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Rodney Keith Watterson
University of New Hampshire, Durham

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32 in '44:

A MANAGEMENT AND ENVIRONMENTAL STUDY OF
SUBMARINE CONSTRUCTION AT PORTSMOUTH NAVY YARD
DURING WORLD WAR II

BY

RODNEY KEITH WATTERSON

MA, University of New Hampshire, 2003

BA, University of New Hampshire, 2001

MS, MIT, 1970

BS, United States Naval Academy, 1961

DISSERTATION

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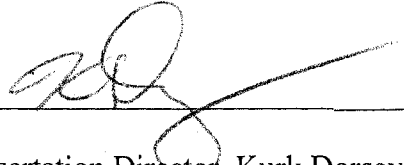
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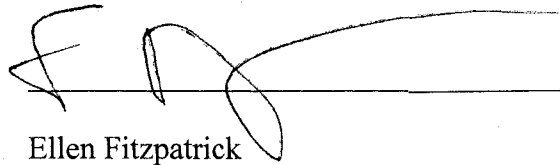
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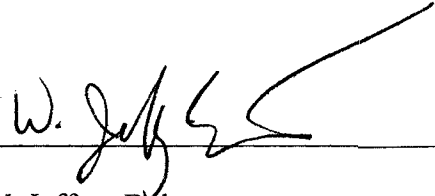
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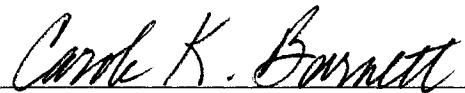
Dissertation Director, Kurk Dorsey
Associate Professor of History



Ellen Fitzpatrick
Professor of History



W. Jeffrey Bolster
Associate Professor of History



Carole K. Barnett
Associate Professor of Management



Gary Weir, Chief Historian
National Geospatial Intelligence Agency

23 April 2007

Date

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ABSTRACT

32 IN '44: A MANAGEMENT AND ENVIRONMENTAL STUDY OF SUBMARINE CONSTRUCTION AT PORTSMOUTH NAVY YARD DURING WORLD WAR II

By

Rodney Keith Watterson

University of New Hampshire, May 2007

After averaging the completion of less than two submarines a year in the 1930s, the Portsmouth Navy Yard completed an astonishing thirty-two submarines in 1944. The yard's outstanding performance during World War II was the product of a highly motivated work force and a management team that thrived in a decentralized wartime shipyard environment. Employing aggressive and innovative management techniques that included employee empowerment, small teams, and mass production techniques to the extent that they could be applied to submarine construction at the time, the shipyard delivered submarines at unprecedented rates.

There were downsides to the shipyard's crowning achievements during the war that included landfills contaminated with toxic industrial waste, increased pollution of the Piscataqua River, and lost wetlands. In addition, the greatly increased employment and military presence at the yard brought challenges to local communities that struggled to increase housing, infrastructure, and services to accommodate the increased numbers of new residents. Not the least of these struggles included efforts to curb prostitution and an alarming increase in venereal disease. While wrestling with these day-to-day problems

during the war, local communities feared an uncertain, and possibly economically disastrous, postwar future should peace bring dramatically reduced employment or closure of the yard.

This dissertation looks at both sides of Portsmouth Navy Yard's war years: the tremendous upside wherein remarkable submarine production records were achieved that brought economic prosperity to the area, and the downside that saw significant environmental abuse and sociological turmoil as communities adjusted to the problems that accompanied a Navy boomtown. A preliminary review places the yard in context with important national and international events between the wars to set the stage for an analysis of how the shipyard achieved *32 in '44*, and the consequences of that success.

CHAPTER I

INTRODUCTION

“The enemy has struck a savage, treacherous blow. We are at war, all of us: there is no time now for disputes or delay of any kind. We must have ships and more ships, guns and more guns, men and more men – faster and faster. There is no time to lose. The navy must lead the way. Speed up – it is our navy and your nation.”¹

**Secretary of the Navy Frank Knox
11 December 1941**

As seawater poured through the flood gates into Dry Dock #1 in the early morning hours of 27 January 1944, Fred White was more than a little concerned about the launchings planned for that afternoon. White was the shipyard’s Master Rigger, responsible for the men who would be handling the mooring lines later that day when the shipyard would become the first shipyard to launch three submarines simultaneously. The launchings of *Ronquil*, *Redfish*, and *Razorback* would be accomplished by floating the partially completed submarines off their blocks in Dry Dock #1. The pressure hull cylinders had been welded together, making the submarines watertight, but much work remained to be done alongside the pier. White was concerned because the three submarines were jammed into the dry dock with little separation and it was the responsibility of White and his line handlers to insure that the submarines did not damage

¹ Secretary of the Navy Frank Knox ALNAV Dispatch to all Naval Stations of 11 Dec 1941. National Archives and Records Administration, Waltham, Massachusetts, Record Group 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 24, Folder A14-6, “Status of Nations with Reference to War and Peace.” Hereafter NARA Waltham, RG 181.

each other as they floated free of the blocks. Three 1,800 ton submarines, moving about unrestrained in close quarters, could do considerable damage.²

