The British Merchant Shipping Mission in the United States and British Merchant Shipbuilding in the Second World War

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Cet article traite du rôle de la British Merchant Shipping Mission (la BMSM - Mission de la Marine Marchande Britannique) aux États-Unis pendant la Seconde Guerre mondiale. L'industrie de la construction navale britannique avait traversé une période difficile au cours de la dépression de l'entre-deux-guerres et était à peine préparée à poursuivre adéquatement une guerre. L'Angleterre chercha ainsi à obtenir le soutien des États-Unis. Le progrès de la BMSM allait cependant révéler les faiblesses passées de l'industrie navale britannique et lui faire voir les défis à venir. Bien que l'on puisse affirmer que la BMSM a bel et bien joué un rôle significatif dans le programme de guerre de l'industrie, force est de constater que malgré le substantiel soutien gouvernemental, cette dernière n 'étaitpas en posture de faire face aux rigueurs du marché d'après-guerre.

There has been a recent upsurge in maritime historical scholarship which focuses on the role of an individual nation's merchant shipping in the broadest of contexts but especially its functions as the "fourth arm of defence."[4] Whilst it is a historical axiom that unrestricted U-boat warfare in both World Wars brought Britain to the brink of defeat in both conflicts it is still little appreciated how, in the Second World War particularly, the weakness of the British shipbuilding industry had to be overcome by provision of ships from overseas. The role of these ships, especially the Liberty Ship, is well enough known and the general activities of the British Purchasing Commission in the United States in meeting British

[4] In the British context see R. Hope, *A New History of British Shipping* (London, 1990), M. Doughty, *Merchant Shipping and War* (London, 1982), K.E. Smith, *Conflict Over Convoys: Anglo-American Logisitics Diplomacy in the Second World War* (Cambridge, 1996) and G. Kennedy (ed.) *The Merchant Marine in International Affairs, 1850 -1950* (London, 2000).

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deficiencies across a range of sectors is also well understood.[22] Less well understood, however, at least before the passage of Lend-Lease in March 1941, are the operations of the individual British Missions in the United States. As such this essay will focus on British strategic planning regarding merchant shipbuilding during the Second World War and the performance of the British Merchant Shipping Mission in the United States between 1940 and 1942. It will also consider the impact of "new" construction methods in the United States on the British shipbuilding industry. Despite attempts at modernisation through the Government inspired and financed Shipyard Development Committee between 1942 and 1945, the official view remained that the industry had not modernised enough to meet either the wartime crisis or the projected nature of demand in the post-war period.

One of the major historical lessons of the First World War for British maritime power was that lack of attention to detail in merchant shipping was potentially fatal. Unrestricted German submarine warfare exacerbated by port congestion and repair backlogs combined to produce a merchant shipbuilding crisis by 1916, a situation which was only resolved by progressive Government control over smpbuilding and other industries from 1916.[3] Thus the worth of Government control was enshrined in the planning for any future conflict and the Committee of Imperial Defence, through the Principal Supply Officers Committee, established Supply Committee III to investigate the shipbuilding, shipping and marine engineering industries and recommend allocations. Such estimates were relatively easy to produce between 1924 and 1936 as naval shipbuilding was circumscribed, constrained by the Ten Year Rule, the Washington and London Naval Treaties and near continuous pressure on the defence budget from 1919. The altered strategic circumstances of the second half of the 1930s led Supply Committee III to reconsider its previous recommendations and to establish a Shipbuilding Consultative Committee (SCC). The SCC was chaired by the Burntisland shipbuilder and Chairman of the Shipbuilding Conference, Sir Amos Ayre, with other leading shipbuilders attending.[4]

No planning, however, could fail to take into account the vast changes in the world shipbuilding market which had occurred since 1914. The UK's former dominance of world markets - between 1905 and 1913, for example, UK output had averaged over sixty percent of the world - was broken by a huge increase in shipbuilding capacity internationally. World output in 1919-1920 exceeded 13 million gross registered tons (mgrt), over four times the pre-war record, but with world trade growing slowly in the 1920s, this represented a vast over-capacity in carrying tonnage. Between 1923 and 1930, at least in theoretical terms, British shipyards could have met the world's demand for tonnage. The impact on British

[2] The most recent consideration of US shipbuilding in the Second World War is P. Elphick, *Liberty: The Ships that Won the War* (London, 2001), whilst the standard, if highly controversial, analysis of British industrial shortcomings and dependence on America is, C. Barnett, *The Audit of War: The Illusion and Reality of Britain as a Great Nation* (London, 1986).

[3] C E . Fayle, *The War and the Shipping Industry* (Oxford, 1927).

