Sea power and its effective exercise by nations rested upon solid economic, financial, and industrial foundations. In general, national capacity and resources dictated the ability to build and operate fleets of ocean-going ships for military and trade purposes. Machine-age navies, in particular, were by nature technically complex and demanding. Warship construction constantly incorporated changes in technology, design, and production technique, in order to promote efficiency and quality advantage over rivals.¹ Interplay between finances, policy, anticipated threat levels, strategy, operational requirements, and tactical employment factored into naval plans and in turn the available number and types of ships. In the first half of the twentieth century, the long lead times and significant budgetary constraints characteristic of naval procurement during peace gave way to the hurried provision of ships, munitions, and ordnance in quantity when money flowed more freely in times of impending crisis and world war. Shipbuilding, a highly cyclical industry, became a major benefactor of enlarged government business geared toward victory. Timely construction of ships for war purposes required sufficient shipbuilding capacity - public and private sector - at the call of procuring authorities.² New sources of supply in support of this effort grew in geographical areas, either under-utilized or until then deemed non-economical for competitive commercial reasons, for the


sake of national defense. Wartime shipbuilding proved a great artificial catalyst to regional economic development, temporary job creation, and industry-specific stimulus.³

Shipbuilding was part of a larger process by which civilian and military effort met the needs of deployed fighting forces, broadly falling under the classification of logistics. Logistics, though certainly not new in the naval sphere, reached higher levels of importance and refinement in prolonged conflict spanning the globe involving total mobilization. The navies so engaged adapted through practical experience, learning, and improved organization. Henry Eccles, a retired rear admiral with first hand wartime knowledge of naval logistics and professor at the US Naval War College in Newport, Rhode Island, described logistics as "the bridge between the economy of the nation and the tactical operations of the combat forces."⁴ This seemingly simple proposition masked the inherent complexity behind the delivery of goods and material from the home country of origin to have some significant effect on the conduct of naval and military operations far away at a distance. The key elements so identified included determination of requirements, procurement, and distribution. According to Eccles, the overriding objective of any logistic effort in war was "the creation and sustained support of combat forces."⁵ Logistics was deductively a function of command, and to be realistic, had to be merged seamlessly into planning and managed properly. Setting of clear goals, informed awareness, and constant discipline were always necessary because resources were finite.⁶

Though serving a military purpose, logistics represented blended activity on the part of first civilian and then uniformed naval participants. Eccles distinguished between two distinct phases: producer logistics and consumer logistics. The former, the main focus here, furnished the means of war out of available financial, industrial, and managerial


assets within mobilized national economies instead of how navies operationally and tactically used those goods and services themselves.\(^7\) Since Allied planning and strategic decisions were predicated on waging war against enemies located across large bodies of water, shipbuilding in North America was a core war industry, second only to aircraft manufacturing. Rationale for the renewal and remarkable growth of shipbuilding along the Pacific Coast behind producer logistics primarily came from the perceived and real threat of Japan's militaristic and territorial ambitions across the Pacific Ocean.

Any major conflict with Japan was strongly maritime in scope and prosecution. Japan was an island nation dependent upon imports, and possessing an advanced navy and to some degree an expeditionary army accustomed to fighting from land and sea outside the home islands in China and elsewhere. Events before and after the surprise Japanese attack on the American naval anchorage at Pearl Harbor in late 1941 reinforced the immediacy of adequate preparations on the industrial home front. The Battle of the Atlantic against German U-boats, while impacting the Atlantic and Gulf Coasts, was remote compared to the shocking disablement of the US Pacific Fleet's main battle line of battleships, quick loss of the Philippines and other colonial territories including the main British naval base at Singapore, as well as latent fears of direct attack on North America proper, until the decisive sea battle at Midway turned the scales. The shift from defensive to offensive operations demanded more warships, fleet auxiliaries, specialized transports, and landing craft in unprecedented quantities. Shipyards in the western US states and province of British Columbia received contracts and construction orders for ships as fast as they could build them. Geographical proximity, industrial capacity, and adequate supply of labor in key cities duly turned the Pacific Coast into a focal-point for wartime shipbuilding.

The overview that follows gives a sense of the scale and scope of shipbuilding along North America's Pacific Coast from the years 1937 to 1946. To meet the Japanese threat, expanded and newer shipyards operated in several major urban areas, namely San Francisco, Los Angeles, Portland-Vancouver, Seattle, as well as Vancouver and Victoria, British Columbia. Many business executives and private companies interacted with

government officials and naval authorities beyond just the attention-seeking businessman and entrepreneur Henry Kaiser, to whom historical writings and popular narrative customarily attribute most achievements in Pacific Coast shipbuilding. The tremendous effort on both sides of the international border involved a multitude of industrial concerns and categories of shipyards at various locations working to build ships necessary for specific operational requirements. The entire Pacific Coast transformed into a huge integrated base of operations and continental shore establishments for projection of military power across the Pacific Ocean. The foundation was the shipyards, those who ran them, and the ships that they produced. Wartime shipbuilding was a temporary phenomenon that came and went with the stimulus furnished by conflict with Japan.

**Toward Rearmament**

Prior to 1936, shipbuilding on the Pacific Coast was caught in a deep boom and bust pattern. The last period of large-scale shipbuilding in the region arose during the final years of the First World War, when standardized steel and wood ships had been completed for the United States Navy, the government-run Emergency Fleet Corporation, and the Imperial Munitions Board. This shipbuilding activity extended into the early 1920s, mainly to provide continued employment for workers and ward off industrial unrest that might influence socialist politics. The result was a glut of relatively new ships, exceeding in number those that could profitably be employed on existing coastal and international shipping trade routes or naval service. Attempts to expand markets and even establish a government-backed Canadian Merchant Marine using surplus wartime ships met only marginal success. Already depressed economic conditions took a turn for

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the worse with the 1929 stock market crash and onset of the Great Depression afflicting North America and the rest of the world. The number of mercantile ships built on the Pacific Coast since 1921 was negligible.\textsuperscript{10} In fact, many private companies went years without construction orders or simply ceased to operate, either by choice or forced into bankruptcy. Those yards that survived eked out a bare existence on the staple business of ship repair by keeping costs low and carefully watching the bottom line. Until expected demand increased as ships grew older, the shipbuilding industry drifted along in the doldrums.

The Pacific Coast had also been for all intents and purposes shut out on the naval side for a long time. Atlantic Coast shipyards were favored on the basis of price and locale by the Navy Department. The public navy yards at Puget Sound and Mare Island laid down hulls for a handful of destroyers and light cruisers on building ways. Destroyers, the largest warships in the Canadian inventory, were acquired from British sources because the federal government preferred foreign purchase to indigenous building for reasons of interoperable British designs, attractive prices, and better quality.\textsuperscript{11} Even the reasonably well-equipped Yarrows yard beside the Pacific naval base at Esquimalt with affiliation to a British parent company and privileged access to a new large government graving dock performed mostly ship repair work. Because the Washington Limitations Treaty of 1922 signed by the major naval powers including the United States, Japan, and Great Britain on behalf of the Commonwealth limited the number and size of major capital ships, an absolute building holiday was respected in regard to battleships, the main big gun fleet unit, whereas aircraft carriers and cruisers were restricted by strict tonnage ratio, which favored the United States over Japan roughly 5:3.\textsuperscript{12} Despite persistent lobbying from shipyard interests and politicians on the

Pacific Coast, no warship contracts were forthcoming for private firms as long as treaty limits were in place.

Presidential politics and national finances also influenced the size and strength of the United States Navy. The administration of disarmament-minded Herbert Hoover chose not to build up to allowed levels, safe in the knowledge that naval superiority was still preserved through the Washington treaty and supplemental limitation agreements negotiated in London. That Japan cheated on naval arms limitation through clandestine building and creative interpretation of restrictions in its favor was an open secret, but hardly changed the matter. Franklin Roosevelt, a new Democrat president elected in 1933 with strong ties to the navy and more apprehensive about Japan's intentions, allocated funds from New Deal public works under the National Industrial Recovery Act toward shipbuilding for naval benefit.13 The policy may have been explained publically in terms of fostering good skilled employment in tough economic times, though the strategic rationale of replacing older with newer more capable warships in the American fleet was not lost on the president. Battleships were still excluded, but aircraft carriers, cruisers, destroyers, and submarines were added as replacements and new additions.14 Selected shipyards on the Pacific Coast entered into competitive bidding for a share of this business, notwithstanding higher relative labor costs, harder access to raw materials, and plain lack of recent experience in such naval building compared to eastern yards. Japan's withdrawal from arms limitation with expiration of the treaty system in 1936 opened the way for more shipbuilding on behalf of the navy as restrictions fell by the wayside and the United States openly began rearmament. Japan was increasingly framed as the most likely potential enemy for the use of those naval forces.

During the pre-war period, American strategic and operational planning was heavily weighted toward fighting a likely naval war with Japan. In the US Navy, a number of color-coded war plans were prepared for the sake of possible contingency and

to focus fleet exercises and long term procurement activity. War Plan Orange, among the
most developed plans, specifically anticipated offensive operations against Japan to
regain lost territory in the western Pacific and to destroy the Japanese battle fleet there.\textsuperscript{15}
The basic premise was fighting far away from the shores of North America by projecting
and maintaining strong US naval forces over long distances in numbers sufficient to seize
enemy-held fortified islands and possess quantitative and qualitative superiority in any
fleet or sea engagement. Annual naval maneuvers, called fleet problems, involved mock
landings of marines on American-territory Pacific islands under the protection of the
navy.\textsuperscript{16} Such activities tested the adequacy of evolving American operational concepts
and disclosed some of the key challenges in command and control, ship design and
capabilities, as well as logistics arrangements.

