅜	4	4⅞	80—83	—
Belfast Steam ... ... "A"	10 (5pd.)	5⅜—4⅜	5	3	4¼—5¼	—
British & African Nav. Deb.	Stk.	102—101	4½	4⅜	96⅝—98⅜	103
British India Nav. ... Deb.	Stk.	104—98⅝	4½	4½	99⅜—100	91⅜
Bucknall SS. ... Cum. pref.	2	2⅛—1⅞	5⅜	—	—	—
Cairn Line ... ... Deb.	Bds.	102—94	5	5⅛	91—93	—
Clan Line ... ... Ord.	10	142—9	15	10⅝	10⅜—11	13⅛
Court Line ... ... Ord.	£1	—	10	9	—	1⅛
Cunard SS. ... ... Ord.	1	35/9—28/-	20	9	1¾—1⅞	2⅛
Do. ... Cum. pref.	Stk.	103—97⅜	5	5⅜	99—101	90⅜
Do. ... ... Deb.	Stk.	102⅜—98	4⅛	4⅛	101—103	96
Elder Line ... ... Deb.	Stk.	103—100	4⅛	5	98—102	90
Elder Dempster ... Cum. pref.	1	1⅜—1⅛	5⅜	5⅛	1⅜—1⅜	—
Do. ... ... Deb.	Stk.	105—99⅜	5	5⅛	102—104	88⅜
Ellerman Lines ... Pref. Ord.	10	10⅜—10 7/6	6¼	6	10—10⅜	9⅛
Do. ... Cum. pref.	10	10⅜—10 7/6	4⅜	4⅜	10—10⅜	9⅜
France Fenwick ... Cum. pref.	5	97/6—92/6	6⅜	6⅜	4⅞—5	4⅞
Furness, Withy ... Ord	1	24/3—25/6	10	8⅜	1⅛—1⅜	1⅛
Do. ... Cum. pref.	10	9⅜—9⅛	5	5⅛	9⅛—10	8⅝
General Steam Nav. Ord.	7½	6¼—5⅜	8	8	5⅛—5⅝	5⅛
Do. ... ... Pref.	8	7⅞—7⅛	8	8	7⅞—7⅞	5⅛
Houlder Line ... Cum. pref.	5	85/—80/-	Nil	Nil.	2¾—2¾	4⅛
Do. ... ... Deb.	Stk.	84⅜—80	4⅛	5⅛	81—86	83
Houlder Bros. ... Cum. pref.	5	4⅜—3	5⅜	6	4⅜—4⅝	4⅜
Do. ... ... Deb.	Stk.	85—78	4⅝	5	81—86	90⅜
India Gen. Nav. & Rly. ... Ord.	10	9⅜—7⅛	8	9⅜	9—10	8⅝
Indo-China N. ... Pref. Ord.	5	5⅛—87/6	6	5⅜	3⅜—4⅜	5⅜
Irrawaddy Flotilla	40	125—114	15	5⅞	126⅜—128⅜	—
King Line ... ... Ord.	10	9¼—8	8	7⅛	8¾—9⅜	10⅛
La Guaira Harbour ... Deb.	Stk.	87—79	5	7⅛	78—80	65⅜
Lamport & Holt ... Cum. pref.	£1	1 1/16—7/8	6	6	1⅛—1 1/16	1⅛
Leyland (F.) ... Cum. pref.	10	11—9⅜	10	12½	7¼—8¼	8
Do. ... ... Deb.	100	99½—95½	4	4	99—101	—
Mercantile SS. ... ... Ord.	5	8⅛—6⅜	17½	10⅜	6—6⅜	8⅜
Do. ... ... Pref.	1	18/—16/3	5	5⅛	¾—1	5⅜
Moor Line ... ... Ord.	10	14—11⅛	15	—	—	—
Nelson Steam Nav. ... Deb.	100	103⅜—99	5	5¼	99⅜—101½	97½
New Zealand ... ... Ord.	8	20⅛—10⅝	8	3⅞	14⅜—15½	19
Do. ... ... Deb.	Stk.	95—92⅜	1	4½	92 94	89⅛
Nitrate Producers SS. ... Ord.	5	8⅜—8	12½	7½	8—8⅛	12¼
Do. ... Cum. pref.	5	5—97/6	5	—	4⅛—5	—
Oceanic Steam. Nav. ... Deb.	100	100—96⅛	4⅛	4⅛	97—99	93⅜
Orient.Stm.Nav.Co. Cum. pref.	10	10⅛—9⅜	5	5⅛	9⅛—10	9⅝
Do. ... ... Deb.	100	99—94⅜	4⅜	4⅜	98—100	98
P. & O. S. N. ... Cum pref.	100	125⅜—107	5	5⅛	109—112	96⅜
Do. ... ... Def.	100	350—270	15	5⅜	270—290	267
Do. ... ... Deb.	Stk.	91—83	3½	4⅛	84—86	80⅜
Prince Line	1	25/3—20/-	5	3⅜	1—1⅛	1⅛
R.M.S.P. ... ... Ord.	100	143—100½	Nil.	Nil.	82—87	74⅛
Do. ... ... Pref.	Stk.	100⅞—96	5	5⅛	98—101	88⅛
Do. ... ... Deb.	Stk.	104⅛—100¾	4½	5⅛	101—103	85
Shaw, Savill & Alb. Cum. pref.	5	5⅛—96/3	5	—	4⅛—5	—
Shell Transport ... ... Ord.	1	5⅛—96/10½	30	5⅝	4—4⅛	4 1/16
Do. ... Cum pref.	10	11⅞—10	5	5⅛	10⅜—10⅝	9⅛
Sutherland SS. Co.	£1	1¼—1	20	13⅜	1—1⅛	1⅜
Union-Castle SS. Cum. pref.	10	10—9½	4½	5	8⅜—9⅛	8⅝
Do. ... ... Deb.	Stk.	95⅞—92	4	4⅜	93—95	87½
Union SS. of N. Z. ... Deb.	Stk.	95—91	—	—	—	—
West Hartlepool ... ... Pref.	10	4¾—3½	Nil.	Nil.	2⅜—3½	7¾

INSURANCE.

Alliance	20 (2·4 pd.)	12⅞—11⅜	12/-	6½	11⅞—12⅜	9½
Do. (new shares)	1	14 1/16—12⅛	12/-	5⅜	13⅛—14⅛	10 1/16
Indem. Mutual Marine	15 (3 pd.)	10 1/16—8½	18½	6	10—11	9
London Assurance	25 (12½ pd.)	54—49	20	5⅜	54—56	44⅜
Marine Insurance	25 (15 pd.)	38½—36⅜	45/-	6⅜	38⅜—39⅜	35⅞
Maritime Insurance	10 (2 pd.)	5⅜—4 1/16	12½	—	8 1/16—8⅜	—
Merchants' Marine Insurance ...	10 (2½ pd.)	66/3—61/3	7½	5	4—4 1/16	3 1/16
N. British & Mercantile Ord.	25 (6¼ pd.)	40½—38⅛	40/-	5⅜	40⅜—41⅛	35 1/16
Do. Pref.	Stk.	100⅛—95⅜	4	4⅛	98—100	90 1/16
Phœnix Assurance	10 (1 pd.)	7⅛—7	49	6¼	7⅜—8⅛	6 1/16
Reliance Marine	10 (2 pd.)	7—6⅛	17½	4 1/16	7 1/16—7⅛	7⅛
Royal Exchange Assurance ...	Stk.	210—196½	10	5 1/16	213—218	191
Sea Insurance	10 (2 pd.)	20—17⅜	8	4	20—21	20 3/16
World Marine, Limited ...	5 (2 pd.)	25—23 1/16	5	5⅛	1 1/16—1 1/16	1 1/16

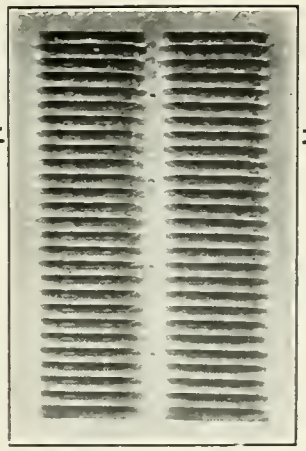
* With arrears. † Includes 2½% bonus.