[4] Public Record Office (hereafter PRO) CAB 102/440, "Merchant Shipbuilding 1939-1945," unpublished narrative by C.C. Wrigley, paras 245-249. The other shipbuilders were the Clyde builders, Sir James Lithgow and Sir Maurice Denny, Sir Charles Craven of Vickers-Armstrong and F.C. Pyman of William Gray and Company of Hartlepool.

shipbuilding was a severe and protracted depression. Employment, in what was a heavily casualised industry, collapsed and from a high point of nearly 300,000 in 1920 only 69,000 were employed in 1932. The formal response of the industry was self-rationalisation and some 216 berths, or 1.4 mgrt of berth capacity was either closed or sterilised. The attitudes spawned by these appalling years would henceforward blight the whole industrial relations history of the industry. As was observed, "the true potential of the industry had long ceased to bear any relation to the output theoretically obtainable from its berths and plant."[44] The long depression had led the industry's labour force to adjust itself to the actual rather than potential level of production which was only measurable by labour supply and not berth potential. As early as 1936 the Shipbuilding Employers' Federation had highlighted labour supply as a major constraint on the expansion of production, and in 1937 the SCC Interim Report, prefaced its conclusion with the statement that, "effective production capacity should not be based upon the number of shipbuilding berths actually in existence in the yards, but on the berths for which it is likely that there would be sufficient labour in the emergency."[6]

Amidst a welter of planning documents in 1937 and 1938 two underlying assumptions are clear, that shipping losses would average the annual losses of the Great War and that British shipbuilding could produce 1 mgrt of dry cargo ships per year. As one commentator later observed:

> On the basis of an almost entirely hypothetical assessment, mcluding disjointed estimates, prepared at different times for different purposes and on the basis of different conditions, and containing a number of factors which it readily professed to be unable to quantify - still considered its estimates sufficiently accurate to justify the unqualified conclusion [that]: 'British shipping is adequate for the first year of the war.'[7]

By 1939, however, the Government was still engaged in trying to deal with the slump in shipbuilding and planning for war. Indeed, the President of the Board of Trade, Oliver Stanley considered it "essential for the safety of the country to reserve the capacity of the shipbuilding industry to produce a large volume of merchant shipping without delay should war break out. This capacity will not be maintained if the activity of the industry remains at its present low level, since...the necessary shipyard labour will be lost to other industries."[8] Accordingly the Government promulgated a Bill to support the construction of merchant shipbuilding, which although it lapsed on the outbreak of war, still provided for the construction of some 150 vessels of almost 750,000 grt. Taken together with fourteen orders placed by the Government, this undoubtedly filled a gap which otherwise would have been

[5] PRO, CAB 102/440, para 33 and footnotes.

[6] PRO, CAB MT40/23, Shipbuilding Consultative Committee, Reports to the Committee of Imperial Defence, 1936 and Shipbuilding Consultative Committee, Interim Report, July 1937.

[7] Doughty, *Merchant Shipping,* 107 and see also 68-73 and 86-114.

[8] PRO, CAB 27/1656 Sl(39)l, "Committee on the Shipping Industry," Composition and Terms of Reference, 20 January 1939.

revealed upon the outbreak of war.[9]

The outbreak of war occasioned only few alarms in its first months. By the end of 1939, however, the excess of demand for shipping over its available supply was being described as "fantastic."By January 1940 the Lord Privy Seal, Sir Samuel Hoare, surveyed the position for the Cabinet and his views mark a step-change in terms of attitudes towards merchant shipbuilding in war and his conclusions are worth quoting at length.

> We should set our hands to securing an output of merchant shipping as such at a much higher rate than we have contemplated hitherto. ... From the point of view of securing relief from our shipping difficulties there are hardly any limits to the extent to which it is to the national advantage to increase our output of merchant tonnage. For the possession of such tonnage is not only of value for the purpose of providing the carrying capacity not otherwise obtainable, since, even if output could be raised to the full extent required for that purpose, it would be to the national advantage still further to increase our merchant fleet, since to do so would enable us to dispense with the need for chartering neutral tonnage on disadvantageous terms or even perhaps to re-employ some of our shipping in neutral trades, thereby giving us additional foreign exchange.[10]

The dramatic nature of this statement reflected the situation still prevailing in the "Phoney War" and could hardly take account of the strategic disasters of 1940. With Churchill committed to mamtaining Britain's position in the Middle East, the fall of Denmark, Norway and France in the Spring of 1940 stretched British thinking to the limit. By May 1940 the priority was to get the British Expeditionary Force off the beaches and then respond to potential invasion. The entry of Italy into the war and the use of the Biscay coast by the German Navy fundamentally changed the strategic picture. The losses of Allied ships soared - between June and October 1940 Axis submarines alone sank over 1.5 mgrt - and Allied shipping lost another 500,000 grt to all attacks.[11] By July 1940 the Minister of Shipping concluded that the loss rate was unsustainable and, "besides decreasing the death rate we must increase the birth rate."[12] Given the constraints attaching to British shipbuilding, the above proved easier to conceptualise than realise, however, and attention began to turn to the United States.

The British Merchant Shipbuilding Mission (BMSM) to the USA duly arrived in New York on 3 October. It was headed by Cyril Thompson, the Chairman of the Sunderland shipbuilders Joseph L. Thompson & Sons. With him was Harry Hunter, the Technical Director of the Tyneside firm, North Eastern Marine Engineering Co. Also attached to the

[9] PRO, C A B 102/440, paras 275-283.

[10] PRO, C A B 102/440, paras 61-62.

[11] On this see, C. Blair, *Hitler s U-Boat War: The Hunters 1939-1942* (London, 1996) 771 and P. Padfield, *War Beneath the Sea: Submarine Conflict 1939-1945* (London, 1995) 481-483.