War Plan Orange, in this respect, represented a blueprint for how the United
States Navy intended to prosecute war successfully against Japan, duly ingrained into a
generation of naval officers at home and in the Far East. The effect of this strategic focus
and the previous treaty limitations created ships of the fleet with greater endurance,
innovation in carrier aviation, and truly novel ideas about provision of fleet underway
support and mobile basing.\textsuperscript{17} The main obstacle, in those years, to realizing the full
implications of War Plan Orange was financial. The plans needed sufficient ships of the
right type and any building of ships required money from the government. Carl Vinson,
chair of the Congressional Naval Affairs Committee, and Park Trammel, chair of the
Senate Naval Affairs Committee, collaborated to get legislation passed committing to a
long-term building program with the promise of future appropriations.\textsuperscript{18} The explicit
goal was a modern fleet for use against Japan and power projection in the Pacific should


\textsuperscript{17} John T. Kuehn, \textit{Agents of Innovation: The General Board and the Design of the Fleet That Defeated the Japanese Navy} (Annapolis, MD: Naval Institute Press, 2008).

war come. Besides newer and larger warships, provision of fleet auxiliaries, particularly fast tankers able to keep up with the fleet, was essential. Given the widening scope of rearmament, greater interest was shown in shipbuilding capacity available on the Pacific Coast to meet some of these needs.

In the United States, revival of Pacific Coast shipbuilding received stimulus from a new government body tasked with renewal and modernization of the American-flagged mercantile fleet. The 1936 Merchant Marine Act created the United States Maritime Commission and granted it authority to place shipbuilding orders and contracts on government account according to rational long-term programs for the country as a whole. Emory Land, the retired admiral brought in to lead the commission, assured business and congressional interests that the Pacific Coast was included in rehabilitation if the shipbuilding industry itself took the initiative.\(^{19}\) In Summer 1937, the Maritime Commission followed up with preliminary study of shipbuilding in various regions and on-site visits to see first-hand the state of facilities and labor supply. A survey of four areas on the Pacific Coast - Seattle, Portland, San Francisco Bay, and Los Angeles - concluded that San Francisco was best positioned for immediate construction of ocean-going ships with existing skilled labor and private companies, though other areas could be profitably developed through extension of financial assistance for plant improvements and recruitment of workers.\(^{20}\) As the Maritime Commission settled on a number of standardized hull designs for its long-range program, interested shipyards were invited to bid on contracts starting in 1938. Admiral Land personally believed there was then room enough for at least two principal shipyards on the Pacific Coast and he invited the president of Oakland-based Moore Dry Dock to Washington for consultation.\(^{21}\) This company subsequently received a contract for 5 C3 cargo hulls, to be built for the Maritime Commission by 1940. Additional contracts for smaller C1 cargo hulls went to two other shipyards in San Francisco, a steel-company affiliated yard in Los Angeles.

\(^{19}\) National Archives and Records Administration, College Park (NARA C-P), RG 178 Entry 35 Box 65 Bundle "Shipbuilding in 1937", Summary, Emory Land to Joseph Moore, 26 June 1937.
\(^{21}\) NARA C-P, RG 178 Entry 35 Box 65 Bundle "Shipbuilding in 1938", Summary, Emory Land, 21 November 1938.
harbor, and an associated Todd shipyard in Seattle.\textsuperscript{22} The designs were purposefully amenable to conversion as naval auxiliaries should need arise. In fact, the US Navy requested that the Maritime Commission start a program of high-value fast tankers which could be easily adapted to war purposes.\textsuperscript{23} The ships as much as the encouragement of facilities to build them on the Pacific Coast served predominantly strategic military requirements. The Maritime Commission's program and early interest in Pacific Coast shipbuilding paralleled accelerated rearmament by the United States Navy and the smaller Royal Canadian Navy.

Naval rearmament in both countries proceeded in the context of rising worries about Japan and bolstering of defenses against possible seaborne attack in the Pacific. The Naval Expansion Act, passed by Congress in 1938, stipulated a 20 percent increase in fleet strength, not less than 3,000 naval aircraft, 26 additional auxiliaries, and $15 million at the discretion of the president for acquisition of light surface craft below 3,000 tons.\textsuperscript{24} The US fleet in the Pacific took higher priority than the Atlantic, thereby adhering to the \textit{de facto} interwar policy of a one ocean navy. On the Pacific, most construction of naval vessels went to the Puget Sound and Mare Island navy yards where heavy cruisers, destroyers, and submarines were completed by industrial staffs on available building ways. The additional naval building provided continuity of employment and preservation of skills for ship repair and refit work. At that point in time, the only private shipyard engaged in naval work was Bethlehem Steel Company's Union Iron Works plant in San Francisco, which constructed two Gridley-class 1,500 ton destroyers. Nonetheless, the Navy Department was eager to expand building facilities in the two Pacific navy yards and enlist nearby private shipyards when further appropriations became available in the next few years. On the Canadian side, William Lyon Mackenzie's Liberal government had embarked on a limited naval rearmament


\textsuperscript{24} Operational Archives Branch, Naval History and Heritage Command, Washington Navy Yard (OAB/NHHC), Administrative History No. 89a-b. "U.S. Naval Administration in World War II: Bureau of Ships during World War II", 98.
program, mainly purchase of destroyers from Great Britain, with the aim of having a flotilla of 6, half of which stationed in the Pacific at Esquimalt. Ostensibly for coastal defense, these small warships were to guarantee Canada's neutrality in the event of war between the United States and Japan or more likely join cooperatively in local defense plans. The international boundary straddled the Strait of Juan de Fuca which controlled access to Puget Sound and the important US naval base at Bremerton. To fill out this force, private shipyards in Victoria and North Vancouver were awarded contracts for construction of two Fundy (British Basset) class coal-driven minesweepers. Although small with limited operational capabilities, these steel ships were the first naval vessels built in British Columbia in over three decades. After Canada's mobilization for war in September 1939, western Canadian shipyards received further contracts for improved British-type minesweepers and corvettes earmarked for the Royal Canadian Navy and the Royal Navy. Some of these warships stayed on the Pacific Coast after working-up to an operational state. By such means, rearmament eased Pacific Coast shipyards into the torrent of building orders soon to materialize on the horizon.

Financing and Contracts

For two countries still not at war with Japan, the pace of naval construction in North America quickened in short order as targeted funding appropriations came forth. Estimates just under $96 million for a projected two year Canadian shipbuilding program were allotted for corvettes and minesweepers spread out among a larger number of builders and work to begin on fleet destroyers of British design. Shipyards in North Vancouver and Victoria received some orders for the first, while the second were concentrated in one yard at Halifax on the east coast, coincidently the political riding of the naval minister, Angus Macdonald, a former Nova Scotia premier. Burrard Dry Dock and Yarrows, the two best equipped shipyards in western Canada, could probably have

28 LAC, RG 19 Vol. 3984 File N-2-9, Memorandum, J.L. Ralston to Governor-in-Council, 1 February 1940.
built destroyers faster, though at substantially greater cost than back east.\textsuperscript{29} In fact, simpler American-type destroyers building in Puget Sound represented a far more logical choice since management and industrial ties across the border were close.\textsuperscript{30} Destroyer construction expanded beyond the Pacific navy yards to private shipyards like Todd Dry Docks in Seattle and Bethlehem Steel interests in San Francisco and San Pedro. On 14 June 1940, Roosevelt signed a long-awaited naval expansion act allowing for construction of additional aircraft carriers, cruisers, and submarines, representing an 11 percent increase to US fleet strength (less than half the 25 percent actually requested), followed on 19 July 1940 by the so-called "two ocean navy" act giving another 70 percent increase.\textsuperscript{31} The latter, valued at nearly $2 billion, approved building 1.3 million tons of warships comprising 7 larger battleships, 18 aircraft carriers, 33 heavy and light cruisers, 115 destroyers, and 43 submarines, 100,000 tons of auxiliary naval vessels, and 15,000 naval aircraft. Shipyards on the Pacific Coast were most suited to building a share of the smaller warships. The sizeable growth, once realized, finally boosted the United States Navy above former treaty limits and signaled a determination to out-build any other naval powers, with special view toward a combination between Nazi Germany and Japan.

Shipbuilding on this scale was only achievable by leveraging private shipyards inside and outside the navy's stable of existing producers. Whilst the largest capital ships were still reserved for the Atlantic Big Three (New York Shipbuilding, Newport News Shipbuilding and Dry Dock, Bethlehem Steel Company's Fore River shipyard), Bethlehem Steel's waterfront San Francisco plants gained continuing orders for cruisers and destroyers. Starting from August 1940, a responsible naval officer working from the Bethlehem premises supervised and coordinated all private shipyards engaged on naval

\textsuperscript{29} In regard to Yarrows, the controller of ship construction and repairs stated: "Destroyer facilities will be prepared, should we decide to encourage such development by this company." LAC, RG 24 Series D-1-c Vol. 817 File 1280-325, Letter, D.B. Carswell to K.S. MacLachlan "Brief Summary of Shipbuilding Facilities in Canada", 25 November 1940.
work in the San Francisco Bay area. The weight of naval construction shifted to Bethlehem-Almeda once the navy expropriated the steel company’s Hunter's Point site and docking facilities for other purposes. In keeping with Roosevelt's declaration of a limited national emergency, the naval districts and affected private shipbuilding interests mobilized so far as prevailing peacetime conditions on the Pacific Coast permitted.

At the heart of the transactional business relationship with government procurement officials overseeing shipbuilding was the contract. Although the customary rigorous competitive bid process associated with such work was somewhat relaxed given unprecedented demands of growth and speed, contractors had first to be qualified, second abide by the terms and conditions imposed through the contract, and third respect allowable cost and profit margins. In practical terms, a shipyard had to exist alright, preferably with modern facilities of sufficient size and suitably skilled personnel showing some measure of expertise and experience. On this score, the available pool of eligible enterprises on the Pacific Coast was indeed limited. Prospects for getting contracts, however, were demonstrably improved if owners or business representatives were known to procuring authorities. Canadian war contracts, including shipbuilding, were handled through the Department of Munitions and Supply, a dedicated federal agency under a heavy-weight political cabinet minister, Clarence Howe, who also exercised authority for placement of all contracts on behalf of the British Admiralty in Canada; on the American side, contracting authority rested with the Navy Department's bureau of ships for warships and the Maritime Commission for cargo vessels and any other ships deemed necessary for military requirements, landing craft and auxiliaries being the most obvious examples. Trips from the Pacific Coast to Ottawa and Washington, D.C. invariably increased visibility and occasionally resulted in promises of contracts being forthcoming on the spot. Moreover, congressmen, senators, and ministers of parliament were ever willing to remind officials in the procurement process about shipbuilding potentialities in their political constituencies, as some voters and business interests lobbied them to do. For instance, Admiral Land and his deputy Howard Vickery were inundated with letters

from Pacific Coast firms seeking contracts or wanting information about Maritime Commission and navy shipbuilding work.\textsuperscript{34} In actuality, procurement authorities screened companies for financial soundness, good management practices, and basically ability to deliver on time and budget.\textsuperscript{35} Once satisfied, a contract could well be awarded to a shipyard deemed qualified and ready to produce; numerous private firms and subcontractors on the Pacific Coast became engaged on major naval and government work. Procurement officials, however, were never adverse to taking back work or cancelling contracts in clear cases of under-performance. Shipyard owners and the government alike lived by the terms of the contract.