IRON AND STEEL.

Name.	Share and paid.	Extreme quotations, 1913.	Last ann. div. % or per share.	Yield. %	Quotation, July 30, 1914.	Cash price during week.
	£					
Babcock & Wilcox ... ... Ord.	1	69 4½—56 3	16	5½	2⅝—2⅞	2 1/16
Baldwins ... Cum. pref.	1	22/6—21/3	5⅜	5 1/16	1 1/16—1 1/16	1 1/16
Do. ... ... Deb.	Stk.	100¼—100¼	4⅛	4⅛	97—99	99
Bayliss, Jones ... Cum. pref.	1	—	5	7½	⅝—⅞	⅝—1 1/16
Bell Bros. ... ... Cum. pref.	10	12 1/16—11	6	5 1/16	11 1/16—12⅛	10 1/16
Do. ... ... Deb.	Stk.	98—96⅜	4	4 1/16	96—98	96—98
Bessemer (Henry) ... ... Ord.	1	1 1/16—1 1/16	10	8 1/16	1 1/16—1 1/16	1 1/16—1 1/16
Bolckow Vaughan ... Ord.	1	22/6—19/4⅜	6	6⅜	1 1/16—1⅛	—
Do. ... ... Cum. pref.	20	21⅛—20 -	5	5⅛	20—21	19⅛
Cargo Fleet Iron ... ... Ord.	1	11 10⅜—7/6	2⅜	5	1 1/16—1 1/16	1 1/16
Do. ... ... Deb.	100	91—85⅝	4⅜	5⅛	89—92	88⅛
Consett Iron Co. ... ... Ord.	1	88/6—74/6	30	7	3¼—3⅞	3⅜
Dominion Iron & Steel	Bds.	100⅛—88⅛	5	6⅛	83—87	77
Dorman, Long ... ... Ord.	1	21/6—16/9	7⅜	8⅜	1 1/16—1 1/16	1 1/16
Do. ... ... Deb.	Stk.	88⅜—85⅜	4	4⅜	87—90	84⅜
Ebbw Vale Steel & Iron Ord.	1	18/—16/-	10	10⅜	1 1/16—1 1/16	1 1/16
Guest, Keen & Nettefids Ord.	1	68/9—61/3	15	5	3 1/16—3 1/16	3 1/16
Do. ... ... Cum. pref.	5	5⅜—5⅜	5	4⅜	5 1/16—5 1/16	5 1/16
Do. ... ... Deb.	Stk.	100⅜—95⅜	4	4⅛	96—98	87 1/16
Hadfield's Steel Foundry Ord.	1	63/—58/9	22½	7 1/16	3—3⅛	3 1/16
Hawthorn (R. & W.) Leslie Ord.	10	13—12	10	7¾	13⅛—13⅜	13⅛
Ibbotson Bros.	5 (1 pd.)	7—5¼	10	7 1/16	6—6⅛	6
Jessop (W.) & Sons ... Ord.	5 (4 pd.)	6⅜—6⅜	15	11 1/16	5⅞—6⅜	6
Lanarkshire Steel Cum. pref.	10	7⅛—6¼	5	6 1/16	5½—6⅜	6
Lysaght (J.) ... Cum. pref.	1	27/6—25/-	6	5	1⅛—1⅜	1⅛
Do. ... ... Deb.	Stk.	108⅜—102½	4½	—	104—106	—
Manganese Bronze ... Ord.	1	⅜—⅜	6	11	⅜—⅜	
Do. ... ... Cum. pref.	1	1—⅞	6	6 1/16	¼—1	
North-Eastern Steel ... Deb.	Stk.	89—92	4½	—	—	—
Palmers Ship & Iron "A"	1	1/4—1/8	Nil.	Nil.	1/16—1/16	—
Scott (Walter) ... ... Ord.	1	16 —14/6	5	6 1/16	⅜—⅝	⅜—⅝
Do. ... ... Deb.	Stk.	86—82	4	4⅝	81—83	89 - 91
Sheffield Forge ... ... Ord.	1	1⅝—1⅜	12½	7	1⅜—1⅜	1 1/16
Shelton Iron & Steel ... Deb.	100	99⅜—90	5	5⅜	93—98xd	94
S. Durham Steel & Iron Ord.	1	35/—23/6	10	6 1/16	1⅜—1⅜	1 1/16
Do ... ... Cum. pref.	1	20/6—19 -	6	5 1/16	⅞—1 1/16	1 1/16
Do. ... ... Deb.	Stk.	9⅛—98	4½	4	90—92	90—92
Steel Co. of Scotland ... Ord.	10	12⅜—8⅜	5	5⅜	8⅜—9	8⅛—9⅛
Stewarts & Lloyds Pref. ord.	10	21 1/16—20	10	5⅜	20—21	19 1/16
Do. ... ... Cum. pref.	10	14⅜—13¼	6	4⅜	11 1/16—13⅞	13⅛
Stone (J.) ... ... Cum. pref.	10	9⅜—9	5	5⅜	8⅞—9⅛xd	9⅛
United States Steel ... Ord.	100$	71⅜—50	3	3⅜	61—61⅛	77
Do. ... ... Cum. pref.	100$	113⅞—104⅜	7	6⅜	112—113	118
Vickers Ltd. ... ... Ord.	1	43/6—33/3	12½	7	1 1/16—1⅛	1 1/16
Do. ... ... Pref.	Stk.	106¼—99	5	5⅛	104—107	98⅜
Do. ... ... Deb.	Stk.	100⅜—91¾	4	5⅜	96⅜—98⅜	79
Weardale Steel ... Def. ord.	1	21 —17/-	6	7⅜	⅜—1⅛	
Do. ... ... Cum. pref.	1	20/1⅜—18 -	6	6⅜	1⅛—1	1 1/16
Do. ... ... Deb.	Stk.	77—73¼	4	—	77—80	—
Workington Iron & Steel Ord.	1	16/6—12/3	6	8½	2 1/16—3⅜	1 1/16

SHIPBUILDING AND MARINE ENGINEERING.

Armstrong, Whitworth Ord.	1	60 —39/	12½	6	1 3/16—2 1/16	1 1/16
Do. ... ... Cum. pref.	5	95 —84/6	4	5⅜	4 1/16—4 1/16	3 1/16
Do. ... ... Deb.	Stk.	98⅜—94⅜	5	5⅜	96—98	89⅛
Beardmore (W.) ... ... Deb.	100	96⅛—91⅛	4⅜	5⅛	94—96	89⅛
Brown (John) ... ... Ord.	1 (15s. pd.)	23/—17/9	12½	9⅛	2⅜—3 1/16xd	1 1/16
Do. ... ... Cum. pref.	10	10⅛—9⅛	5	5 1/16	9⅜—10xd	9
Cammell Laird ... ... Ord.	5	3⅜—2⅞	7½	8	3⅜—4⅛	5
Do. ... ... Cum. pref.	5	92/6—79/-	5	6	4⅛—4⅜	4 1/16
Do. ... ... Deb.	100	90⅜—84⅛	4½	5⅛	92—94	89⅛
Dunlop (Jas.) ... ... Ord.	1	18/6—17/6	Nil.	—	1⅜—1⅝	1 1/16
Do. ... ... Cum. pref.	1	1⅛—⅞	6	7⅛	1—1	1 1/16
Fairfield Shipbldg Cum. pref.	10	10—7⅞	6	8 1/16	—	7 1/16
Fleming & Ferguson ... Ord.	10	20⅛—12½	10	6 1/16	14¼—14⅜	15
Gray (Wm.) ... ... Deb.	100	100⅜—100	4⅜	4⅜	100-102	100
Henderson (D. & W.) Cum. pref.	1	⅞—⅞	5	12	1/16—1/16	
Richardsons Westgarth Ord.	1	3/6—1/9	Nil.	Nil.	1/16—⅛	
Do. ... ... Cum. pref.	1	9 9—4 3	Nil.	Nil.	1/16—⅛	
Do. ... ... Deb.	Stk.	70—58	4½	6⅜	55 - 58	69⅜
Simons (W.) ... Cum. pref.	10	10⅜—10	5	4⅜	10⅛—10⅜	10⅜
Stephenson (R.) ... ... Ord.	1	66⅜—53	Nil.	Nil.	—	—
Do. ... ... Deb.	Stk.	66⅛—63	Nil.	Nil.	—	—
Swan, Hunter & W. R. ... Ord.	1	19 10⅜-16 -	†10	10⅜	1⅛—1	1 1/16
Do. ... ... Cum. pref.	1	19 9—17 9	5	5⅜	1⅛—1	1 1/16
Do. ... ... Deb.	Stk.	90⅜—88	4¼	—	90—93	—
Thornycroft (John I.) ... Ord.	1	27 6—12/6	8	8	⅜—⅝	3 1/16
Do. ... ... Cum. pref	1	19 3—11/3	6	7⅜	⅜—⅝	
Do. ... ... Deb.	100	94—91	5	5 1/16	88—92	91
Wallsend Slipway ... Ord.	1	1⅛—1⅛	10	—	1 1/16—1⅛	—
Do. ... ... Cum. pref.	1	20/—20/-	5	—	1⅛—1 1/16	—