[12] Quoted in Smith, *Conflict Over Convoys,* 17.

Mission were the Principal Surveyor for Lloyd's Register in the USA and Canada, William Bennett, Lloyd's Principal Engineering Surveyor in New York, J.S. Heck and R.R. Powell, an Assistant Secretary at the Admiralty but now attached to the British Admiralty Technical Mission who was transferred to the Shipbuilding Mission to act as Secretary. The Slnpbuilding Mission would work under the auspices of Sir Walter Layton the head of the British Purchasing Commission (BPC) in New York. The Mission was charged with obtaining, as quickly as possible, 60 tramp vessels of 10,000 dead-weight tons capable of a service speed of 10.5 knots. To facilitate as much standardisation as possible around a single design, Thompson had taken with him to New York the drawings for his own yard's Ship Number 607, later to become *Empire Wave* and sometimes termed the North Sands Type after the location of one of the Thompson yards, a design which became the progenitor of the Liberty ship. Although the Mission was given considerable leeway in its negotiations it was restricted to an initial financial limit of £10 million; its activities were quickly extended to include purchases in Canada in order to procure 18 vessels.[13]

Within two days of its arrival the Mission visited Rear Admiral Emory S. Land, the Chairman of the US Maritime Commission whom Thompson reported as being as "anxious to be as helpful as possible."It quickly became clear in negotiations that most US shipbuilding capacity was being fully utilised and that for the British the best option may well be to reactivate or open redundant/new yards. This had been provided for in the initial remit of the Mission but it was widely regarded as the worst possible option. Despite this Thompson had already carried with him an extension to the original limit of £10 million to £15 million.[14] Following the meeting with Land the Mission then embarked on a whirlwind tour of shipyards in the United States and Canada to ascertain exactly what was feasible in terms of their needs. The tour was a revelation in that the Mission quickly realised that after the long depression which had afflicted US as well as UK shipbuilding, the industry was saturated with a variety of rearmament needs of its own. Another aspect the Mission had clearly not anticipated but perhaps should have, was the difference in technical approaches to building. On a visit to the Tacoma yard near Seattle, for example, the Mission noted that the yard had not even existed at the outbreak of the war. From only two berths, however, it had already launched two ships and two more were on the berths. Thirty five-ton cranes were average and welding predominated with the only riveting connecting shell plating to frames amidships. The Mission considered all of the workmanship to be a "very high and satisfactory standard," an outstanding achievement given that of 1,200 employees only 50 had ever worked in a shipyard previously.[15]

Despite criss-crossing the North American continent visiting yards and other

[13] See PRO ADM 116/4990 Admiralty and Secretariat Papers, "Merchant Shipbuilding Mission," Various papers, October 1940; University of Glasgow Business Archives Centre, Sir James Lithgow Papers, DC 35/69, "Merchant Shipbuilding Mission to USA," 11 October 1940 and P. Elphick, *Liberty* 23-33 for the origins of the proposals.

[14] P. Elphick, *Liberty,* 39-40. (The already agreed, if secret, limit was actually £20 million).

[15] PRO, ADM 116/4990, "Merchant Shipbuilding Mission," Notes on visit to the Tacoma Shipyard of the Seattle Tacoma Shipbuilding Company, undated, but October 1940.

facilities it quickly became obvious to the Mission that the Maritime Commission would only sanction construction in new facilities. By the end of October the Mission telegraphed to London its preliminary conclusions that "no large existing yards in United States can undertake work for us."On the other hand the Todd Shipyard Corporation had been "practically allocated to us . . . provided we act quickly.'This offer appears to have been made by the U.S. Maritime Commission although, as the BMSM noted "if we lose this chance Maritime Commission will certainly give them orders."Impressed by Tacoma which was part of the Todd organisation, the Mission argued that Todd's were the only potential source of ships "in quantity" and that although the deal would be costly "the larger the original order the lower the price will be and the better the deal.'The Mission pressed for agreement as soon as possible. By 4 November, A.V. Alexander, the First Lord of Admiralty and R.H. Cross, the Minister of Shipping, petitioned the War Cabinet that whilst the delivery dates were longer than was hoped and that the price at £25 million was £5 million above the secretly agreed limit, they were "convinced . . . that in view of the abnormally heavy losses our shipping has recently suffered all 60 vessels should be ordered at the earliest possible date."[16] The full War Cabinet considered this on 6 November. Whilst the Chancellor, Kingsley Wood, felt that he could not oppose the proposals he did feel that the Treasury should be consulted in advance were further expenditure necessary; this the War Cabinet agreed to at the same time as it approved the Alexander-Cross proposals.[17] This formed the basis of a reply which allowed the Mission to proceed with its negotiations.