The types of contracts pertaining to shipbuilding on the Pacific Coast varied in form and purpose. In general, the object was to ensure that price as well as profit were considered fair and reasonable on either side. Navies had traditionally used the fixed or firm price contract, in which costs were fairly well-known amongst producers experienced in warship building. Canada's Department of Munitions and Supply, like the British Admiralty, tried in principle to adhere to this basis as much as possible by adding escalator clauses to cover variable costs if necessary.\textsuperscript{36} Canadian shipbuilders, many of whom had apprenticed or trained in Scotland and England, proved amenable or at least familiar with the practice. As true competition disappeared, procurement officials increasingly resorted to investigation of actual costs and various forms of renegotiation. Companies really had no other recourse, except to give up lucrative government work. For US shipyards, the United States Navy preferred the newer fixed price incentive contract, a variation which negotiated a reasonable ceiling price meaning the contractor lost any excess above and shared in the profit if below, the lower the costs the greater the amount.\textsuperscript{37} Often requiring legal expertise and elaborate cost accounting to run smoothly, this form of contract introduced a certain degree of efficiency and flexibility. Costs, procurement officials and shipyards observed, customarily dropped in runs of serial production, so that later ships were cheaper than the first built. Fixing prices either too

\textsuperscript{34} NARA C-P, RG 178 Entry 28 Boxes 1-2, Commissioner H.R. Vickery Office Reading Files, 1942-43.
\textsuperscript{35} NARA C-P, RG 178 Entry 29 Box 20 File "Shipbuilding - Financial and Cost Accounting Aspects", Memorandum, "Financial Resources of Bidders for Shipbuilding Contracts".
\textsuperscript{36} TNA, CAB 102/203, T.L. Thorne, "Admiralty Contracts", December 1944.
\textsuperscript{37} NARA C-P, RG 178 Entry 35 Box 62, Pamphlet, \textit{Buying a Navy: A Description of Navy Buying, Prepared by the Navy Department for the Information of Business Men and Naval Officers}, May 1946.
high or too low could then create problems later on. The least favored contract on the part of procurement officials was the cost plus, much maligned in the previous world war for, it was claimed, rewarding contractors by reimbursing costs and in turn needlessly increased profits. Some shipbuilders, whom likely disagreed on that last point, believed the accounting system more realistic and fairer in regard to real costs and risk. The Maritime Commission whenever possible avoided cost plus contracts in favor of fixed price or differential-fee, as much to stay competitive with the Navy Department which held the edge on financing and publicity. The US Navy secured most of the established Pacific Coast shipyards, arguably the best run, for its own production and repair needs.

Notwithstanding basic differences in contracting philosophy, both the navy and the Maritime Commission extended generous facilities construction contracts for plant expansion, purchase of machine tools, and equipment up-grades. Shipyards acquired additional land and built new building ways and shops. The government retained title and ownership if funded directly, or companies investing their own money gained accelerated depreciation on corporate income taxes, wherein capital expenditures were written off in as little as 3 years instead of the normal 20. Innovative contracts provided the legal and fiscal framework for Pacific Coast shipbuilding to really accelerate.

The Pacific Coast was a prime choice for vastly expanded merchant shipbuilding. Shipyard space was still available because the navy's penetration into the industry was less intensive compared to other parts of North America. In early 1941, the Maritime Commission embarked on an emergency program of 200 standardized cargo ships (in addition to 60 to be built for the British) mentioning both Los Angeles (8 ways) and Portland (8 ways). The chosen design was based on a simplified British tramp steamer redrawn to American production standards, christened the Liberty ship (officially designated EC2). It was cheaper, easier to build, and more economical than the Maritime Commission's existing standard designs, which were also on order in bigger numbers. By the following June, the number of Liberty ships authorized for construction was

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38 Franklin Roosevelt Library, Hyde Park, Isador Lubin papers Box 118 File "Shipping and Shipbuilding November 1942 - December 1943", Emory Land to Isador Lubin "Memorandum as to Maritime Commission Contracts", 22 September 1943
39 NARA C-P, RG 178 Entry 5A Box 2 File "1940", Memorandum, E.J. Land to President "Project - 200 Merchant Marine Ships", 27 December 1940. The navy was concerned about the priority that the 200 ship program would over warship construction. OAB/NHHC, Admiral Harold Ramsford Stark papers, Series II Box 4 File "Admiral H.R. Stark, 1940-41 Chief of Naval Operations", Diary, 5 February 1941.
doubled. Admiral Land also brought Canadian shipyards into the picture in a deal worked out in Washington talks with Harvey MacMillan, a British Columbia businessman and lumber baron now president of the crown corporation Wartime Merchant Shipbuilding Limited set-up by the Canadian government. The Americans agreed to finance, on behalf of the British, building of 63 standard emergency ships based on the North Sands 10,000 ton design and 10 smaller 4,700 ton ships as well as provide allocations of steel and key components. In effect, Canadian merchant shipbuilding became an extension of the Maritime Commission's ambitious program. Most contracts went to the Pacific Coast, not surprising given MacMillan's business and personal connections. Burrard Dry Dock opened a second yard across Vancouver harbor devoted entirely to merchant ships, while other nearby shipyards rushed to add more building slips and complete facilities.

The dire predicament of Great Britain in the Battle of the Atlantic has commonly been cited as the chief impetus for this sudden interest in North America shipbuilding. In truth, the ships built on the Pacific Coast operated globally in transporting goods and materials to operational areas according to agreed Allied strategy. A little known fact is that more Liberty ships were actually required in the Pacific due to longer transit distances and turnaround times. Formal entry of the United States into the world war only increased demand.

Pacific Coast shipbuilding went onto a war footing after Japan's surprise attack on the US naval anchorage at Pearl Harbor on 7 December 1941. The battleships of the US

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41 National Maritime Museum, Greenwich (NMM), Admiral James Wilfred Dorling papers, JOD/185/1, Diary, 18 June 1941.
Pacific Fleet rested on the bottom awaiting salvage, while American aircraft carriers available in the Pacific were out-numbered until the crushing defeat of the Japanese fast carrier task force in the naval battle of Midway six months later. The effect was truly profound. In 1942, the first of successive Victory programs mobilized American industry and economic capacity for the war effort. Congress passed legislation for special war appropriations; in turn, the Navy Department and Maritime Commission contracted for thousands of ships and naval aircraft. Although higher level Allied political and strategic decisions agreed on a Europe first strategy, the war against Japan remained foremost in the thinking and plans of most senior naval officers and procurement officials. Admiral Ernest King, the wartime chief of the US Navy, was unwavering in making sure his senior commanders received sufficient resources to fulfill their allotted tasks and command decisions: "we shall do more in the Pacific as more 'ways and means' are made available. It is no news to you (British admiral Sir Charles Little), I'm sure, that I am a constant (even persistent!) advocate of more 'ways and means". Pacific Coast shipyards met the basic demand for ships and more of them. Average Americans and Canadians flocked to shipbuilding employment in unprecedented numbers, no doubt attracted by good wages besides patriotic contribution to a popular total war. Like Admiral King, these people showed a single-minded determination to defeat Japan, oftentimes bordering on hatred. Neither the United States nor Canada had started the war, but day-to-day achievements in shipyards and on factory floors surely helped to win it. The Pacific war was closer, literally on the doorstep of those who lived and worked in the western part of North America. Timely production of ships in wartime relied heavily upon well-run shipyards.

**Management in the Shipyards**

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The motives behind participation of Pacific Coast businessmen and investors in wartime shipbuilding were many and varied, in fact almost as different as the character of each individual shipyard. Profit was of course an overriding concern for private enterprise, though governments in both countries limited the amount that could be earned to around 5 percent; even then, accounts were subject to audit and renegotiation by procurement authorities. For some people, the war was a unique opportunity - a once in lifetime experience with the lure of steady government contracts and guaranteed returns. Certainly, wartime shipbuilding was welcome to a badly downtrodden industry, delivered modern, expanded facilities, and went some way in alleviating the known competitive disadvantage with eastern shipyards for defense work. Pride in craft also played a part amongst traditional builders - if not the newcomers as well - because shipbuilders were celebrated in wartime and business propaganda. Therefore, individual egos and corporate reputations should not be under-estimated as yet another key factor.

Wartime shipyards were big employers in communities. The ship launchings, war bond drives, and production recognition events became significant social occasions tied to the war effort and public demonstration of patriotism. Like workers, those that managed the shipyards believed and were told that the war could be won through their efforts on the home front. Constant striving for excellence in organization and performance results was reflected in the way shipyards operated. Notwithstanding the multiplicity of private companies and combines engaged in shipbuilding along the Pacific Coast, most concerns belonged in four broad categories: established shipyards, entry-point shipyards, affiliated conglomerate shipyards, and agency shipyards. This range of enterprise delivered much needed ships for the war against Japan.