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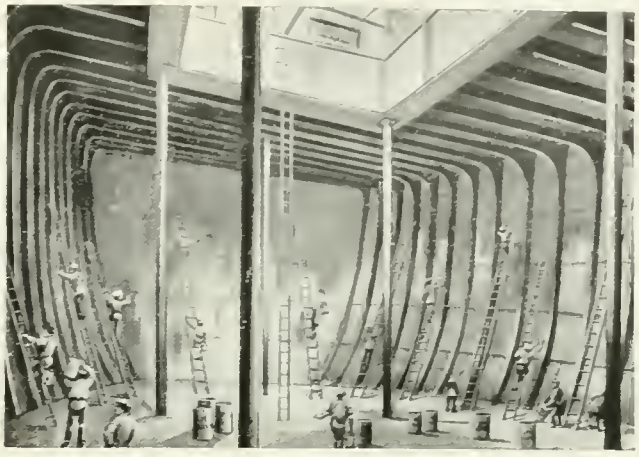

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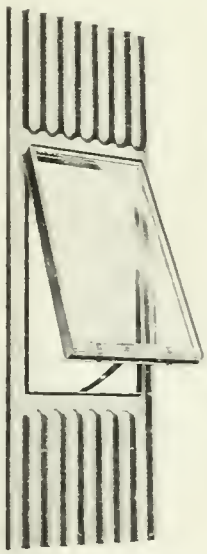

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ACCOMMODATION LADDERS—
Linkleter's Patent Ship Fittings Co., Hudson St., North Shields.

ACETYLENE—
Carbic Ltd., 51, Holborn Viaduct, London, E.C.

AERIAL ROPEWAYS—
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.

AIR COMPRESSORS—
Belliss & Morcom, Ltd., Birmingham.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, S.E.

AIR PUMPS—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
Belliss & Morcom, Ltd., Birmingham.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Contraflo Condenser & Kinetic Air Pump Co., Ltd., 3, Central Buildings, Westminster, S.W.
Dawson & Downie, Elgin Works, Clydebank.
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, London, S.E.
Weir, G. & J., Ltd., Cathcart, Glasgow.

ALUMINIUM GOODS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

ALUMINIUM PAINT—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

ANCHORS—
Hingley & Sons, Ltd., Netherton Iron Works, Dudley, Staffs.
Spencer, John, & Sons, Ltd., Steel Works, Newburn-on-Tyne.
Sykes, Richard, & Son, Ltd., Cradley Heath.
Taylor, Samuel, & Sons (Brierley Hill), Ltd., Brierley Hill, Staffs.
Wright, Joseph, & Co., Ltd., Tipton, Staffs.

ANTI-CORROSIVE COMPOSITIONS—
Briggs, W., & Sons, Ltd., Dundee.
Hamilton, Archd., & Co., Possilpark, Glasgow.
Holzapfels, Ltd., Newcastle-on-Tyne.
Milburn, A., & Co., Sunderland.
Wailes Dove Bitumastic Ltd., 5, St. Nicholas Buildings, Newcastle-on-Tyne.
Websters Ltd., Hull.

ANTI-FOULING COMPOSITION—
Holzapfels, Ltd., Newcastle-on-Tyne.
Hoyle, Robson, Barnett, & Co., Ltd., St. Nicholas Chambers, Newcastle-on-Tyne.
Websters Ltd., Hull.

ANTI-FRICTION METALS—
Billington & Newton, Ltd., Longport, Staffs.
Bowran, Robt., & Co., Ltd., Newcastle-on-Tyne.
Delta Metal Co., Ltd., East Greenwich.
McConwell, A., & Co., Ltd., 60, Drury Buildings, Water St., Liverpool.

ARMOUR PLATES—
Brown, John, & Co., Ltd., Atlas Works, Sheffield.

ASBESTOS FITTINGS—
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

ASBESTOS GOODS—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.
Walker, Jas., & Co., 11, Bishop Court, Anderston, Glasgow.

ASH BAGS—
Speedings Ltd., Sail Works, Sunderland.

ASH BINS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

ASH DISCHARGING APPLIANCES—
Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh
Trewent & Proctor, F. J., Ltd., 43, Billiter Buildings, E.C.

AWNINGS—
Speedings Ltd., Sail Works, Sunderland.

BARROWS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

BARROWS (Cargo)—
Edina Manufacturing Co., 19h, Broad Wynd, Leith.

BEDDING & NAPERY—
Stewart, Archibald & Co., 40-48, Union Street, Glasgow.

BEMAL CONDENSER TUBES—
The Yorkshire Copper Works, Ltd., Leeds.

"BITUMASTIC" ENAMEL MANUFACTURERS—
Wailes Dove Bitumastic Ltd., 5, St. Nicholas Buildings, Newcastle-on-Tyne.

BLINDS—
Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield.

BLOCKS—
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.
Higginson & Co., 7, Hurst Street, Liverpool.

BLOWERS—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford. [Belfast.
Davidson & Co., Ltd., Sirocco Engineering Works,
Keith, James, & Blackman Co., Ltd., 27, Farringdon Avenue, London, E.C.

BOATS—
Crichton, J., & Co., Saltney Shipyard, Chester.
Leitch, John, & Co., The Ferry, Renfrew, Scotland.

BOILERS—
Central Marine Engine Works, West Hartlepool.
Elliot & Jeffery, East Dock, Cardiff.
Harris Bros., Ltd., Cambrian Dry Docks, Swansea.
Hawthorne, R. & W., Leslie & Co., Ltd., St. Peter's, Newcastle-on-Tyne.
Howden, James, & Co., Ltd., Scotland St., Glasgow.
Perman & Co., Ltd., 32-38, Fenchurch Street, E.C.
Wallsend Slipway & Engineering Co., Ltd., Wallsend-on-Tyne.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

BOILER CIRCULATORS—
Beresford Eng'n'ring Co., Beresford Lane, Cardiff.

BOILER CLEANER—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.

BOILER COMPOSITION—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.

BOILER COVERING—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.
Walker, Jas., & Co., 11, Bishop Court, Anderston, Glasgow.

BOILER MOUNTINGS—
Cockburns Ltd., Cardonald, Nr Glasgow.
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.
Royles Ltd., Irlam, Nr. Manchester.

BOILER PLATES (Steel)—
Leeds Forge Co., Ltd., Leeds.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.

BOILER PRESERVATIVE—
Atlas Preservative Co., Ltd., Deptford, S.E.

BOILER TUBES—
Yorkshire Copper Works, Ltd., Leeds.

BOLTS AND NUTS—
Coventry Chain Co., Ltd., Coventry.

BORING MACHINES—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.
Greenwood & Batley, Ltd., Albion Works, Leeds.

BRASS & COPPER FITTINGS—
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

BRASS & COPPER RODS—
Delta Metal Co., Delta Works, East Greenwich, London, S.E.