Indeed, the following day the B M S M met with the President of the Todd Shipyards Corporation, John D. Reilly, to thrash out terms. Individual ships would cost between $1.5 and $1.6 million and would be welded, of around 10,800 dead-weight tons with reciprocating engines and Scotch boilers. This would approximate as closely as possible to the design given to the New York naval architects Gibbs and Cox (who were effectively acting as a clearing house for British orders in the US) which would be adapted to US building conditions. The first delivery was promised in 12 months with the full 60 in 20 to 24 months and a further 60 (if required) in a further 12 months. The ships would be built in two designated yards - one on the East and one on the West coast - with the sites being approved by the Mission. On the downside "the whole project would be financed by the British Government" with the Corporation expecting to be paid for the construction of the ships on a normal contractual basis.[18] Having reached a formative agreement with Todd the Mission left for Canada but not before asking London for permission to conclude the deal. They later wired from Canada seeking agreement to order a further 18 ships at a cost of £9 million.

[16] PRO, A D M 116/4989, "Merchant Shipbuilding Mission," extract from telegram 29 October 1940 and War Cabinet WP (40) 433, "Merchant Shipbuilding," Memorandum by the First Lord of the Admiralty and the Minister of Shipping, 4 November 1940. The B M S M was gloomy over the prospects if they did not get the Todd yards. Such a failure in their view would mean that "We shall have to try to obtain ships from Mushroom Concerns on time and time (sic) basis".

[17] *ibid.,* Extract from Conclusions of a Meeting of the War Cabinet, WM (40) 283, 6 November 1940.

[18] PRO, A D M 116/4990, "Merchant Shipbuilding Mission," Proposed terms of Contract with Todd Shipyards Corporation and his associates, 7 November 1940.

The BMSM visits to Canada were no more and no less encouraging than those to the United States. The Mission identified three yards - Canadian Vickers, Davie Shipbuilding and Burrard Vancouver - as being able to build ships to the British account. Costs in Canada, however, as the Mission noted were "relatively somewhat higher than the cost of our programme in the United States."Despite the fact that the British had a dim view of Canadian shipbuilding in general, as the BMSM observed "Canadian yards had not built merchant ships for a number of years," desperation overrode conviction. On a visit to Burrard's, for example, the Mission noted that the firm was building corvettes and minesweepers, but had "a good platers shed . . . [which] . . . was well equipped."Additionally "the works generally appeared to be well organized and the management capable and very keen to take on additional work on behalf of the British Government."Canadian shipbuilding had received a shot in the arm but it would not last for long.[19]

As the Chancellor commented in correspondence with the First Lord, A.V. Alexander, he wished "it had been possible to postpone a decision until we are able to see our way more clearly as regards financial assistance from the United States".[20] Given the status of the war, however, Britain was in no position to continue trying to minimise dollar expenditure and now the purse strings were loosened with dramatic effect.[21] A few weeks later Thompson telegraphed Ayre that "negotiations with Todd are now rapidly approaching finality."The estimated capital expenditure on the yards was $8.5 million and on ships $87.5 million and, as the Mission commented "we feel that the deal should be concluded immediately on the basis that British Government should provide all necessary finance."Accordingly the Mission sought approval to incur immediate capital expenditure of $8.5 million. This took no account of further expenditure in Canada and the scale of expenditure caused a degree of consternation in London.[22] Indeed, Sir James Lithgow wired back stating that the proposals cut across "our settled financial arrangements" and introduced "fears of dangerous precedent".[23] The wrangle was played out between the Treasury, Admiralty and War Cabinet as to costs and the designs of the ships. This invoked a change of design with the Thompson 607, *Empire Wave* being replaced by the same yards 611, *Empire Liberty,* the design which would actually form the basis of the Liberty ship. The original design was amended by Gibbs and Cox, the New York firm of naval architects and

[19] PRO, ADM 116/4989, "Merchant Shipbuilding Mission," Merchant Shipbuilding in Canada to Admiralty Account; PRO, ADM 116/4990 "Merchant Shipbuilding Mission," Meeting in New York, 4 October 1940; and Notes on visit to Burrard Dry Dock Company, 25 October 1940. The issue is given consideration from the Canadian point of view in M A . Hennessy, "To Market or to War? NATO Shipping Pools and the Demise of the Canadian Merchant Marine" in Kennedy (ed) *The Merchant Marine,* 176-209.

[20] PRO, ADM 116/4989, Merchant Shipbuilding in Canada to Admiralty Account, Alexander to Wood, 18 November 1940 and Wood to Alexander, 22 November 1940. For the construction of ships to UK account in Canada see S.C. Heal, *A Great Fleet of Ships: The Canadian Forts and Parks* (St. Catherine's Ontario, 1999) passim.

[21] On this issue see PRO, CAB 102/519, "History of Overseas Supply," by H. Duncan Hall, *passim.*

[22] PRO, ADM 116/4989, Salor 351, From Ayre to Thompson, Merchant Shipbuilding Mission, 1 December 1940 and Position of Negotiations for Building Merchant Vessels for Admiralty Account in Canada, 3 December 1940.

[23] *ibid.,* Salor 361, For Thompson from Lithgow, 5 December 1940.

as Thompson was to recall: "Their function was to produce a new set of plans, based upon those provided by us, but modified as regards to the substitution of welding for riveting, and to suit American practice . . . Gibbs were to purchase all the major items . . . and arrange for everything to be delivered at the shipyard at the right time."[24] Towards the end of December contracts were signed with the Todd-Bath Iron Shipbuilding Corporation and the Todd-California Shipbuilding Corporation and a number of yards in Canada. The B M S M had covered hundreds of thousands of miles in visiting some 35 yards and other potential building sites, in a remarkable *tour de force* on behalf of the British war effort. If they hadn't exactly secured the idealistic terms sought by the War Cabinet they had got the best that they could and, in all probability, given a further boost to US shipbuilding which would prove vital in the wider war effort.