The few established shipyards on the Pacific Coast were generally medium-sized private companies identified by skill and reputation with shipbuilding spanning several decades of corporate activity. Shipbuilding was a main business line among the side activities of marine repair and manufacturing which had kept those companies more or less solvent during lean economic times. They were predominantly family-run through one or more generations. Moore Dry Dock in Oakland, California, started by Joseph Moore, Sr. and run by his sons, exemplified the close familial connections:
It is a great satisfaction to me to have built this plant up from a hundred-employee yard, when we purchased a thirteen-acre site in 1909, to a 16,000-employee yard during the last war, and now a 33,000-employee yard with an addition of forty acres. I am glad to say the boys and I practically have the entire holdings in our own names, which is also a great satisfaction I can assure you. The boys are practically running the yard.47

Moore Dry Dock, the recipient of some $20 million in land and facilities assistance, initially began construction for the navy and then switched to Maritime Commission C2 hulls as well as considerable repair work. Due to geographical constraints, the number of building slips was limited to no more than 4.48 Management in established shipyards were ever cognizant about developing excess capacity during wartime that could not profitably be used upon return to peace. Consequently, growth was controlled and limited through a mixture of private and public investment. In North Vancouver, British Columbia, Burrard Dry Dock traced its roots to a shipyard started by English shipbuilder Alfred Wallace, leveraged by a government subsidy for a floating dry dock and his son Clarence Wallace's finesse at obtaining financial backing and a string of lucrative contracts.49 The North Shore shipyard grew within the bounds of its geography transitioning from small warship to cargo vessel construction on 4 building slips. A second larger yard operated under Burrard management across the harbor on the Vancouver side, and a grain pier was leased from the port authority for refit work on US-built escort carriers belonging to the Royal Navy.50 Clarence Wallace turned the Burrard

50 George N. Edwards, Waterfront to Warfront: Burrard Dry Dock Company During World War II (North Vancouver, BC: North Vancouver Museum and Archives, 1995). Library and Archives of Canada, Vancouver, RG 66 Accession V93-94/555 Vol. 13391 File S1-6-252, "Minutes of Meeting of the National Harbours Board Held at Ottawa on Wednesday, the 1s Day of December, 1943". The lease for Lapointe Pier was between the US government and the Ottawa-based National Harbours Board on behalf of the port of Vancouver. North Vancouver Museum and Archives, North Vancouver (NVMA), Doug Kinvig Fonds 97 Box 3 File 1, "Lapointe Pier: C.V.E.'s Report of Movements".
yards into the most productive merchant ship producers in Canada, by measures of numbers and quality because wartime workforces imbued the skill base of traditional shipbuilders. Yarrows, the province's other longstanding shipyard on Vancouver Island at Esquimalt, had been purchased by Scotland Clyde's small warship builder Sir Alfred Yarrow in 1913 in anticipation of speculative Royal Canadian Navy contracts and one of his two living sons Norman put in charge. Close proximity to Canada's main Pacific naval base with its adjacent government graving dock accorded the company a certain competitive advantage in getting naval work. The main problem was the limited supply of skilled labor in the general Victoria area. Consequently, William Lalley, Admiral Land's special assistant visiting from the Maritime Commission, recommended that Wartime Merchant Shipping concentrate merchant shipbuilding in the greater Vancouver area in order to devote Victoria shipyards entirely to warship construction. After finishing two last merchant ships on the slips, Yarrows began construction of prefabricated frigates, an improved twin screw corvette design reengineered by the Americans and the Canadians to speed-up production essentially the same as the Maritime Commission's Tacoma class. Though neither the largest nor the fastest on the Pacific Coast, established shipyards delivered solid and dependable work when skill and experience in construction counted. They intended, for the most part, to stay in the shipbuilding business beyond the war.

Entry-point shipyards, in contrast, were about the same size of operation but definitely more opportunistic and transitory. Interest in shipbuilding derived directly from the profits and money to made off government war contracts. Typically, these Pacific Coast shipyards were connected to companies in related manufacturing and marine industries such as ship repair, marine salvage, steel fabrication, and machine shops. Western Pipe and Steel in San Francisco, headed by Howard Tallerday, had last built merchant ships on an emergency basis during the First World War, gained C1 contracts from the Maritime Commission in 1939, and then moved on to construction of prefabricated frigates, an improved twin screw corvette design reengineered by the Americans and the Canadians to speed-up production essentially the same as the Maritime Commission's Tacoma class. Though neither the largest nor the fastest on the Pacific Coast, established shipyards delivered solid and dependable work when skill and experience in construction counted. They intended, for the most part, to stay in the shipbuilding business beyond the war.

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the larger C3 hull in modest numbers.\textsuperscript{53} Due to a tight 40 acre space, ships were launched sideways on 4 building slips. Western Pipe and Steel opened a second shipyard at San Pedro with $7.2 million from the US Navy for purchase of land and development of facilities adding a further 5 slipways.\textsuperscript{54} Tallerday signed contracts for building of destroyer escorts, landing ships, and coast guard cutters sufficient to keep the company busy for the rest of the war. The separation between the two shipyards became progressively less significant as naval-related conversion work and repair increased.\textsuperscript{55} Associate Shipbuilders in Seattle, a joint venture formed in September 1940 between Puget Sound Bridge and Dredging Company and Lake Union Dry Dock and Machine Works, built a shipyard from scratch dedicated to naval contracts, primarily seaplane tenders, minesweepers, and submarine chasers. The driving force behind the executive team was Horace Winslow McCurdy, whose business was building bridges but his passion was anything maritime; a general manager with extensive shipbuilding experience, George Stebbins, was brought from out east to run the Harbor Island plant.\textsuperscript{56} The pair turned Associated Shipbuilders into an efficient and profitable producer of small warships under indirect control of the US Navy. Though facilities were largely navy-financed, the corporate structure and ownership remained strictly private enterprise.

In the same vein, North Van Ship Repairs, a wartime shipyard located beside Burrard Dry Dock in North Vancouver, was a subsidiary of Pacific Salvage Company, a Victoria company owned by well-off Vancouver Island businessman Arthur Burdick. Donald Service was the yard's general manager and a shareholder.\textsuperscript{57} Years previously, Burdick had been convinced by a group of employees that the struggling repair yard should not be shut down, a decision that paid handsome rewards when government


\textsuperscript{55} NARA C-P, RG 178 Entry 5A Box 3 File "1943 April thru August", Memorandum, E.S. Land to Chief of Naval Operations "Repair and Conversion Work on the West Coast", 6 August 1943.

\textsuperscript{56} NARA C-P, RG 19 Entry 1266L Box 159 File QM/Associated Shipbuilders, "Plant Survey - Associated Shipbuilders (Harbor Island Plant)", June 1941. OAB/NHHC, "History of the Office of the Assistant to the Industrial Manager, USN, Seattle, Washington", 26 March 1946.

\textsuperscript{57} NVMA, Versatile Pacific Shipyards Fonds 27 Box 945, North Van Ship Repairs General Ledger 1931-1944 "North Van Ship Repairs Ltd. Share Certificates".
procurement authorities came looking to place war contracts with qualified industrial firms.58 In quick fashion, the company used its own money to construct 4 building ways, modernized facilities, and completed a 10,000 ton floating dry dock on the assurance of special capital depreciation. North Van Ship Repairs, still a relative newcomer to the shipbuilding field, split the Pacific Coast share of minesweeper contracts with Burrard Dry Dock and the Canadian National Railway shipyard in Prince Rupert.59 Later, Burdick returned from Ottawa with orders from Harvey MacMillan for construction of 10,000 ton merchant ships. North Van Ship Repairs proved a well-run little yard, which given the limited number of slipways lagged behind its larger neighbor Burrard, but compared favorably with West Coast Shipbuilders Limited, another similar size entry-point shipyard on Vancouver's False Creek, where labor problems impeded production rates.60 No doubt, Burdick and his accountants took full advantage of the war situation; Clarence Wallace, critical of his neighbor's extravagant spending on fancy office furniture and company cars, was not even allowed inside the gates of wartime North Van Ship Repairs. Some entry-point shipyards may have tried shipbuilding for a short turn longer, but more often than not private owners cashed out wartime gains while the going was still good and gravitated back to previous lines of business endeavor. There were no long term commitments or raised expectations about continuing defense-related shipbuilding from government which the largest companies pressed.

Affiliated conglomerate shipyards were commonly part of larger, heavy-weight industrial entities in the North American economic landscape. Shipbuilding was by necessity intimately connected with supply of steel and metal products. To diversify and secure end-markets, US steel companies had over the years bought up defunct shipyards through receiverships and at incredibly attractive prices. These yards, some very far apart geographically, were grouped together as single operating units and branded corporately. Several major steel companies, therefore, stood at the forefront of Pacific Coast wartime shipbuilding. Bethlehem Steel Corporation's association with

58 NVMA, Donald Greenwood collection, Inventory 800, Newsletter "Burrard-Pacific News", April 1954.
shipbuilding and ship repair in the San Francisco Bay area was longstanding. Arthur Homer, a former naval engineering officer with the company since 1919, was vice president in charge of Bethlehem's shipbuilding division and A.S. Gunn was general manager responsible for all its Pacific Coast yards. The Union Iron Works yard, owned by Bethlehem since 1905 and site of destroyer and submarine construction before and during the First World War, returned to naval building after completing 5 Maritime Commission C1 hulls in 1941.61 Destroyers, destroyer escorts, and light cruisers were built there as well as considerable ship repair work performed, for which nearly $19 million was spent on facilities improvements. Across the harbor, Bethlehem-Almeda shipyard was heavily engaged in naval repair work and Maritime Commission construction.62 In San Pedro near Los Angeles and Long Beach, Bethlehem constructed fleet destroyers in a shipyard employing upwards of 4,500 workers located at Terminal Island. The mix of ship construction and repair work undertaken on the Pacific Coast by Bethlehem, turned during the war into one of the leading defense contractors in the United States, was primarily naval centered in those three yards.63 Wartime shipbuilding also attracted conglomerate steel companies without necessarily Bethlehem's deep experience. Consolidated Steel Corporation established a shipyard in Wilmington on land leased from the Los Angeles Board of Harbor Commissioners and $13 million worth of facilities assistance from the Maritime Commission. An assortment of ships for naval use was built on first 4 and then 8 slipways.64 For a first time shipbuilder, Consolidated Steel produced naval auxiliaries quickly to reasonable quality as well as warships at a sister shipyard in Texas. The large steel companies, arguably a natural fit, brought necessary managerial experience in projects of scale and familiarity with the basic materials and labor that went into shipbuilding. The really big numbers on the Pacific Coast came from affiliated conglomerate shipyards of a business nature.