BRASS FOUNDERS—
Billington & Newton, Ltd Longport, Staffs.
Chambers, John, Ltd., Lowestoft.
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow. [Street, Glasgow.
McGeoch, Wm., & Co., Ltd., 28, West Campbell
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.
Williams, Wm., Alexandra Brass Foundry, Cardiff.

BRASS NAME-PLATES—
Metograph Co., 280, Cathedral Street, Glasgow.
Rennie & Co., North Greenhill Road, Paisley.

BRASS TUBES—
Yorkshire Copper Works, Ltd., Leeds.

BRASSWORK—
Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield.

BRONZE (Manganese)—
Billington & Newton, Ltd., Longport, Staffs.
Bowran, Robt., & Co., Ltd., 4, St. Nicholas Buildings, Newcastle-on-Tyne.
Callender's Cable & Construction Co., Ltd., Belvedere, Kent.
Delta Metal Co., Ld., E. Greenwich, London, S.E.
Stone, J., & Co., Ltd., Deptford, London, S.E.

BRIGHT STEEL—
Stonehouse Works Co., Ltd., Houghton Street, West Bromwich.

BUCKETS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

BULKHEADS (Patent)—
Hogg-Carr Construction Co., Ltd., Newcastle-on-Tyne.

BUNTING—
Riley, Edward, & Co., Leeds.

BUOYANT DECK SEATS— [Liverpool.
Crichton, C. & H., Ltd., Huskisson Engine Works,
Linkleter's Patent Ship Fittings Co., Hudson Street, North Shields.

BUOYS—
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool.
Hingley & Sons, Ltd., Netherton Iron Works, Dudley, Staffs.

CABINET MAKERS—
Stewart, Archibald & Co., 40-48, Union Street, Glasgow.

CABLES (Chains)—
Hingley & Sons, Ltd., Netherton Iron Works, Dudley, Staffs.
Sykes, Richard, & Soo, Ltd., Cradley Heath.
Taylor, Samuel, & Sons (Brierley Hill), Ltd., Brierley Hill, Staffs.
Wright, Joseph, & Co., Ltd., Tipton, Staffs.

CAISSONS & DOCK GATES—
Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne.

CALORIFIERS—
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Royles Ltd., Irlam, Nr. Manchester.

CAPSTANS (Electric)—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh
Stothert & Pitt, Ltd., Bath.

CARGO BLOCKS—
Higginson & Co., 7, Hurst Street, Liverpool.

CARPETS—
Stewart, Archibald & Co., 40-48, Union St., Glasgow.

CASE HARDENING BOXES—
Else, John, & Son, Ltd., 48, Muntz St., Birmingham

CASE HARDENING COMPOSITION—
Else, John, & Son, Ltd., 48, Muntz St., Birmingham

CASE HARDENING OIL—
Else, John, & Son, Ltd., 48, Muntz St., Birmingham

CAST BRASS PLATES—
Brown, Robert, & Co., 12, Espedair St., Paisley.

CASTINGS (Steel)—
Brown, John, & Co., Atlas Works, Sheffield, and Clydebank, Nr. Glasgow.
Darlington Forge Co., Ltd., Darlington.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.

CASTINGS (Steel, Iron and Brass)—
Chambers, John, Ltd., Lowestoft.
Darlington Forge Co., Ltd., Darlington.
Hamilton, A., & Sons, 13, Bute Crescent, Docks, Cardiff.
McRobie, John & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

CEMENT—
Aberthaw & Bristol Channel Portland Cement Co., Ltd., Merthyr House, Cardiff.

CHAINS—
"The Coventry" Chain Co., Ltd., Spon End Works, Coventry.

COAL—
Beynon, T., & Co., Ltd., Merthyr House, Cardiff.
Britannic Merthyr Coal Co., Ltd., Cambrian Bldgs., Cardiff.
Cambrian Collieries, Ltd., Cambrian Bldgs., Cardiff.
Davis, D., & Sons, Ltd., Cymric Bldgs., Cardiff.
Ebbw Vale Steel, Iron & Coal Co., Ltd., Merthyr House, Cardiff.
Fernhill Collieries, Ltd, Merthyr House, Cardiff.
Glamorgan Coal Co., Ltd., Cambrian Bldgs., Cardiff.
Harrisons (London), Ltd., 66, Mark Lane, E.C.
Naval Colliery Co. (1897), Ltd., Cambrian Bldgs., Cardiff.
Newport Abercarn Black Vein Steam Coal Co., Ltd., Merthyr House, Cardiff.
Powell Duffryn Steam Coal Co., Ltd., Cardiff.
Rhymney Iron Co., Ltd., Merthyr House, Docks, Cardiff.

COMPASSES (Ship)—
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.

CONDENSERS—
Belliss & Morcom, Ltd., Birmingham.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Contraflo Condenser & Kinetic Air Pump Co., Ltd., 3, Central Buildings, Westminster, S.W.
Dawson & Downie, Elgin Works, Clydebank.
Royles Ltd., Irlam, Nr. Manchester.
Weir, G. & J., Ltd., Cathcart, Glasgow.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

CONDENSER TUBES (Brass and Copper)—
The Yorkshire Copper Works, Ltd., Leeds.

CONTROLLERS & CONTROL GEAR—
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

CONVEYORS—
Mather & Platt, Ltd., Manchester.

COOKING APPARATUS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Grieve, T., & Sons, Bedford Street, North Shields.

COPPER PIPES—
Yorkshire Copper Works, Ltd., Leeds.

COPPERSMITHS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Chambers, John, Ltd., Lowestoft.
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Royles Ltd., Irlam, Nr. Manchester.

COPPER TUBES—
Yorkshire Copper Works, Ltd., Leeds.

CORK INSULATION—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W. [Newcastle-on-Tyne.
Newalls Insulation Co., 31, Mosley Street,

CORRUGATED IRON—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

COUNTER (Engine)—
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.

CRAB WINCHES—
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.

CRANES—
Ransomes & Rapier, Ltd., 32, Victoria Street, London, S.W.
Stothert & Pitt, Ltd., Bath.

CYLINDERS (Copper)—
The Yorkshire Copper Works, Ltd., Leeds.

DELTA METAL—
Delta Metal Co., Delta Works, East Greenwich, S.E.

DERRICKS & DAVITS (Tubular Steel)—
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.

DISTILLING APPARATUS—
Royles Ltd., Irlam, Nr. Manchester.

DIVING APPARATUS—
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, S.E.
Mining Engineering Co., Ltd., Meco Works, Moorfields, Sheffield.

DOCK & SHIP LIGHTING—
Carbic Ltd., 51, Holborn Viaduct, London, E.C.

DOCK GATES—
Chalmers, Wm., & Co., Ltd., Rutherglen, Nr. Glasgow.
Hamilton, Wm., & Co., Ltd., Port Glasgow, Scotland.
Swan, Hunter & Wigham Richardson, Ltd., Wallsend-on-Tyne.

DOORS (Watertight)—
British Thomson-Houston Co., Ltd., Rugby.
Stone, J., & Co., Ltd., Deptford, S.E.

BUYERS' GUIDE—*continued.*

DREDGE PLANTS—
Chalmers, Wm., & Co., Ltd., Rutherglen, Nr. [Glasgow.
Simons, Wm., & Co., Ltd., Renfrew, Nr. Glasgow.

DREDGING—
Fibury Contracting & Dredging Co., Ltd., Queen Anne's Chambers, Westminster, London, S.W.

DRILLING MACHINES—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.

DRILLS—
Chatwin, Thos., Ltd., Gt. Tindal St., Birmingham.

DRILLS (Pneumatic and Electric)—
United States Metallic Packing Co., Ltd., Bradford

DRY FITTINGS (Laundry)—
Bradford, T., & Co., Salford, Manchester.

DYNAMOS—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.

ELECTRIC CRANES—
Berry, Henry, & Co., Ltd., Croydon Works, Leeds.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [Edinburgh.
Mactaggart, Scott & Co., Ltd., Loanhead,
Mather & Platt, Ltd., Manchester.
Ransomes & Rapier, Ltd., 32, Victoria Street, London, S.W.
Stothert & Pitt, Ltd., Bath.