Despite the success of the B M S M the War Cabinet could barely disguise its dissatisfaction with the small number of ships coming from North America which did little to close the gap being widened by sinkings, repairs and port congestion. Throughout the early months of 1941 attention turned to increasing output and improving productivity in British yards. Given recent history, entrenched mind-sets and the prominent role played by Sir James Lithgow in the wartime organisation (a quasi-official sanction of his role in the rationalisation of the industry in the 1930s and a seeming acceptance of his virulent anti-labour views) all served to retard this. Dilution and interchangeability, which did so much in other industries, made little progress in shipbuilding with, much to the chagrin of the Minister of Labour, Ernest Bevin, the employers every bit as intransigent as labour. A whole raft of proposals, including one to decasualise the industry which had an important impact in the ports, got precisely nowhere.[25] Thus the Prime Minister could declare almost simultaneously that "everything turns on the Battle of the Atlantic. Our losses in ships and tonnage have been very heavy, and vast as they are the shipping resources which we control, these losses could not continue indefinitely without seriously affecting our war effort and our means of subsistence," and that "it is to the United States building that we must look for relief in 1942."[26] Long, hard and ultimately fruitless negotiations made no progress in boosting British shipbuilding output and the British consistently eyed the US as the cradle of its salvation.

By the spring of 1942 the B M S M had reported the American view to London that not enough was being done to increase output and productivity in the U K. When Powell reported this to Ayre the reply was a mixture of cantankerous and doleful. Ayre took the

[24] *ibid.,* Salor 390, For Thompson from Lithgow, 12 December 1940 and see also P. Elphick, *Liberty,* 47-8,53-7. The quotation is from Elphick, pp. 55-6.

[25] The context of this is well captured in K. Smith, *Conflict* 5-27 and see also, P R O A D M 116/4891, Report to the Right Hon., Ernest Bevin M P, Minister of Labour and National Service, 7 February 1941, Minutes of a Conference, 13 February 1941, Joint Report to the Minister of Labour and National Service, 12 & 13 February 1941, Meeting between the Minister of Labour, First Lord of the Admiralty and Representatives of the Shipbuilding Industry, 1 March 1941, and the Government's Plan for Shipyard Labour, 17 April 1941. See also P R O, A D M 116/555, Meeting between the First Lord and the C S E U, 10 March 1942 and letter from A. V. Alexander to Sir William Jowitt, April 1942.

[26] Quoted in A D M 116/4891 and also Smith, *Conflict* 24.

view that no comparisons could be made between the two industries as British yards were on old established sites not chosen from considerations of space and that "without space, welding and pre-fabrication and assembly on the lines being adopted in America now are not practicable . . . it would be foolish for us to adopt welding just for the sake of doing so. "According to Ayre, the crux of the problem was labour. In the UK the total average workforce of 90,000 employed during the late 1930s corresponded to the peak demand of the industry. Thus, the increase to 170,000 employed in the spring of 1942 represented "a remarkable achievement" although it was quickly conceded that only one-fifth were engaged on merchant shipbuilding with the rest engaged upon repairs and naval work. Citing the example of the Richmond yard, Ayre claimed that it employed 9,000 workers, which equated to 1,300 workers per berth, or the total number employed in a four-berth yard in the UK. Comparing Richmond and Thompson's, Ayre claimed that output per person in the US was, 28 tons per man per annum, whilst on the Wear it was 57 tons per man per annum "showing that we are not down in this old country yet."Still, according to Ayre, the scope for mass production in the UK was "very small indeed," given the labour force constraint which was being "reduced by death alone.'Tndeed, Ayre recommended that Powell tell the Americans "that there is only the halt, the lame and the blind that are left in this country today without a job of work."To cap it all "as recently as yesterday at a meeting in the Controller's room, a Shipbuilder mentioned that the Employment Exchange in his locality had actually offered him a man as an unskilled labourer who was in possession of only two limbs."[27]

The overall situation had, of course, been changed by the Japanese attack on Pearl Harbor in December 1941. The war had become genuinely world-wide and, in the process, gravely affected Britain's shipping difficulties. Whilst US belligerence at least implied that the full weight of American economic resources would now be bent in service of the war, in the short term the situation deteriorated. To existing commitments were now added war in the Pacific and a German declaration of war on the US. After a period when Allied sinkings had fallen, in late 1941, 1942 proved to be horrific. In January 1942 the Germans launched Operation *Paukenschlag* against die eastern seaboard of the US and a change in the Enigma cipher machine caused a ten-month intelligence blackout of U-boat traffic. Losses soared and Britain once again struggled with measures to overcome a shipping crisis. Sensitive to American criticisms, a range of enquiries were launched into ways of improving British output. Two major reports were produced in 1942, the Barlow Report into the conditions of labour in the shipyards and the Bentham Report on the equipment of shipyards and marine engineering shops. Amidst a raft of recommendations including extending dilution, piecework and the work of yard committees, Barlow decided "that the Government's attention be directed to modernisation where this is feasible as a matter of urgency."Such schemes should cover the layout of yards and shops, equipment, including craneage, machine shop facilities and welding and that "the Government should give the