61 Hagley Museum and Library, Wilmington, Delaware, Pamphlet "Building ships for war: Bethlehem's effort in shipbuilding and ship repair", 1943.
62 NARA C-P, RG 178 Entry 100 Box 27, "Shipyard Facilities Data West Coast U.S.M.C. Yards Revised as of July 1, 1943".
64 NARA C-P, RG 178 Entry 100 Box 27, "Shipyard Facilities Data West Coast U.S.M.C. Yards Revised as of July 1, 1943". Josh Sides, "Battle on the Home Front: African American Shipyard Workers in World War II Los Angeles", California History 75(1996), 250-263.
Some shipyards of this type matched the traditional skills of multi-yard shipbuilders with engineering and accounting expertise in combinations of corporations. This approach treated shipbuilding as a business venture instead of craft vocation found in most smaller established shipyards. Larger companies entailed economy of scale and division of responsibility across complex organizational structures. Todd Shipyards Corporation, a constantly expanding and shrinking corporate entity with toe holds on three coasts in shipbuilding and repair, possessed a strong presence in the Pacific North-West, particularly the Seattle-Puget Sound area. Predecessor subsidiary yards had built naval and merchant ships at Seattle and Tacoma during the First World War, and Todd's corporate executives were quick to realize the new opportunities presented by renewed interest in Pacific Coast shipbuilding from the US Navy and Maritime Commission. Todd-Seattle division's Roscoe Lamont, with the backing of Todd's corporate president John Reilly, formed the Seattle-Tacoma Shipbuilding Corporation in partnership with a group of general engineering and construction contractors called the Six Companies best known for completion of several major dam and road-building projects in the western US states; John McEachern of the Washington State-based General Construction Company, for a short time, assumed the title of vice president in the new corporation and rising entrepreneurs Stephen Bechtel and Henry Kaiser held minority stakes until differences with Todd ended the business relationship. In due course, Seattle-Tacoma Shipbuilding Corporation became a wholly-owned Todd subsidiary incorporating the reactivated Tacoma yard on Commencement Bay and Todd Seattle Dry Docks yard in Seattle proper overseen by Lamont as president. The Maritime Commission awarded contracts for facilities construction and building of C3 cargo hulls at Tacoma, subsequently handed over to the navy in exchange for exclusive use of Moore Dry Dock for merchant shipbuilding. The partially completed C3 hulls were finished as small auxiliary aircraft carriers for operational use in the US Navy and Royal Navy.


Green and O.A. Tucker were vice presidents and general managers of the Tacoma and Seattle divisions respectively. The navy funded construction of two plants side-by-side at Seattle for building destroyers of different types and sizes.\textsuperscript{67} The operating name later changed in 1944 to Todd-Pacific.

The Los Angeles Shipbuilding and Dry Dock Company, an under-performing and troubled shipyard at San Pedro, was also taken over for operation by Todd interests in 1943. The company, previously known as Los Angeles Lumber, had only emerged from bankruptcy protection in 1939 and never really lived-up to the expectations of procurement officials.\textsuperscript{68} Fred Hesley, a long-time Todd executive with experience in the corporation’s Gulf and Atlantic yards, was brought in to turn things around at San Pedro. Todd-operated Los Angeles Shipbuilding and Dry Dock constructed tenders and other naval auxiliary vessels destined for operations in the Pacific Ocean. Todd ended up almost an entity onto itself in terms of affiliated conglomerate shipyards and relations with the navy, but by transferring interests in other shipyards to Henry Kaiser and his organization of companies contributed to the wonder of merchant shipbuilding on the Pacific Coast.

In terms of shameless self-promotion and seemingly remarkable results, Henry Kaiser was truly the giant of affiliated conglomerate shipyards. He came to shipbuilding with no direct previous experience, except keen business acumen at putting together management/engineering teams with the right people and a knack for making money off any project. In time, Kaiser grew accustomed to success and accolades, at least enough to believe his own propaganda.\textsuperscript{69} Certainly, he went to Washington to convince Roosevelt and badger Emory Land to put contracts into his hands and duly achieved production numbers and completion times that established shipbuilders declared next to impossible. A yard was taken over from Todd at Richmond, California to complement another for British-contracted ships set-up as the Oregon Shipbuilding Corporation in

\textsuperscript{67} NARA C-P, RG 19 Entry 1266L Box 928 File C-QM/Seattle-Tacoma S.B., "Preliminary Internal Security Survey of Seattle-Tacoma Shipbuilding Corporation (Seattle Division - Plants A and B) Eleventh Avenue S.W. Seattle, Washington", 23 April 1942.
\textsuperscript{68} NARA C-P, RG 178 Entry 29 Box 20 File "Shipbuilding - Los Angeles, Calif. Los Angeles Shipbuilding & DD Co.", Letter, C.C. Spicer to John Slacks, 1 March 1939.
Portland. Additional shipyards were opened in Oregon at Swan Island, on the Washington side at Ryan's Point in Vancouver, and three more at Richmond under Kaiser's incorporated management companies Permanente Metals and Kaiser Cargo.\textsuperscript{70} These large, expansive shipyards were laid out to maximize production through extensive pre-fabrication, assembly, and welding on building ways numbering 58 in total plus accompanying outfitting berths by mid-1944.\textsuperscript{71} Capable managers, including Henry Kaiser's oldest son Edgar, were put in charge of day-to-day operations in each shipyard. Kaiser negotiated generous agreements with unions to keep labor harmony and improved transportation, housing, childcare, and centralized food catering for the benefit of largely temporary workers new to shipbuilding.\textsuperscript{72} Furthermore, material inventories and progress scheduling were carefully choreographed. The result was that happy, well-paid workers built lots of standardized ships in record times. Quality of workmanship posed some problems: Kaiser-built ships were known break-apart in cold weather and heavy seas.\textsuperscript{73} Congressional committees also investigated Henry Kaiser and his companies for excessive profit-taking in the building of ships.

Since no one else produced ships in such quantities, the inadequacy of existing contractual frameworks was partly to blame. Kaiser's corporate structure was complex and fluid (perhaps intentionally so) involving holding companies, numerous one-purpose corporations, and a revolving door of investors, part owners, and suppliers.\textsuperscript{74} The arrangements required a phalanx of lawyers and cost accountants to keep going and on the procurement side to sort out. Maritime Commission officials like Emory Land just


\textsuperscript{71} NARA C-P, RG 178 Entry 3N FRC Box 266, D.W. Fernhout, "Shipyard Facilities Index - West Coast Yards", 1 July 1944.


\textsuperscript{73} Christopher James Tassava, “Weak Seams: Controversy over Welding Theory and Practice in American Shipyards, 1938-1946”, \textit{History and Technology} 19(2003), 87-88.

\textsuperscript{74} Donald E. Wolf, \textit{Big Dams and Other Dreams: The Six Companies Story} (Norman: University of Oklahoma Press, 1996).
went along for the ride as long as Kaiser, now bigger than life, delivered on his promises. Affiliated conglomerate shipyards run by Kaiser in three US Pacific states delivered ships badly needed in the Pacific theatre of operations and elsewhere at a pace sure to get them into operations against Japan. The ships may not have been the best, or for that matter even good, but Kaiser was always more interested in numbers than quality. They were not expected to last, like the shipyards that made them, beyond the wartime emergency.

Agency shipyards likewise were purely temporary affairs operated on government behalf. Although Wartime Merchant Shipping, renamed Wartime Shipbuilding Limited given purview over all naval and merchant shipbuilding, engaged agency shipyards in Toronto, Montreal, and Picton, Nova Scotia, no such yards were established in western Canada. Most Canadian shipyards on the Pacific Coast, again medium in scope, were fairly well-managed in private hands. At one point, munitions minister Howe wanted to take over the Burrard yards because Clarence Wallace opposed the government's hasty implementation of continuous production by siding with troublesome trade unions, but no precedent existed for taking away a private yard from a clearly competent owner whose sole transgression was pursuing the Henry Kaiser model of industrial labor relations for the sake of better results. Agency shipyards occasionally came about from persistent problems in production or labor causing government intervention and take-over. In other cases, shipyards were intentionally designed to be under government ownership from the outset when more direct control over the production process was preferred and in the last instance some comparative measure for private shipyards was useful.

The Maritime Commission retained Bechtel-McCone Corporation to build and participate in management of selected shipyards on an agency or commission basis. This corporate entity dated from 1937 when two leading industrialists, Stephen Bechtel and John McConne, pooled resources to secure projects in the chemical and petroleum distribution industries. A 14 building way shipyard was constructed on swampy land in Los Angeles harbor at Wilmington and given the name California Shipbuilding

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75 Chris Madsen, "Continuous Production in British Columbia Shipyards During the Second World War", The Northern Mariner 14(July 2004), 16.
Corporation, shortened in common usage to Calship. McCone acted as president with W.W. Bechtel as vice president and Stephen Bechtel chairman of the board of directors. This management reported directly to the Maritime Commission in terms of production performance. Employment in the agency shipyard, which extended over 200 acres, reached upwards of 40,000 and 34 ships were under construction at any one time. Still, inspections of Calship found the number of workers employed excessive, overheads high, and slow progress due to inexperience among the 90% of whom had never worked in a shipyard before. Necessary practical experience was gained in the coming years for both workers and management alike as McCone handled the myriad of challenges facing any first-time shipbuilder. Bechtel-McCone interests were also predominant in construction of a 6 building way yard at Sausalito near San Francisco, by W.A. Bechtel Company’s marine shipbuilding division using $17 million forwarded through the Maritime Commission. From November 1942 onwards, a corporation named Marinship took over operation of this agency shipyard; McCone was on the corporation’s board of directors and Kenneth Bechtel was Marinship’s president, William Waste general manager, and Ray Hamilton production manager. Marinship, like Calship, was an expansive yard spread out over 107 acres laid out to facilitate mass production and assembly methods. Production numbers ramped up quickly for delivery of standard emergency cargo hulls and tankers, though workmanship remained an outstanding issue. Officials in the Maritime Commission, particularly Howard Vickery responsible for the national shipbuilding program and Carl Flesher the Oakland-based regional construction director, took special interest in supporting and advising managements in both agency shipyards. In many respects, these large shipbuilding operations on an individual basis chased the results in the Kaiser-controlled yards. The very diversity of

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77 The Story of Calship (Wilmington, CA: California Shipbuilding Corporation, December 1944).
79 NARA C-P, RG 178 Entry 27 Box 19, File "Marinship Corporation", Pamphlet, Marinship, 1944.
management in Pacific Coast shipyards corrects any view that Henry Kaiser alone was the chief mover behind the tremendous increase in shipbuilding for the war against Japan.\(^{81}\) Collective efforts of naval authorities, procurement officials, and private businessmen fed the voluminous appetite for ships.