ELECTRIC DERRICKS—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.

ELECTRIC DYNAMOS & MOTORS—
Boothroyd, H. T., Ltd., Bootle, Liverpool.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Greenwood & Batley, Ltd., Albion Works, Leeds.
Holmes, J. H., & Co., Portland Road, Newcastle-
Mather & Platt, Ltd., Manchester. on-Tyne.
Sunderland Forge & Engineering Co., Ltd.,

ELECTRIC FITTINGS— Sunderland.
Durham, Churchill & Co., Grimesthorpe, Sheffield.

ELECTRIC HEATING & COOKING APPARATUS—
British Thomson-Houston Co., Ltd., Rugby.
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.

ELECTRIC LAMPS—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
McGeoch, Wm., & Co. Ltd., 28, West Camphell St., Glasgow.

ELECTRIC LIGHTING—
Boothroyd, H. T., Ltd., Bootle, Liverpool.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Mather & Platt, Ltd., Manchester.
Sunderland Forge & Engineering Co.,' Ltd., Sunderland.

ELECTRIC-LIGHTING PLANT—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Greenwood & Batley, Ltd., Albion Works, Leeds.
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.
Mather & Platt, Ltd., Manchester.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

ELECTRIC MOTORS—
Boothroyd, H. T., Ltd., Bootle, Liverpool.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Greenwood & Batley, Ltd., Albion Works, Leeds.
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.
Mather & Platt, Ltd., Manchester.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

ELECTRIC WIRES—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.

ELECTRICAL CONTRACTORS—
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow. [Glasgow.
Martin, W. C., & Co., 10, West Campbell Street,
Mather & Platt, Ltd., Manchester.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

ELECTRICAL ENGINEERS—
Boothroyd, H. T., Ltd., Bootle, Liverpool.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.
Graham, Alfred, St. Andrew's Works, Crofton Park Road, S.E.
Holmes, J. H., & Co., Portland Road, Newcastle-
Mather & Platt, Ltd., Manchester. [on-Tyne.
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

ELECTRICAL INSTRUMENTS (Ammeters)—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-

ELECTRICAL INSTRUMENTS (Circuit Breakers)—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

ELECTRICAL INSTRUMENTS (Relays)—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

ELECTRICAL INSTRUMENTS (Voltmeters)—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-

EMERY WHEELS—
Sterne, L., & Co., Ltd., Crown Iron Works, Glasgow

ENAMEL MANUFACTURERS—
Holzapfels, Ltd., Newcastle-on-Tyne.
Wailes Dove Bitumastic Ltd., 5, St. Nicholas Buildings, Newcastle-on-Tyne.
Websters Ltd., Hull.

ENGINE (Electric Light)—
Belliss & Morcom, Ltd., Birmingham.
Greenwood & Batley, Ltd., Albion Works, Leeds.

ENGINES (Land)—
Chambers, John, Ltd., Lowestoft.

ENGINES (Marine)—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
Central Marine Engine Works, West Hartlepool.
Chambers, John, Ltd., Lowestoft.
Hawthorne, R. & W., Leslie & Co., Ltd., St. Peter's, Newcastle-on-Tyne.
Howden, James, & Co., Ltd., Scotland St., Glasgow.
Perman & Co., Ltd., 82-83, Fenchurch Street, E.C.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

ENGINE & DECK STORES—
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.
Metallic Valve Co., Colonial House, Water Street, Liverpool.

ENGINE AUXILIARIES—
Aspinall's Patent Governor Co., 7, Strand Street, Liverpool.

ENGINE FITTINGS—
Aspinall's Patent Governor Co., 7, Strand Street, Liverpool.
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

ENGINE-ROOM OUTFITS—
Grieve, T., & Sons, Bedford Street, North Shields.
Newalls Insulation Co., 31, Mosley Street,

ENGRAVERS— Newcastle-on-Tyne.
Brown, Robert, & Co., 12, Espedair St., Paisley.

EVAPORATORS—
Central-Marine Engine Works, West Hartlepool.
Royles Ltd., Irlam, Nr. Manchester.
Weir, G. & J., Ltd., Cathcart, Glasgow.

EXTRUDED METALS (Brass, Bronze, Copper, Delta Metals)—
Delta Metal Co., Ltd., E Greenwich, London, S.E.

FANS—
Adam, J. M., & Co., Greenfield Iron Works, Dalmarnock, Glasgow.
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
Boothroyd, H. T., Ltd., Bootle, Liverpool.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [Belfast.
Davidson & Co., Ltd., Sirocco Engineering Works,
Hogan & Wardrop, 2, Gresham Buildings, Basinghall Street, London, E.C.
Keith, James, & Blackman Co., Ltd., 27, Farringdon Avenue, London, E.C.

FEED-WATER HEATERS—
Beresford Eng'n'ring Co., Beresford Lane, Cardiff.
Central Marine Engine Works, West Hartlepool.
Contraflo Condenser & Kinetic Air-Pump Co., Ltd., 3, Central Buildings, Westminster, S.W
Royles Ltd., Irlam, Nr. Manchester.
Weir, G. & J., Ltd., Cathcart, Glasgow.

FILES—
Brown, John, & Co., Atlas Works, Sheffield.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

FILTERS (Marine)—
Central Marine Engine Works, West Hartlepool.
Chambers, John, Ltd., Lowestoft.
Cockburns Ltd., Cardonald, Nr. Glasgow.
Mather & Platt, Ltd., Manchester.

FIREBARS—
Liverpool Patents Co., Ltd., Derby Square, James Street, Liverpool.

FIRE EXTINGUISHERS—
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Mather & Platt, Ltd., Manchester.

FIRE-FIGHTING APPLIANCES—
Mining Engineering Co., Ltd., Meco Works, Sheffield.

FLAGS—
Riley, Edward, & Co., Leeds.
Speedings, Ltd., Sail Works, Sunderland.

FLOATING DOCKS—
Chalmers, Wm., & Co., Ltd., Rutherglen, Nr. Glasgow. [Scotland.
Hamilton, Wm., & Co., Ltd., Port Glasgow,
Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne.

FLOOR COVERING—
Docker Bros., Ltd., Metropolitan Road, Saltley, Birmingham.

FORCED DRAUGHT—
Adam, J. M., & Co., Greenfield Iron Works, Dalmarnock, Glasgow. [Belfast.
Davidson & Co., Ltd., Sirocco Engineering Works,
Howden, J. & Co., Ltd., Scotland Street, Glasgow.
Keith, James, & Blackman Co., Ltd., 27, Farringdon Avenue, London, E.C.

FORGING PRESSES—
Berry, Henry, & Co., Ltd., Croydon Works, Leeds.
Mactaggart, Scott & Co., Ltd., Loanhead, Edinburgh.

FORGINGS—
Brown, John, & Co., Ltd., Atlas Works, Sheffield.
Darlington Forge Co., Ltd., Darlington.
Hingley & Sons, Ltd., Nethertoo Iron Works, Staffs.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

FORGINGS (Bronze)—
Delta Metal Co., Delta Works, East Greenwich, London, S.E.

FORGINGS (Steel)—
Brown, John, & Co., Ltd., Atlas Works, Sheffield.
Darlington Forge Co., Ltd., Darlington.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

FUMIGATORS—
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.

FURNACE BRIDGES—
Hamilton, A., & Sons, 13, Bute Crescent, Docks, Cardiff.
McConwell, A., & Co., Ltd., 60, Drury Buildings, Water Street, Liverpool.

FURNACES—
Brown, John, & Co., Ltd., Atlas Works, Sheffield.
Deighton's Patent Flue & Tube Co., Ltd., Vulcan Works, Pepper Road, Leeds.
Leeds Forge Co., Ltd., Leeds.
Piggott, T., & Co., Ltd., Birmingham.

FUSES—
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

GALLEY GEAR—
Grieve, T., & Sons, Bedford Street, North Shields.

GALVANIZERS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

GAS ENGINES—
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Mather & Platt, Ltd., Manchester.

GAUGES—
Chatwin, Thos., Ltd., Gt. Tindal St., Birmingham.