[27] PRO, A D M 116/5555, A. L. Ayre to R.R. Powell, 25 April 1942.

industry such assistance as may be necessary."[28] Bentham, who toured UK shipyards, made recommendations on a yard by yard basis, for improvements in plant, although the yard managements were under no obligation to accept them.[29] These reports led to the establishment of a Shipyard Development Committee (SDC) whose terms of reference were "to consider proposals and where necessary initiate action for the improved equipment, re-equipment and or extension of shipyards and marine engineering works with a view to achieving maximum economic production, and to ensure that such proposals are consistent with the most economical use of manpower."[30] This Committee began its work in November 1942.

Between the Barlow and Bentham Reports and the work of the SDC, the Director of Merchant Shipbuilding, Sir Amos Ayre toured the North American shipyards with a view to making recommendations. This gave Ayre little cause for comfort although he persisted in asserting British labour shortages as the main source of difficulties. He could not, however, deny the revolution taking place in American shipbuilding. The use of welding was extensive, craneage lifts much heavier than in the UK, the physical scale of the yards and the numbers employed as well as the absolute scale of technology applied to the work process all astonished Ayre. As he commented on his visit to the Henry Kaiser owned Vancouver yard near Portland, Oregon: "Having regard to what I had already seen, this yard excels everything; it is impossible to exaggerate in describing this establishment. (At the conclusion of the tour I am able to add that this is the finest yard of all I saw; there cannot be anything like it anywhere in the world)." In comparison, however:

> It is impossible to repeat in . . . [the] . . . UK the wonderful effort of the USA if only because of the position regarding labour supply. It would even be difficult to find in . . . [the] . . . UK a suitable site for such a shipyard of USA layout, which is now approaching the requirement of nearly a square mile and a fitting-out quay of more than half a mile in addition to the water frontage required for the slips.

The prospects, therefore, of applying US shipbuilding methods wholesale to the UK did not seem very propitious. To his enormous credit, however, Ayre did recommend a range of measures which the UK industry could consider and adopt.[31]

From its outset the SDC identified three areas of immediate concern in which

[28] PRO. ADM 116/5555, Report to the Minister of Production of the Committee set up by him to Enquire into Conditions of Labour in Shipyards, 24 July 1942 and ADM1/11892. Labour in Naval and Mercantile Shipyards, July 1942.

[29] PRO, BT 28/319, Report by the Machine Tool Controller on the on the Equipment of Shipyards and Marine Engineering Shops, 30 September 1942 and CAB 102/441, Notes by Mr Bentham on his visits to Shipbuilding and Marine Engineering Firms, August to September 1942.

[30] PRO, ADM 116/5052, Memorandum from Sir James Lithgow on the Shipyard Development Committee, July 1942. The Minutes of the meetings of the SDC are also contained in this classification.

[31] PRO, ADM 116/5555, Visit of the Director of Merchant Shipbuilding to North America, September 1942, Diary together with notes and recommendations.

modernisation was deemed to be necessary: the extension of welding schemes, the provision of new machine tools, and schemes for yard development, including new and larger craneage. As Table 1 shows, Admiralty expenditure on plant and machine tools rose substantially after 1942:

Table 1: Admiralty Expenditure 1940-1944, Plant and Machine Tools (£000s)

1940	1941	1942	1944
259	869	4,002	4,090

Source: CAB 102/442, Merchant Shipbuilding and Repair

It is probable, however, that a proportion of these costs were subsumed into the costs displayed in the following table, but the overall picture in terms of yard development and welding is, nonetheless, enhanced.

Table 2: Total Costs of, and Admiralty Contribution to, SDC Yard Developments and Welding Schemes in Naval and Merchant Shipyards

Yards	Total Cost	Admiralty Contribution
Naval Yards General Development	3,084,618	2,490,482
Merchant Yards General Development	1,671,599	1,162,956
Welding	776,866	451,781

Source: CAB 102/442, Merchant Shipbuilding and Repair

The total value of SDC schemes was almost £7 million, of which the Admiralty provided just over £5 million. In terms of welding the Admiralty provided far more than its promised 50 per cent contribution, but Government expenditure on this scale, on yards that were generally unsuitable for any large scale pre-fabrication schemes due to spatial limitations, was confirmation, if such were needed, that the overall position of the industry was sorry indeed.