**Volume Production**

The Pacific Coast’s record of production by volume and quantity was soon unrivalled in North America, not to mention in comparison to any other country engaged in the global conflict. Only Great Britain, a country with a strong maritime tradition and sizeable naval and mercantile fleets, kept pace notwithstanding deep financial and industrial constraints facing British shipyards.\(^{82}\) The United States and Canada completely out-built the combined shipbuilding efforts of the Axis powers, including the island-nation of Japan after 1942. Indeed, several shipyards singly built more ships than the entire Japanese shipbuilding industry. At their height, Pacific Coast shipyards at Seattle, Portland, San Francisco, and Los Angeles accounted for 28 percent of all merchant ship construction.\(^{83}\) The backbone of this achievement was the simple Liberty/North Sands ship design, delivered in increasing numbers through 1942 and into 1943. The contracted delivery schedule was a complete Liberty ship in 105 days spaced out at regular intervals; individual shipyards, however, significantly shortened the time period from keel laying to launching, mainly through extensive pre-fabrication, assembly, and working three shifts around the clock per day. Certain Kaiser-run yards launched ships in as little as two weeks to much fanfare: Oregon Shipbuilding Corporation claimed that one ship was built in a record 10 days.

Speed of production was generally inversely proportional to standards in quality of work. Poor welding and joining by inexperienced workers was one notable problem;

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\(^{83}\) NARA C-P, RG 178 Entry 5A Box 3 File "1943 April thru August", "Memorandum for War Mobilization Committee Meeting on Thursday, August 26, 1943".
faulty and missing equipment was also common. Canadian shipyards typically stayed with riveting longer which meant slower production rates and more weight due to overlapping plates. North Sands ships in Vancouver could take 3-4 months to build. Among warships, fleet minesweepers, frigates, and destroyers prevalent on the Pacific Coast commissioned anywhere from 6 months to a year after being laid down. Installation of engines and auxiliary machinery, when available, frequently proved a bigger bottleneck than mere construction of hulls. The impact of general steel shortages due to the immensity of the planned Maritime Commission and navy programs as well as competing demands for steel in other war industries eventually limited the total number of Liberty and North Sands ships that could be reasonably completed. Consequently, shipbuilding along the Pacific Coast peaked for growth of numbers in mid-1943, a mere two years after the big push into merchant shipbuilding had begun. Procurement authorities decided to concentrate on improved designs with faster speeds, that in due course evolved into the Victory ship.

The Victory ship (VC2), in its many varieties, became a major component of Pacific Coast shipbuilding for the remainder of the war. The American design incorporated more powerful propulsion units made possible by expanded engine manufacturing, in particular geared turbines: the Victory ship was 50 percent faster than the Liberty, rated at 15-16 knots as opposed to 10-11 knots for the latter.84 This better performance was crucial to operating in and transiting large oceans like the Pacific. Faster speed meant that the Victory was a more capable all-round cargo vessel besides the possibilities for dual military-use in the war against Japan. From the start, the Victory design anticipated conversion to naval types of auxiliaries suited to various roles. In fact, the Maritime Commission used this very rationale for shifting away from the Liberty ship in favor of Victory and C series hulls in the 1944 and 1945 planned programs, a move opposed by shipbuilding experts on the War Production Board keen not to disrupt existing shipyard arrangements.85 The navy, the end-user of these faster ships, was

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certainly far from an impartial observer in the debate, which not surprisingly found in favor of the Victory ship. Pacific Coast shipyards, chief amongst them the temporary Kaiser yards, seemed to have little trouble at all starting on the more complicated Victory ships and returning to steady production numbers. The rate of progress was slower than the Liberty, but schedules were again consistently beaten subject to availability of components and steel.

Victory ships built in Vancouver shipyards were a Canadian variation that used steam-reciprocating engines powered by oil instead of coal. Since British shipyards for some time focused on faster 15 knot merchant ships and the Americans went the same way with the Maritime Commission's Victory design, Wartime Shipbuilding Limited improved and revamped the basic North Sands design to produce a better ship in Canada. In spite of similarity in name, the American and Canadian ships were improved types sufficiently different depending on intended operational use. A fledgling Canadian merchant marine and the Royal Navy stood first in line to receive most of the new ships constructed in western Canada. Like the Americans, Vancouver shipyards switched over almost entirely to converting significant numbers of Victory ships on the stocks to tankers and various naval auxiliaries. Volume production, though well below that of the previous merchant shipbuilding effort, was achieved on a range of specialty types suited to military use, primarily against Japan.

The vast majority of ships henceforth built in Pacific Coast shipyards were destined for operational service in the Pacific and Indian oceans. Destroyers and destroyer escorts were churned out from navy yards and private shipyards in Seattle, San Francisco, and Los Angeles in steady numbers. These ships were employed in both escort and fleet work. Auxiliary aircraft carriers, most commonly called escort carriers, built in Tacoma by Todd and Kaiser's Vancouver yard invariably wound up in the Pacific. The US Navy predominantly used them to transport airplanes and troops from

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86 UBC, Harvey Reginald MacMillan papers, Box 100 File 16, Memorandum, H.R. MacMillan to C.D. Howe "Merchant Shipbuilding Programme January 1st to June 30th, 1944", 23 March 1942.
88 The Chief of Naval Operations was not a fan of the escort carriers built by Henry Kaiser: "Kaiser had the craziest ideas about machinery. I did not agree with the damned things, but the President decided and they
the continental United States and within theatres of operations. The USS Gambier Bay, a Kaiser-built Casablanca class escort carrier, confronted a threatening Japanese task force during landings at Leyte Gulf in October 1944 and earned the distinction of being the only carrier sunk entirely by gunfire during the war but not before inflicting serious damage on the attacking force. Escort carriers handed over to the Royal Navy, 19 in number, were brought to Vancouver for alterations and refits, mainly to improve aviation fuel storage arrangements and lengthen flight decks for less powerful British naval aircraft. The British used these escort carriers in multiple roles, particularly in the Indian Ocean where the absence of developed land-based airfields entailed greater use of escort carriers in protection of sea lines of communication and later in an assault role covering amphibious landings pending arrival of better-suited light fleet carriers from building in Great Britain. The US-built and Canadian-altered escort carriers may not have been ideal for the task, but they were all that was available to the Supreme Allied Commander South East Asia Admiral Louis Mountbatten after most fleet and light fleet carriers went to a British fleet in the Pacific working under the Americans and based out of Sydney, Australia. Staggering demands for ships in support of naval and amphibious operations in the western Pacific area coming ever closer to Japan proper provided a constant draw on Pacific Coast shipbuilding.

Pacific Coast shipyards, already geared toward serial production, delivered an array of ships for specialized tasks connected to fleets. Due to shortages of existing merchant ships available for conversion and the limited number of repair and refit yards busy with naval work, the building and outfitting of new ships became the preferred

were built under Jerry Land. [Vice Admiral Frederick] Horne had to fund and get crews.” Naval War College, Newport, Admiral Ernest J. King papers, Ms. 37 Box 7 Folder 16, Interview Notes with Admiral King "Escort Ships", 27 November 1950.

89 David Hobbs, Royal Navy Escort Carriers (Liskeard, Cornwall: Maritime Books, 2003). This decision was made after one escort carrier blew up during training exercises in the Clyde and went down in less than two minutes. A board of inquiry determined the explosion was likely caused by defects in aviation fuel storage arrangements. TNA, ADM 1/15072, “Proceedings of Board of Inquiry into Loss of H.M.S. Dasher”. The Royal Navy contracted Burrard Dry Dock to do the necessary alterations after American authorities declined to interrupt existing production runs. NMM, Vice Admiral James Wilfred Dorling papers, JOD/185/2, Diary, 20 May 1943. American escort carriers operated in the Pacific Ocean unaltered, and occasionally showed a tendency to blow up, earning them the reputation for being "combustible and expendable".

solution. Many of these auxiliary ships comprised the service force, termed the fleet train by the British, that kept operating fleets provisioned with necessities such as fuel, ammunition, spare parts, and food. Fast tankers (T2) such as those built at Marinship and Kaiser Swan Island brought fuel to forward and advance bases and through special equipment made transfers directly to ships at sea, while provision store ships (AF) were specifically designed for ease of delivery in forward operating areas. Fleet task forces, under the operational control of Admiral Chester Nimitz in Hawaii, used a combination of afloat support ships and advance bases on land to stay at sea longer before retiring back to established intermediate and rear bases for necessary maintenance and overhaul. In contrast, the Royal Navy aspired to putting more services afloat in ships because suitable bases on land were either too far away from the operating fleets or would take too much time and resources to develop properly. Thus, the plan was to co-locate floating dry docks with large repair ships (AR) in secured anchorages supplemented by maintenance, amenities, and accommodation ships.91 The repair ships came from American shipyards like Los Angeles Shipbuilding and Dry Dock subject to allocation by the Navy Department. Given the proclivity of US authorities to retain such ships before completion for their own needs, the British chose to procure the remaining auxiliary vessels from western Canada as additional to those sourced from Great Britain.92

Selected Victory ships, 16 of a total 21 on order, then building in Vancouver at Burrard Dry Dock, North Van Ship Repairs, and West Coast shipbuilders were finished as maintenance ships, essentially floating repair and tool shops geared toward servicing of escorts, landing craft, and coastal forces. Other mercantile ships were taken in for conversion to amenities ships which provided personnel services such as catering, laundry, and barbers and more transferred from building to be fitted as stores issuing

91 NARA C-P, RG 38 Entry 313 Box 2 File "Docks", Memorandum Admiral O.C. Badger to Admiral J.M. Reeves "Assignment of Floating Drydocks for Use of British Admiralty", 6 April 1943. TNA, CAB 120/276, Memorandum War Cabinet Defence Committee (Supply), " Provision of Shipping for the Supply and Maintenance of the Fleets in the War against Japan", 8 February 1944. TNA, ADM 1/15390, Staff Minute, Director of Stores, 24 September 1943. Nicholas Evan Sarantakes, Allies Against the Rising Sun: The United States, the British Nations, and the Defeat of Imperial Japan (Lawrence, KS: University Press of Kansas, 2009).