GEAR CUTTING—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds

GEARING—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.

GEARS—
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

GEARS (Noiseless or Silent)—
British Thomson-Houston Co., Ltd., Rugby.
Brown, David, & Sons (Hfd.), Ltd., Huddersfield.

GOVERNORS—
Aspinall's Patent Governor Co., 7, Strand Street,

GRINDING MACHINES— Liverpool.
Greenwood & Batley, Ltd., Albion Works, Leeds.

GRINDING WHEEL MACHINES—
Sterne, L., & Co., Ltd., Crown Iron Works, Glasgow

HATCH COVERS (Patent)—
Hogg-Carr Construction Co., Ltd., Newcastle-on-Tyne.

HEATING APPARATUS—
Ashwell & Nesbit, Ltd., Barkby Lane, Leicester.
Royles Ltd., Irlam, Nr. Manchester.
Saunders & Taylor, Ltd., 43, Lower Mosley Street, Manchester.

HEATING ENGINEERS—
Ashwell & Nesbit, Ltd., Barkby Lane, Leicester.
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Royles Ltd., Irlam, Nr. Manchester.
Saunders & Taylor, Ltd. 43, Lower Mosley Street, Manchester.

HELM SIGNAL TELEMOTORS—
Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh

HIGH SPEED DRILLS—
Brown, John, & Co., Atlas Works, Sheffield.

HIGH SPEED STEEL—
Brown, John, & Co., Atlas Works Sheffield.

HOISTS—
Mather & Platt, Ltd., Manchester.
Stothert & Pitt, Ltd., Bath.
Waygood-Otis, Ltd., Falmouth Road, S.E.

BUYERS' GUIDE—*continued.*

HOSE—
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, London, S.E.

HYDRAULIC CRANES—
Berry, Henry, & Co., Ltd., Croydon Works, Leeds.
Brown Brothers & Co., Ltd., Rosebank Iron Works, Edinburgh.
Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh

HYDRAULIC MACHINERY—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Berry, Henry, & Co., Ltd., Croydon Works, Leeds.
Waygood-Otis, Ltd., Falmouth Road, S.E.

HYDRANTS—
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

INDIARUBBER—
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, London, S.E.

INDICATORS—
Robinson, A., & Co., Ltd., Bootle, Liverpool.

INDUCED DRAUGHT—
Davidson & Co., Ld., Sirocco Eng'n'g W'rks, Belfast
Keith, James, & Blackman Co., Ltd., 27, Farringdon Avenue, London, E.C.

INSULATIONS—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W. [Liverpool.
Liverpool Refrigeration Co., Ltd., Colonial House,

IRON ROOFS AND BUILDINGS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

JOINTING MATERIAL (Manganesite)—
Hudson & Co.'s Successors, John, 15, Victoria Warehouses, Mansell Street, E.C.

LAMPS AND LIGHTS—
Grieve, T., & Sons, Bedford Street, North Shields.
Kaye, Joseph, & Sons, Ltd., Leeds.

LAUNCHES—
Chambers, John, Ltd., Lowestoft.
Crichton, J., & Co., Saltney Shipyard, Chester.
Leitch, John, & Co., The Ferry, Renfrew, Scotland.
Livingstone & Cooper, Ltd., Hessle, Hull.
MacLaren Bros., Ltd., Dumbarton.
Perman & Co. Ltd., 82-83, Fenchurch St., E.C.
Seamless Steel Boat Co., Ltd., Wakefield.
Thornycroft, John I., & Co., Ltd., Caxton House, Westminster, London, S.W.
Watson, J. S., Gainsborough.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

LAUNDRY MACHINERY—
Bradford, T., & Co., Salford, Manchester.

LAVATORY FITTINGS AND APPLIANCES—
Levick, John, Alma Street, Aston, Birmingham.

LEAD (Sheets and Pipes)—
Rimer Bros., Newcastle-on-Tyne.

LEAD (White and Red)—
Rimer Bros., Newcastle-on-Tyne.

LIFEBELTS AND BUOYS—
Speedings Ltd., Sail Works, Sunderland.

LIFTS (Window)—
Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield.

LIFTS AND HOISTS—
Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh
Waygood-Otis, Ltd., Falmouth Road, S.E.

LIGHTERAGE—
Alexander, W. H. J., St. John's Wharf, Wapping, E.

LIGHTERS—
Chalmers, Wm., & Co., Ltd., Rutherglen, Nr. Glasgow.
Crichton, J., & Co., Saltney Shipyard, Chester.
Watson, J. S., Gainsborough.

LIMEWASHING & DISINFECTING MACHINES—
Stonehouse Works Co., Ltd., Houghton Street, West Bromwich.

LOCKS—
Kaye, Joseph, & Sons, Ltd., Leeds.

LOCOMOTIVE TUBES (Copper & Brass)—
The Yorkshire Copper Works, Ltd., Leeds.

LUBRICATORS— [Cranstonhill, Glasgow.
McRobie, John, & Sons, 94, Elliott Street,

MACHINE TOOLS—
Campbells & Hunter, Ld., Dolphin Foundry, Leeds.
Greenwood & Batley, Ltd., Albion Works, Leeds.
Scriven & Co., Leeds Old Foundry, Leeds.

MACHINERY NAME PLATES—
Brown, Robert, & Co., 12, Espedair St., Paisley.

MAGNESIA—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.

MARINE ENGINEERS—
Bailey, C. H., Newport, Mon. Barry Docks.
Barry Graving Dock & Engineering Co., Ltd.,
Brown, John, & Co., Ltd., Clydebank, Nr. Glasgow.
Chambers, John, Ltd., Lowestoft.
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool. [Southampton.
Day, Summers & Co., Ltd., Northam Ironworks,
Delegación de la Compañia Trasatlantica, Cadiz.
Diamond, Thos., & Co., Cardiff.
Doxford, Wm., & Sons, Ltd., Sunderland.
Elliot & Jeffery, East Dock, Cardiff.
Gray, Wm., & Co., Ltd., West Hartlepool.
Harland & Wolff, Ltd., Belfast.
Harris Bros., Ltd., Cambrian Dry Docks, Swansea.
Hawthorne, R. & W., Leslie & Co., Ltd., Hebburn-on-Tyne.
Hill's Dry Docks & Engineering Co., Ltd., Cardiff.

MARINE ENGINEERS *(contd).—*
Isherwood, J. W., 4, Lloyd's Avenue, London, E.C.
Livingstone & Cooper, Ltd., Hessle, Hull.
Mountstuart Dry Docks, Ltd., Cardiff.
Perman & Co., Ltd., 82-83, Fenchurch St., E.C.
Shearman, John, & Co., Ltd., Cardiff.
Simons, Wm., & Co., Ltd., Renfrew, Nr. Scotland.
Stephen, Alex., & Sons, Ltd., Linthouse, Govan, Glasgow.
Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne. [Westminster, S.W.
Thornycroft, John I., & Co., Ltd., Caxton House,
Wallsend Slipway & Engineering Co., Ltd., Wallsend-on-Tyne.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.
Workman Clark & Co., Ltd., Belfast.
Yarrow & Co., Ltd., Glasgow.

MARINE GOVERNORS—
Aspinall's Patent Governor Co., 7, Strand Street,

MARKING-OFF TABLES— Liverpool
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.

MATTRESSES—
Stewart, Archibald, & Co., 40-48, Union St., Glasgow

METALLIC PACKING—
McConnell, A., & Co., Ltd., 60, Drury Buildings, Water Street, Liverpool.
United States Metallic Packing Co., Ltd., Bradford

METAL SPINNINGS—
Levick, John, Alma Street, Aston, Birmingham.

METALS (Patent)—
Bowran, Robt., & Co., Ltd., Newcastle-on-Tyne.
Delta Metal Co., Ltd., Delta Works, East Greenwich.

MOTOR BOATS—
Chambers, John, Ltd., Lowestoft.
Crichton, J., & Co., Saltney Shipyard, Chester.
Leitch, John, & Co., The Ferry, Renfrew, Scotland.
Livingstone & Cooper, Ltd Hessle, Hull.
Perman & Co., Ltd., 82-83, Fenchurch St., E.C.
Seamless Steel Boat Co., Ltd., Wakefield.
Thornycroft, John I., & Co., Ltd., Caxton House, Westminster, London, S.W.
White, J. Samuel, & Co., Ltd, East Cowes, I.W.