The year 1943 saw the high watermark of the huge American emergency shipbuilding effort and indeed the turnrung point in the Battle of the Atlantic. By November, W. Franklin Knox who sat on the US Maritime Commission was able to announce that more tonnage had been built than had been sunk in the war to date.[32] Tonnage under British control also showed a net gain after the horrendous losses of 1942. As Table 3 [next page]

HMSO, *Build the Ships: the Official Story of the Shipyards in Wartime* (London, 1947) 63.

demonstrates, whilst British gains were welcome they were as nothing compared to the huge US output. The gains coincided with an increasing attrition rate against the U-boat in the

Table 3: British and United States net gains (+) or losses (-) 1942 and 1943

Date	British Controlled			US Controlled		
	Gains	Losses	Net gain or loss	Gains	Losses	Net gain or loss
1942						
January - March	546	757	-211	300	296	+ 4
April - June	607	892	-285	909	587	+ 322
July- September	822	980	-158	1387	490	+ 897
October - December	626	1334	-708	1727	287	+1440
1943						
January - March	542	722	-180	2147	419	+1728
April - June	643	437	+206	2855	213	+2642
July- September	830	389	+441	2650	215	+2435
October - December	338	266	+ 72	2571	155	+2416

Source: C B A *Behrens, Merchant Shipping and the Demands of War* (London, 1955) 293

Atlantic. There were many factors involved in this: the resumption of Ultra intelligence, the more effective use of convoying and the closure of the air gap through the use of escort carriers.[33] With U-boat losses at 41 for May 1943 alone, Admiral Doenitz was forced to revise strategy. As he noted "We have to accept the heavy losses provided the amount of enemy shipping sunk is proportionate. In May, however, the ratio was one U-Boat to 10,000 gross tonnage of enemy shipping, whereas a short time ago it was one U-boat to 100,000 gross tonnage of enemy shipping. The U-boat losses in May 1943 therefore reached unbearable heights … ,"[34] The U-boats were thus withdrawn to less hazardous areas.

The easing of the situation in the Battle of the Atlantic coincided with the British decision, inspired by the desperate need for dollars to maintain its Lend Lease obligations,

[33] On this see W.J.R. Gardner, *Decoding History; The Battle of the Atlantic and Ultra* (London, 1999) 178-209 and E.J. Grove, (ed), *The Defeat of the Enemy Attack on Shipping, 1939-1945* (Aldershot, 1997) 87-123.
[34] Quoted in E.J. Grove, (ed), *The Defeat,* 93.

to sell the two Todd Corporation Yards which they owned since 1940 to the US Maritime Commission. This sale, at an exchange rate of $4 to £1, resulted in a net loss to the British Exchequer of approximately £750,000. This was a transaction that the Treasury representative in Washington deemed, on the whole to be favourable. In effect, Britain had transferred a liability, albeit for the Allied pool of ships, to build vessels in their yards to the United States Maritime Commission, a factor which prompted one parliamentarian to observe that Britain had sold her ally a "pup."Overall, the cost of building ships in the USA was around three times more expensive than in Britain, with the two yards costing around £7.5 million of £26 million spent on shipyards and ships, out of a total of £39 million expended by the Admiralty on armaments.[35] Given the urgent need for these vessels at the time and subsequently, this was a relatively small price to pay, even though it had resulted in a considerable drain of much needed dollars. The spatially limited British shipyards could not, however, hope to compete with US production times. Ayre continued to assert the liability of the labour constraint but from 1942 production in some yards had been diverted into the building of merchant aircraft carriers, troop ships or tankers equipped with a flight deck, elevators and a hanger, which whilst it undoubtedly weakened the mercantile programme, in all probability enhanced the strategic situation.[36]

By 1944 consideration in the UK had turned to the future of the shipbuilding industry in the post war world. A vast amount of thought, talk and paper was expended to create a Shipbuilding Committee and its successor body the Shipbuilding Advisory Committee in an effort to avoid what the First Lord, A.V. Alexander termed the "chaotic conditions" of the past.[37] Despite the fulminations, despite the financial efforts of the SDC and despite the evidence of an entirely new approach to shipbuilding methods, traditional attitudes and approaches remained impossible to break. Ayre, for example, advanced the view that the industry "must at least talk to the unions," and that they must be told (as if they did not already know) what "exactly was the position of the industry in 1938."Following much discussion, however, John Boyd of the Shipbuilding Employers' Federation, declared that "in the long-run the test was what the industry was prepared to do, not what the unions were prepared to do."[38] The Clyde Shipbuilder, Maurice Denny, probably summed the situation up by stating that "Unless our industry takes this [modernisation] seriously and goes into the future with a complete determination on a 'must' basis, we shall bequeath our successors the same legacy of strife, frustration and comparative stagnation that has been on the whole a characteristic of our industry in the past."[39] As a forecast of doom it carried the weight of Cassandra.

[35] British Parliamentary Papers, 1943-1944, Vol JJ, Public Accounts Committee, Minutes of Evidence, 25 May 1943, paras 2963-2992.

[36] A. Ayre, "Merchant Shipbuilding During the War," *Transactions of the Institute of Naval Architects* (April 1945), *passim.*

[37] On those discussions see L. Johnman, "The Shipbuilding Industry," in H. Mercer, N. Rollings and J. Tomlinson, (eds), *Labour Governments and Private Industry: The Experience of1945-1951* (Edinburgh, 1992). See also, NMM, SRNA4, PI 1/1, Committee on Improved Shipbuilding Practice, 1944-1945.

[38] NMM, SRNA4, PI 1/1, Committee on Improved Shipbuilding Practice, 1944-1945.

[39] NMM, SRNA4, PI 1/3, Sub-Committee on Welding, Denny to Ayre, 6 February 1945.