92 NARA C-P, RG 38 Entry 316 Box 3 File "1944", Letter, Admiral E.J. King to Admiral Percy Noble, 2 July 1944. Additionally, the British asked the Canadians to man 2 repair ships building in the US destined for the British Pacific Fleet. TNA, ADM 1/18015, Telegram, Dominions Office to Canada High Commission London, 7 November 1944.
The direct contribution of American and Canadian shipyards on the Pacific Coast allowed navies participating in the war against Japan to carry out extensive and complex logistics planning essential to conduct of operations on an almost unprecedented scale.

Power projection from sea to shore in the maritime environment required significant lift and carrying capacity by a range of ships classified as military types. Kaiser yards at Vancouver and Richmond constructed 45 landing ship tank (LST) from June 1942 to June 1943 through Maritime Commission contract on behalf of the navy.\(^9^4\) The landing ship tank, originally a British design reworked and modified for American usage, was a shallow-bottom ship with bow ramps able to beach itself and get off on its own power. This type of ship, in spite the name, carried more than just tanks and was pressed into service in its intended role of landing supplies onto beachheads following amphibious operations as well as general purveyor of goods and troops to shorelines without developed infrastructure in a theater of operations. The landing ship tank, due to its size, occupied the same building ways as a destroyer or cargo ship. Though the Kaiser organization was hardly enthusiastic about taking on the job in the first place, the landing craft tank provided emergency shipyards with handy experience for more naval building to follow. Canadian shipyards in Vancouver and Victoria started construction of a British redesigned landing ship tank (LST 3), known by the name transport ferries, which incorporated steam reciprocating engines and common components from the scaled-back frigate program. The need for landing ships and combat loaders, in American parlance, was appreciated by strategic planners and pushed forcefully by Admiral King.\(^9^5\)

The scale of the oceanic war against Japan was immense and the distances correspondingly large. The Maritime Commission, after some hesitation, agreed to convert large numbers of C series and Victory hulls into attack transports (APA), transports (AP), attack cargo vessels (AKA), and cargo vessels (AK) for delivery to the


US Navy in 1944 and early 1945. These armed ships carried people and goods throughout the Pacific Ocean and proved instrumental to conducting and sustaining major operations. Contracts were shared out primarily amongst shipyards in Oregon and California. Oregon Shipbuilding Corporation, Kaiser Vancouver, Kaiser Richmond yards No. 1 and No. 2, Consolidated Steel, and Western Pipe and Steel focused on attack transports, Calship built transports, and Moore Dry Dock converted C2 hulls to attack cargo vessels.96 The work involved both conversion of existing hulls at various stages of building as well as new construction. Outfitting of these ships was time and labor intensive pushing completion times from keel laying to commissioning anywhere from 70 to 120 days. Consolidated Steel actually delivered the first attack transports before the Kaiser yards. Pacific Coast shipyards were scheduled to build 520 navalized Victory ships up to July 1945.97 It is hard to put a final figure on the total due to cancellations, but the number was likely higher if conversion and construction of other hull types are also taken into account. Given that the whole program was executed in only a year and half timeframe, the achievement and numbers were truly impressive. These ships were based on existing practice and design in merchant shipbuilding, though technically more sophisticated and certainly operationally relevant for the kind of warfare waged against Japan in the Pacific. The Pacific Coast, in relatively short order, became a powerful logistics producer of ships in unsurpassed quantities.

**Draw-down**

In effect, the whole Pacific Coast of North America represented a massive rear continental base anchored in the productive capacity of shipyards for projection of naval power across the Pacific Ocean in the latter stages of the Second World War. It was here that ships were built, converted, repaired, and refitted for planned operations against Japan. In terms of a base of operations, the same scale of facilities, access to raw resources, and availability of skilled labor could not be found in Hawaii, Australia, nor India. San Francisco Bay was the hub of this great logistics network, with important secondary centers in Los Angeles, Portland-Vancouver, Seattle-Puget Sound, and Vancouver. The stimulus of Pacific Coast shipbuilding was an artificial creation borne

96 NARA C-P, RG 178 Entry 35 Box 27 File "APA-AKA Program", "Tentative Assignment of Hulls for Conversion to APA and AKA Naval Auxiliaries", 8 November 1943.
97 The Maritime Commission built a total of 2,518 merchant ships on the Pacific Coast from 1941 to 1945.
from the necessities of war and continued full bore until Japan was finally beaten. Naval authorities no doubt worried about winning the war at least possible cost in terms of losses and casualties, while procurement officials ensured the right types of weapons kept coming and the public interest was protected. Meanwhile, wartime mobilization of industry put enormous strains on local economies, first from rapid growth and then from slower contraction. Private companies, business owners, and workers alike felt the effects first hand. Shipbuilding on the Pacific Coast, which had delivered so much for the war effort against Japan, searched for its own equilibrium located somewhere between vastly raised expectations about continued business and the stark reality of an inflated wartime industry with few future prospects. The scaling-back of Pacific Coast shipbuilding involved lay-offs, cancellations, disposal of assets, business consolidation, and renegotiation.

Certainly, the good times could not go on forever. Without the stimulus of war conditions, demand was just not there. The high-point for employment and business activity peaked with the climax of merchant shipbuilding in late 1943. Procurement officials lengthened intervals in schedules for new construction and directed companies to shed workers so to minimize costs to government. Additional naval work for auxiliary vessels on the Pacific Coast softened the full impact, but the clear trend was steadily downward. New ships were ordered in fewer numbers and greater emphasis was given to conversion, repair, and refit. This type of work required special skills and experience instead of the assembly methods of mass production. Established shipyards, particularly those that cultivated existing ties with the navies either by location or size, were better positioned to make the transition. Moore, Burrard, Yarrows, Todd, and to a certain extent Bethlehem kept order ledgers full through a mix of conversion, repair, and building work. Wartime workforces, not overly large in comparison to the biggest shipyards, were trimmed back to match available business. The largest lay-offs of course took place in the wartime emergency shipyards where the rationale for having so many thousands of workers no longer pertained. Procurement authorities generally called the shots because most of the facilities and plants were government-owned. Executives and

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managers were simply told that shipbuilding was winding down and to plan accordingly.\(^{100}\) Entreaties by Henry Kaiser and others to get firm orders for continuity of work may have been politely received so long as the war lasted, but seldom resulted in definite promises of government procurement - on the contrary, Kaiser was in the sights of lawmakers and congressional representatives in Washington for his wartime antics. Terminations, which began gradually, steadily increased from month to month as work on specific jobs finished.\(^{101}\) In short order, payrolls were drastically reduced. The least experienced and newest workers - in some shipyards the vast majority - were the first let go. The stimulus of wartime that had fuelled the remarkable growth in Pacific Coast shipbuilding soon came to an abrupt end.

The sudden ending of the war against Japan triggered a swift and almost automatic curtailment of government war orders. Strategic plans, to which approved shipbuilding and conversion programs were tied, forecasted hostilities and force levels being maintained until well into 1946. The three operational commanders most affected, Admiral Chester Nimitz, General Douglas MacArthur, and Admiral Louis Mountbatten, coordinated planning on this basis. Large fleets operating off Japan's occupied territories and home islands were envisioned supporting capture of key locations, strategic bombing, and eventual full-scale invasion, if Japanese resistance proved unwavering.\(^{102}\) The explosion of atomic bombs on the cities of Hiroshima and Nagasaki changed the whole strategic picture and initiated a chain of events that led to Japan's declared intention to surrender unconditionally on 15 August 1945 followed by a signing ceremony on 2 September in Tokyo Bay presided over by MacArthur. With the war now formally over, procurement officials invoked cancellation and termination clauses in contracts with companies engaged in wartime shipbuilding on the Pacific Coast.\(^{103}\) All work stopped in the shipyards subject to further direction from the Maritime

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\(^{100}\) Harvey MacMillan, after leaving Wartime Shipbuilding Limited, advised his successor that the system of shipbuilding that worked under the stimulus of war was ill-suited for post-war conditions. UBC, MacMillan papers, Box 113 File 6, Letter, H.R. MacMillan to C.L. Dewar, 11 May 1945.

\(^{101}\) UBV, MacMillan papers Box 113 File 6, "Total Terminations December 26, 1943 to May 27, 1944", 16 June 1944.


Commission, Navy Department, and Department of Munitions and Supply as to post-war needs and requirements. Cancellations meant that companies were entitled to payments up to a designated date and then would need to make claims and justify any work performed either in good faith up to that date or after. At the request of the British Admiralty, munitions minister Howe allowed certain maintenance ships and transport ferries in advanced stages of completion to be finished and handed over to the Royal Navy in Vancouver.  

104 The same was done for warships such as fleet destroyers and light cruisers building in Seattle and San Francisco. The amount of money already invested in these nearly finished first-line ships that could replace worn-out, tired ones from the war appeared to be sensible and cost-effective. Construction on most emergency-type wartime designs, however, was suspended since such ships possessed no worth in peacetime. The materials and partially completed hulls on the stocks were declared surplus, along with the wartime ships returned and decommissioned from operational service. Though some of these ships were designated for reserve maintenance in case of future conflict and reactivation, the majority were slated for scrapping or disposal on the open market.