MOTOR STARTING AND CONTROL GEAR— [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

NAVAL ARCHITECTS' SUPPLIES—
Walker, Jas., & Co., 11, Bisbop Court, Anderston, Glasgow.

OIL CANS—
Kaye, Joseph, & Sons, Ltd., Leeds.

OIL ECONOMISERS—
Kaye, Joseph, & Sons, Ltd., Leeds.

OIL ENGINES—
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Edina Manufacturing Co., 19h, Broad Wynd, Leith.
Perman & Co., Ltd., 82-83, Fenchurch Street, E.C.
Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne.
Thornycroft, John I., & Co., Ltd., Caxton House, Westminster, S.W.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

OIL-FUEL INSTALLATION—
Wallsend Slipway & Engineering Co., Ltd., Wallsend-on-Tyne.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

OIL IMPORTERS & BLENDERS—
Rimer Bros., Newcastle-on-Tyne.

PACKING—
Beldam Packing & Rubber Co., Ltd., 1 and 2, Gracechurch Street, London, E.C.
Walker, Jas. & Co., Ltd., Lion Works, Garford Street, West India Dock Road, E.

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Cocks, Harry, & Co., Cardiff.
Hamilton, Archd., & Co., Possilpark, Glasgow.
Hoyle, Robson, Barnett, & Co., Ltd., St. Nicholas Chambers, Newcastle-on-Tyne.
Wailes Dove Bitumastic Ltd., 5, St. Nicholas Buildings, Newcastle-on-Tyne.
Websters Ltd., Hull.

PANELLING—
Stewart, Archibald, & Co., 40-48, Union St., Glasgow

PATENT HAWSE PIPE AND DECK FLANGE—
Hamilton, A., & Sons, 13, Bute Crescent, Docks, Cardiff.

PERFORATED METALS—
Braby F., & Co., Ltd., Eclipse Works, Glasgow.
Piggott, T., & Co., Ltd., Birmingham.

PIPES—
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.
The Yorksbire Copper Works, Ltd., Leeds.

PLANING MACHINES for Plate Edges—
Scriven & Co., Leeds Old Foundry, Leeds.

PLATE BENDING ROLLS—
Scriven & Co., Leeds Old Foundry, Leeds.

PORCELAIN ENAMELLED CAST IRON—
Levick, John, Alma Street, Aston, Birmingham.

PROPELLERS—
Billington & Newton, Ltd., Longport, Staffs.
Chambers, John, Ltd., Lowestoft. [Liverpool,
Crichton, C. & H., Ltd., Huskisson Engine Works.
Darlington Forge Co., Ltd., Darlington.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

PROPELLER BLADES—
Billington & Newton, Ltd, Longport, Staffs.
Darlington Forge Co., Ltd., Darlington.
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.

PUBLICATIONS—
"Shipbuilding and Shipping Record," Queen Anne's Chambers, Westminster, London, S.W.

PULLEY BLOCKS—
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.
Higginson & Co., 7, Hurst Street, Liverpool.
Loveridge, Ltd., Cardiff.
Wright, Joseph, & Co., Ltd., Tipton, Staffs.

PUMPING ENGINES—
Central Marine Engine Works, West Hartlepool.

PUMPS— [ing Works, Bedford.
Allen, W. H., Son & Co., Ltd., Queen's Engineer-
Beresford Eng'n'ring Co., Beresford Lane, Cardiff.
Berry, Henry, & Co., Ltd., Croydon Works, Leeds.
Davey & Co. (London), Ltd., 88, West India Dock Road, E.
Dawson & Downie, Elgin Works, Clydebank.
Edina Manufacturing Co., 19h, Broad Wynd, Leith.
Hall, J. P., & Sons, Ltd., Peterborough.
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Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Royles Ltd., Irlam, Nr. Manchester.

RADIATOR TUBES—
The Yorkshire Copper Works, Ltd., Leeds.

REAMERS—
Chatwin, Thos., Ltd., Gt. Tindal St., Birmingham.

REFRIGERATING MACHINERY—
Hall, J. & E., Ltd., Dartford Ironworks, Kent.
Liverpool Refrigeration Co., Ltd., Colonial House, Liverpool.
Sterne, L. & Co., Ltd., Crown Iron Works, Glasgow

RESCUE APPLIANCES—
Mining Engineering Co., Ltd., Meco Works, Moorfields, Sheffield.

REVERSING ENGINES (Direct-Acting Type)— [Works, Edinburgh.
Brown Brothers & Co., Ltd., Rosebank Iron
Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh

RHEOSTATS & RESISTANCES (all kinds)—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

ROPE-CUTTING MACHINES—
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.

ROPES (Wire)—
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.

ROUND AND OVAL HOLE CUTTING-OUT MACHINES—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.

RUBBER GOODS—
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, London, S.E.

RUBBER HOSE—
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, London, S.E.

RUSTLESS IRON—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

SAFE MANUFACTURERS—
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SALOON LIGHTS— Birmingham.
Callender's Cable & Constructioo Co., Ltd., Belvedere, Kent.
Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield.

SALVAGE—
Alexander, W. H. J., St. John's Wharf, Wapping, E.

SANITARY FITTINGS AND APPLIANCES—
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Darlington Forge Co., Ltd., Darlington.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

SHAPING MACHINES—
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SHEERS, TRAVERSING (Land and Floating)—
Day, Summers & Co., Ltd., Northam Ironworks, Southampton.

SHIP APPLIANCES—
Linkleter's Patent Ship Fittings Co., 20, Percy Street, Tynemouth.

SHIP BROKERS—
Walford, Leopold (London) Ltd., 29, Gt. St. Helens, E.C.

SHIP BROKERS (Sale and Purchase)—
Hall, Edward, Cardiff.
Pinkney, Thos., & Sons, Sunderland.
Walford, Leopold (London) Ltd., 29, Gt. St. Helens, E.C.

BUYERS' GUIDE—*continued.*

SHIPBUILDERS—
Brown, John, & Co., Ltd., Clydebank, Nr. Glasgow.
Chalmers, Wm., & Co., Ltd., Ruthergle n, Nr. Glasgow.
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Crichton, J., & Co., Saltney Shipyard, Chester.
Day, Summers, & Co., Ltd., Northam Ironworks, Southampton.
Delegación de la Compañia Trasatlantica, Cadiz.
Doxford, Wm., & Sons, Ltd., Sunderland.
Gray, Wm., & Co., Ltd., West Hartlepool.
Hamilton, Wm., & Co., Ltd., Port Glasgow.
Harland & Wolff, Ltd., Belfast.
Hawthorne, R. & W., Leslie & Co., Ltd., Hebburn-on-Tyne.
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Isherwood, J. W., 4, Lloyd's Avenue, London, E.C.
Livingstone & Cooper, Ltd., Hessle, Hull.
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Stephen, Alex., & Sons, Ltd., Linthouse, Govan, Glasgow.
Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne. [Westminster, S.W.
Thornycroft, John I., & Co., Ltd., Caxton House, Watson, J. S., Gainsborough.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.
Workman Clark & Co., Ltd., Belfast.
Yarrow & Co., Ltd., Glasgow.

SHIP CONSTRUCTION—
Brown, John, & Co., Ltd., Clydebank, Nr. Glasgow.
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Isherwood, J. W., 4, Lloyd's Avenue, London, E.C.
Simons, Wm., & Co., Ltd., Renfrew, Nr. Scotland.
Swan, Hunter, & Wigham Richardson, Ltd., and Maxwell Pallard, Wallsend Shipyard, Wallsend-on-Tyne.

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Linkleter's Patent Ship Fittings Co., Hudson Loveridge, Ltd., Cardiff.
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Metallic Valve Co., Colonial House, Water Street,
Stewart, Archibald, & Co., 40-48, Union Street, Glasgow.
Waygood-Otis, Ltd., Falmouth Road, S.E.