Alexander, however, was not the only figure at the Admiralty to be concerned over the industry. The Under Secretary, E A . Seal, who had served on the B M S M , reflected:

> The industry is in by no means a healthy condition. The principal weaknesses seem to me to be a lack of up-to-date equipment, and worse than that, a general failure on the part of management to recognise their deficiencies in this respect, or if they do recognise them a general disinclination to remedy them . . . . The real fact of the matter is that instead of worrying about the future efficiency of the industry they are like a lot of small-minded pettifoggers simply worrying about a minor and literally insignificant detail and using their alleged lack of capital as an argument.

Seal also believed that the new production methods established in the US would be widely copied and that "competition from the Continent.. . will soon be intense again."[40]

These views were all the more trenchant for being made not in an office-only internal memorandum but in a letter to the Director of Naval Construction, Charles Lillicrap. Seal proposed to use a future meeting with the shipbuilders "to say what I have been feeling in my heart for some time," and sought Lillicrap's advice on his proposals. These were far-reaching in that Seal envisaged nothing less than a full scale enquiry into the industry to examine whether or not it was adequately equipped for post-war competition and if not, what could be done as well as an examination of management efficiency and the financial state of the industry. Lillicrap's reply was hardly any more encouraging than Seal's *cri de coeur* in that he was "very sorry . . . to have to agree generally with your indictment of die shipbuilding industry. "As Lillicrap noted "What has exasperated me so much is that the Shipbuilders did not welcome with open arms the opportunity for capital development necessary to bring themselves up to date . . . the only explanation is I fear innate conservatism and reluctance to face up to the fact that the old methods are outmoded."

Lillicrap took the view that British yards were hampered in that they had laid-out for riveting technology, not welding, and that it was "a matter for wonderment that they ever had budt ships at all."Commenting on the inter-war slump his view was "that even remembering the dreadful slump days the policy adopted has been one of pinch-back economy, whereas what was wanted was a bold facing up to modernisation."Lillicrap's general view of the industry was that:

> It is stubbornly conservative and this includes the Marine Engineering side of it. They are slow to change any well-established practice . . . but in these days of rapid progress it simply has to be done. The yards have been built up on rivet practice and the equipment is more or less adequate for that purpose, but the new processes have come to stay. Of that I am convinced and I have said so in season and out of season.

PRO, A D M 116/5555, E A . Seal to C.S. Lillicrap, 22 March 1945.

Thus Lillicrap shared Seal's view of the industry. He did not, however, agree with Seal's recommendations having "very serious doubts about your proposals] . . . I think rather I should say that I have no doubt whatever that it would not be a wise move, as I am certain the industry would resent it and the opposition would be tremendous."[41] Thus the diagnosis was agreed but the prescription was not. It was, however, fatal in that all the same problems would come home to roost, but twenty five years later.

The British Merchant Shipbuilding Mission had done valuable work; it had closed the gap between sinkings and launches, formed the basis of the huge emergency programme of the US and set the trend for post-war building. Arguably it had provoked, directly or indirectly, a wide-ranging debate about shipbuilding construction methods in Britain and forced the Government to the realisation that without financial intervention there was little chance of technological reform. How far such measures could be pushed in the admittedly desperate conditions of the war remained, however, a moot point. The Admiralty consistently despaired on the issue of welding as the representative of the Director of Naval Construction commented in 1942 "it is the DNCs policy to increase welding as much as possible, and . . . the present position is that we cannot get as much welded structure as we would like . . . firms should be encouraged to weld rather than rivet."[42] But as the DNC himself observed in 1945, Thornycroft's had had to be threatened with the prospect of no more naval orders before they would adopt welding.[43] Despite the evidence from the United States, the pressure from the Admiralty and the evidence in the technical journals, the antipathy in terms of ship design and construction methods remained. As N.M. Hunter of Swan Hunter and Wigham Richardson commented "I think there is a great danger of the spectacular building of a very simple type of comparatively small cargo ships of one design, built in the USA during the last war years in great number, creating an impression that the methods used were new and so far ahead of any in this country that they should be slavishly copied.[44] Although the debate continued, the prevalent technological conservatism would be disguised by the post-war seller's market. That British shipbuilders failed to make the changes, so clearly enshrined in US production methods in the Second World War, established the parameters for the decline of British shipbuilding in the post 1945 period.[45]

[41] PRO, A D M 116/5555, C.S. Lillicrap to E.A. Seal, 23 March 1945.

[42] N M M, Ship's Box 666, Intermediate Aircraft Carrier 1942, Note of Controller's meeting held in the Grand Pump Room Hotel, Bath, 11 March 1942.

[43] PRO, A D M 116/5555, Lillicrap to Seal, 23 March 1945.

[44] Quoted in, Discussion on, "The application of modern management methods to the shipbuilding industry," *Transactions of the North East Coast Institute of Engineers and Shipbuilders,* 63 (1946-1947).

[45] On the post-war position see, L. Johnman , "Old Attitudes and New Technology: British Shipbuilding, 1945-1965" in P C. van Royen, L.R. Fischer and D.M. Williams (eds) *Frutta diMare: Evolution and Revolution in the Maritime World in the 19th and 2ff Centuries* (Amsterdam, 1998) 133-152.