The disposal of assets after the war followed an outwardly methodical process beset by its own shortcomings in actual practice. The primary aim was to reduce expenses on government in the quickest possible fashion and recover some measure of invested costs in property and fixed assets. Much of the plant and machinery in expanded shipyards were either wholly or partially government-owned. Specifically, the terms of the original facilities contracts retained title with responsible procurement officials. Procurement agencies established bodies and staffs to dispose of property declared surplus to public needs. In most cases, they were put up for sale or auction to anyone interested. Published catalogues listed available items with descriptions, suggested price, and state of condition; advertisements and announcements also appeared in national and local newspapers. Word of mouth was another important means, and frequently companies that had previously managed shipyard sites were given first opportunity to bid on any machine tools and adjacent property. These new and modern facilities, given the

slide of depreciation, were generally offered at reasonable prices compared to full replacement value. Flooding of the market with so much government-owned property further depressed prices to near basement levels. Companies traded-up, added to neighboring private properties, or held-out for even cheaper prices. Frequently, procurement and asset disposal agencies could not find qualified buyers or were unwilling to sell at prevailing prices. The remaining option was to keep property under government ownership until the industrial resale market improved. Vacant shipyards were convenient storage areas for surplus materials and ships. Private companies were hired on a care and maintenance basis. Leases lapsed on harbor and port lands, sometimes requiring removal of equipment and return of land to previous condition states as legally required in agreements and contracts. Water-access industrial property, on which most shipyards sat, could be prime locations, but often were heavily polluted from wartime use or previous lax environmental standards. The costs of remediation were too prohibitive for other usage, in a classic case of buyer beware. Such considerations factored into whether private companies and private individuals acted upon opportunities presented by government sell-offs of fixed and moveable assets. Competition in the expected market for shipbuilding was hugely important in how individual firms positioned themselves for staying in the business in the wake of the wartime experience.

Once emergency and agency shipyards shut-down, the shipyards remaining went through a natural selection leading to consolidation and rationalization on the Pacific Coast. Industry associations and labor groupings heavily lobbied governments before and after the war for further contracts, mostly to no avail. Navies returned to traditional suppliers or those few that distinguished themselves over the others for good quality work at reasonable prices during the war. Bethlehem's yards and Todd Pacific continued the association with the US Navy interspersed with whatever commercial work could be secured in a tighter and tighter market. Shippers could draw upon a surplus of wartime-built ships offered by the government at cheap prices which made new construction in relative terms expensive. The staple business of ship repair work smoothed out dwindling orders for building ships. San Francisco's Moore Dry Dock focused almost entirely on maintenance and repair work for another decade and a half. The business

rationale for staying in shipbuilding was just too weak for some money-losing shipyards which closed doors or went up for sale.

Uncompetitive shipyards became acquisition targets by other companies. In 1946, Clarence Wallace's Burrard Dry Dock purchased the shares of Yarrows in Victoria for just under $400,000 and five years later, bought neighboring Pacific Dry Dock, late North Van Ship Repairs, from Arthur Burdick for a reputed $900,000. Transferred tax credits from left-over wartime capital depreciation sweetened the deal. The bold business move made the enlarged Burrard Dry Dock western Canada's premier steel shipbuilder in both the commercial and naval fields. A trickle of government and foreign orders kept shipyards more or less occupied. Protective tariffs and restrictive domestic legislation generally prevented Canadian and American shipyards from competing against each other straight on. The situation meant that a handful of private companies engaged in shipbuilding along the Pacific Coast on either side of the international border. Labor and transportation costs were still higher than eastern shipyards which put them at a competitive disadvantage. The American and Canadian governments, when pressed, pushed business to qualified firms on the Pacific Coast, particularly when the Cold War and the United Nations action in Korea started another fitful period of limited naval rearmament going into the next decade. Yet, the gradual decline of Pacific Coast shipbuilding after 1946 proved irreversible. The wartime achievements left a mixed legacy for private firms comprising the industry.

Final settling of accounts between government and private enterprise, preceded by renegotiation, was the last vestige of the wartime relationship. Claims for unfinished business, inventories, and management fees took many years to determine what was fair and reasonable. Cost accountants and lawyers were the main antagonists on either side pushing their respective arguments. Wartime companies were subject to excess profits taxes and naturally looked for refunds on corporate tax returns. Some conglomerates

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actually offset profits made in shipbuilding with losses in other less profitable parts of the
corporate structure. Henry Kaiser appeared before congressional committees in
Washington to explain accounting and accrual methods in his mix of companies.\footnote{Mark S. Foster, \textit{Henry J. Kaiser: Builder in the Modern American West} (Austin, TX: University of Texas Press, 1989).} In the
opinion of some observers, costs and profits made in some wartime shipyards were too
excessive compared to others; Kaiser's reputation for fast money finally caught up with
him. Procurement officials had also clawed-back monies through mandatory
renegotiation for contracts over a certain value since at least 1944. The Maritime
Commission and the Navy Department each maintained separate renegotiation boards
and issued manuals to inform private companies about the process; Canada's Department
3-S-14 Pt. 2, Memorandum, "Relationship of Termination to Renegotiation".} Renegotiation essentially opened
up the signed contracts to close audit about what was fair and reasonable to the public
interest in retrospect. Overall, the amounts recovered from renegotiation were fairly
small in comparison to total contracted values, but procurement officials were
determined, if not obligated, to ensure the government had not over-paid for war work.\footnote{NARA C-P, RG 178 Entry 27 Box 29 File "Renegotiations", "Summary of Renegotiations: United States Maritime Commission Price Adjustment Board from Inception to December 31, 1944".}

Most business executives, unsurprisingly, disliked the privilege of returning money to the
US Treasury and Canada's Receiver General out of wartime shipyard profits. Those
funds, sometimes viewed as just another corporate tax grab by government, reduced
amounts available for payrolls, capital expenditures, and pay-outs to investors. Business
resumed back to normal in the Pacific Coast shipbuilding industry.

\textbf{Conclusion}

Over the space of a decade, shipbuilding on the Pacific Coast of North America
went from modest levels to intense activity focused on volume wartime production and
then back again. The main rationale for this enormous industrial effort was war against
Japan, both prospective and real. Countering Japanese military and naval power
preoccupied pre-war preparations, the composition of fleets and ship types, and
operational plans in war. The war against Japan was maritime in nature which demanded...
ships of certain characteristics in large numbers to match strategic and operational requirements. The Pacific Coast by virtue of its geography, industrial capacity, and population acted, in the words of Henry Eccles, as the logistics producer in the supply chain stretching to the deployed combat forces across the large ocean. Shipyards along the Pacific Coast progressively developed and mobilized, especially after the attack on Pearl Harbor and American entry into the global war. A steady stream of warships, merchant ships, and naval auxiliaries poured forth from locations in San Francisco, Los Angeles, Portland/Vancouver, Seattle, as well as Vancouver and Victoria, British Columbia. These previously untapped areas met heavy demands for ships in the Pacific and South East Asia. For the Pacific Coast, the war against Japan was always closer than Europe and figured more prominently as time went on.

Though the stimulus of war conditions brought new work for private companies and temporary employment for thousands of workers, the actual period of full-out production was remarkably short in duration, little more than 2 years. Contraction began gradually once merchant shipbuilding peaked in 1943 with a shift to higher speed cargo vessels and a range of converted ships adapted to naval usage in the Pacific and Indian oceans. The pace of production, though slowing, was kept up right until Japan's unconditional surrender in 1945. Almost immediately, removal of the Japanese threat entailed cancellations, closing of wartime shipyards, and disposal of fixed and moveable assets. Shipbuilding then basically returned to about the same level as 10 years before, with a handful of privates companies, perhaps a bit larger, richer, and wiser, trying to carry on in a business dependent upon slim government defense contracts, irregular commercial orders, and to pay the bills ship repair and maintenance. Building wartime ships might have been a lucrative and daresay exciting endeavor at times, but it was a tougher gamble when stimulus funding ran out and government work dried up. Only a select few private concerns survived. National defense-related procurement made the small industry of shipbuilding on the Pacific Coast more or less viable.

Variety in wartime shipbuilding along the Pacific Coast was quite striking. Producing ships for the war against Japan was a collective effort on the part of procurement officials, naval authorities, and private enterprise. The dividing line between merchant and warship building represented by the demarcation between the
Maritime Commission and US Navy in the United States and a dedicated crown corporation in Canada blurred, though it never entirely disappeared. Shipyards were duly designated and used according to association with larger procurement agencies. Naval-focused shipyards, mostly established and entry-point shipyards, concentrated on serial runs of specialized warship building, while bigger affiliated conglomerate and agency shipyards producing cargo ships transitioned to tankers and naval auxiliaries based on the same hulls. Differences existed in types of contracts, management styles, ownership, the size and scope of plant, as well as the ships being produced in any given yard. Indeed, wartime shipbuilding on the Pacific Coast was bigger than just Henry Kaiser and his large yards mass-producing ships as fast as possible, though that achievement certainly remained an important contribution. The true story was the many shipyards in the western United States and Canada that together combined delivered a variety of suitable ships in good time and on budget for pressing operational requirements. Those operational requirements changed significantly as the war against Japan evolved and reflected subsequently the output of shipyards on the Pacific Coast. In short, no single person, company, or city won the war of industrial production on the home front. Variety of response again dictated which business executives and private companies decided to pursue shipbuilding as a continuing line of business once the wartime situation passed into the background.

Shipbuilding has, with a few notable exceptions, virtually disappeared from the Pacific Coast of North America today. Most commercial ships are now built offshore in places such as Japan, Brazil, South Korea, and China where wages are cheaper and state subsidies prop up heavy industries. Arguably, those countries also build better ships on the basis of quality and price than what could be expected from a smallish, struggling industry in North America with waning skills and experience. To stem apparent decline, existing shipyard companies, industry associations and lobby groups representing them, and organized labor continually call upon assistance from governments, either direct or by way of public-tendered contracts. Commitment to keep building naval and other government fleet ships in North America, mainly to promote high-skilled jobs and regional development, at least gives some prospect of regular work and continuity. Naval procurement, however, generally takes a long time and feeds into the cyclical famine and
feast nature of the shipbuilding industry. Furthermore, Pacific Coast shipyards still operate at a relative competitive disadvantage compared to more economical and politically savvy companies on the eastern seaboard and Gulf Coast. In spite of much heralded national shipbuilding strategies and budgeted monies for fleet renewal over coming decades, the pattern of procurement in shipbuilding has shown remarkable consistency. The Pacific Coast has not benefited fully because of inherent bias in political and bidding processes, whether real or assumed. Short of another major war in Asia, serious interest in Pacific Coast shipbuilding will never reach the same level as the last world war. Port and industrial lands are increasingly given over to residential and commercial development. Wartime shipbuilding on the Pacific Coast has thus become in some locations a tourist curiosity.

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