SHIP LAVATORIES—
Stewart, Archibald, & Co., 40-48, Union St., Glasgow

SHIP PLATES (Steel)—
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.

SHIP REPAIRERS—
Bailey, C. H., Newport, Mon.
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool. [Southampton.
Day, Summers & Co., Ltd., Northam Ironworks,
Dimond, Thos., & Co., Cardiff.
Doxford, Wm., & Sons, Ltd., Sunderland.
Elliot & Jeffery, East Dock, Cardiff.
Gray, Wm., & Co., Ltd., West Hartlepool.
Grayson, H. & C., Ltd., Royal Liver Building,
Harland & Wolff, Ltd., Belfast. Liverpool.
Harris Bros., Ltd., Cambrian Dry Docks, Swansea.
Hawthorne, R. & W., Leslie & Co., Ltd., Hebburn-on-Tyne.
Hill's Dry Docks & Engineering Co., Ltd., Cardiff.
Mountstuart Dry Docks, Ltd., Cardiff.
Shearman, John, & Co., Ltd., Cardiff.
Stephen, Alex., & Sons, Ltd., Linthouse, Govan, Glasgow.
Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne.
Wallsend Slipway & Engineering Co., Ltd., Wallsend-on-Tyne.
Yarrow & Co., Ltd., Glasgow.

SHIPS' ELECTRIC FITTINGS—
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

SHIPS' LAUNDRIES—
Bradford, T., & Co., Salford, Manchester.

SHIPS' TELEGRAPHS—
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.
Robinson, A., & Co., Ltd., Bootle, Liverpool.

SIGNAL FLASHING AND CABIN LAMPS—
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SILICATE-COTTON SPECIALITIES— [Glasgow.
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SKYLIGHT & LIFTING GEARS—
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.

SLAG WOOL (Silicate Cotton)—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.

SLEWING GEAR (for Ships' Derricks)—
Edina Manufacturing Co., 19b, Broad Wynd,

SMITHS' HEARTHS— Leith.
Keith, James, & Blackman Co., Ltd., 27, Farringdon Avenue, London, E.C.

SOLDER—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

SPEAKING TUBES—
Durham, Churchill & Co., Grimesthorpe, Sheffield.

SPELTER—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

SPIRAL SPRINGS—
Cockburns Ltd., Cardonald, Nr. Glasgow.
Sterne, L., & Co., Ltd., Crown Iron Works, Glasgow.

STAMPINGS—
Delta Metal Co., Ltd., East Greenwich.

STAYBOLTS—
Hingley & Sons, Ltd., Netherton Iron Works, Dudley, Staffs.

STEAM-FITTING MANUFACTURERS—
Billington & Newton, Ltd., Longport, Staffs.
Royles Ltd., Irlam, Nr. Manchester.

STEAM-HEATING—
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Royles Ltd., Irlam, Nr. Manchester.

STEAM KETTLES—
Royles Ltd., Irlam, Nr. Manchester.

STEAM PIPES—
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.
Yorkshire Copper Works, Ltd., Leeds.

STEAM TRAPS—
Cockburns Ltd., Cardonald, Nr. Glasgow.
Royles Ltd., Irlam, Nr. Manchester.

STEAM TURBINES—
Belliss & Morcom, Ltd., Birmingham.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Greenwood & Batley, Ltd., Albion Works, Leeds.
Howden, James, & Co., Ltd., Scotland St., Glasgow.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

STEAMSHIP SPECIALITIES—
Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield. [Liverpool.
Metallic Valve Co., Colonial House, Water Street,

STEEL—
Brown, John, & Co., Atlas Works, Sheffield.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

STEEL BARGES—
Crichton, J., & Co., Saltney Shipyard, Chester.
Watson, J. S., Gainsborough.

STEEL BOATS—
Crichton, J., & Co., Saltney Shipyard, Chester.
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Seamless Steel Boat Co., Ltd., Wakefield.

STEEL MAKERS—
Brown, John, & Co., Atlas Works, Sheffield.
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STEEL PLATES AND SHEETS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.

STEERING-GEAR—
Brown Brothers & Co., Ltd., Rosebank Iron Works, Edinburgh.
Chambers, John, Ltd., Lowestoft.
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool.
Hastie, John, & Co., Ltd., Greenock.
Higginson & Co., 7, Hurst Street, Liverpool.

STEERING GEAR (Buffers)—
Loveridge, Ltd., Cardiff.

STEERING TELEMOTORS—
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Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh

STOCKS AND DIES—
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STORES (Ship)—
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STRONG ROOM DOOR MANUFACTURERS—
Whitfield's Safe & Door Co., Oxford St., Birmingham

STRUCTURAL ENGINEERS—
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SUPERHEATERS—
Central Marine Engine Works, West Hartlepool.
Superheater Corporation, Ltd., Palace Chambers, 9, Bridge Street, Westminster, S.W

SUSPENSION BULB FURNACE—
Leeds Forge Co., Ltd., Leeds.

SWITCHBOARDS—
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Mather & Platt, Ltd., Manchester. on-Tyne.
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.
Sunderland Forge & Eng'r'ing Co., Ld., Sunderland.

SWITCHGEAR & INSTRUMENTS—
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

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McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

TANK TOP COVERING—
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TANKS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Mather & Platt, Ltd., Manchester.

TARPAULINS—
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TELEPHONES—
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McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.

TIMEPIECES—
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.

TOOL STEEL—
Brown, John, & Co., Atlas Works, Sheffield.

TOWAGE—
Alexander, W. H. J., St. John's Wharf, Wapping, E.
Tilbury Contracting & Dredging Co., Ltd., Queen Anne's Chambers, Westminster, London, S.W.

TUBE PLATE CUTTING-OUT MACHINES—
Campbells & Hunter, Ld., Dolphin Foundry, Leeds.

TUBES—
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.
Royles Ltd., Irlam, Nr. Manchester.
The Yorkshire Copper Works, Ltd., Leeds.

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TURBINE OIL—
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TURBINES—
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Greenwood & Batley, Ltd., Albion Works, Leeds.
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Mather & Platt, Ltd., Manchester.

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Chatwin, Thos., Ltd., Gt. Tindal St., Birmingham.

UPHOLSTERERS—
Stewart, Archibald, & Co., 40-48, Union St., Glasgow

VACUUM CLEANERS—
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VALVES—
Cockburns Ltd., Cardonald, Nr. Glasgow.
Mather & Platt, Ltd., Manchester.
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow. [Liverpool.
Metallic Valve Co., Colonial House, Water Street,
Royles Ltd., Irlam, Nr. Manchester.

VALVE RE-SEATER—
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Greenwood & Batley, Ltd., Albion Works, Leeds.

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Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield.
Loveridge, Ltd., Cardiff.
Low, Archibald, & Sons, Ltd., 78, Merkland St., Partick, Glasgow.

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WELDING & CUTTING—
Carbic Ltd., 51, Holborn Viaduct, London, E.C.

WINCHES—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool.
Higginson & Co., 7, Hurst Street, Liverpool.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

WINDLASSES—
Chambers, John. Ltd., Lowestoft.
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool.
Edina Manufacturing Co., 19b, Broad Wynd, Leith.

WIRE-ROPE COMPRESSORS—
Edina Manufacturing Co., 19b, Broad Wynd, Leith.

WOOD-WORKING MACHINERY—
Adam, J. M., & Co., Greenfield Iron Works, Dalmarnock, Glasgow.
Stonehouse Works Co., Ltd., Houghton Street, West Bromwich.
Wadkin & Co., North Evington, Leicester.

WORK TABLES—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds

YACHT BUILDERS—
Chambers, John. Ltd., Lowestoft.
Crichton, J., & Co., Saltney Shipyard, Chester.
Leitch, John, & Co., The Ferry, Renfrew, Scotland.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.
Yarrow & Co., Ltd., Glasgow.

ZINC—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

ALPHABETICAL INDEX TO ADVERTISERS.

** Where no number is shewn against an Advertiser's name, the advertisement appears either in previous or subsequent issues. Classified Index to Advertisers will be found on pages 19, 20, 21 and 22.*

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