White's workday would only be half over with the 1:00 pm triple launching. A fourth, and more traditional, launching was scheduled for 2:30 pm that same afternoon when the *Scabbardfish* would be released to slide down Building Way #4 into the Piscataqua River. The fourth launching would set another record for the most submarines launched by a shipyard on the same day. Before the year was over, these four submarines would be included in the record setting thirty-two submarines that the yard completed in 1944. No United States shipyard before, or since, has built so many submarines in one year, hence the title of this dissertation, *32 in '44*.³

White had observed daily the side-by-side construction progress of *Ronquil*, *Redfish*, and *Razorback* in Dry Dock #1 since their keels had been laid on the same day, 9 September 1943, just four and one half months earlier. Since that time, the submarines had grown in size and gradually filled the dock until only a few feet separated the hulls. At the points of least separation, one could almost step from hull to hull. White and the other civilian managers had already convinced Yard Commandant Rear Admiral Thomas Withers that this should be the first, and last, triple simultaneous launching from a dry dock at Portsmouth Navy Yard. Having pushed the envelope this one time, the managers were convinced that working conditions were too tight and the risks too great to attempt to build and launch "three at a time." This was no easy decision because the managers at

² Oral interview with Fred White, 3 Apr 2006, at his home in New Castle, N.H.

³ The 32 submarines completed at Portsmouth Navy Yard in 1944 included one, USS *Lionfish* (SS298), that was towed from Cramp Shipbuilding Company in Philadelphia to Portsmouth Navy Yard after it was 45 % completed. USS *Manta* (SS299), also towed from Cramp Shipbuilding after 45% completed, was finished at Portsmouth in January 1945.

Portsmouth Navy Yard prided themselves on innovative submarine building techniques and a willingness to accept considerable risk for the sake of increased production.

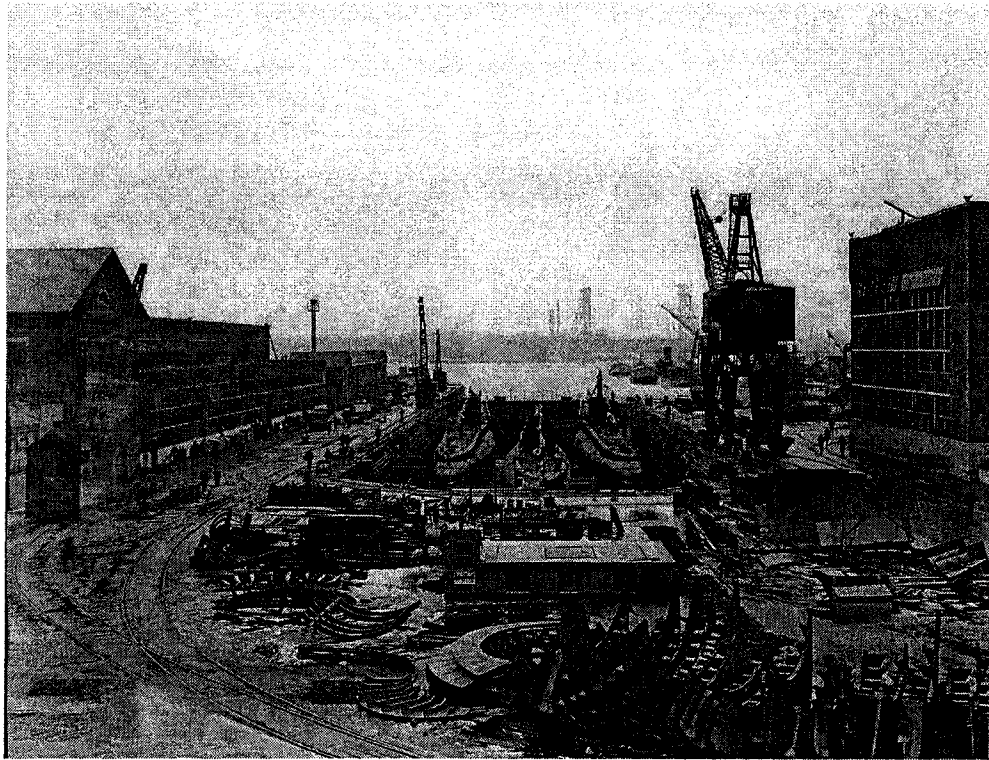


Figure 1: *Redfish, Ronquil, and Razorback* Building in Dry Dock #1. Courtesy of Milne Special Collections, University of New Hampshire, Durham, N.H.

To further complicate matters at the triple launch, Commandant Rear Admiral Withers had invited a number of dignitaries to fill the stands at the head of the dry dock to witness the record setting event. Those dignitaries included the Mayor of Portsmouth, Charles M. Dale, who would be elected Governor of New Hampshire before the year was out. Extensive media coverage had also been arranged to insure that the shipyard received due credit for its record-setting accomplishments. Fred White was one of the managers tasked to insure that the launchings were problem free and that the publicity received was all positive. Hopefully, the only breakage that day would be the traditional champagne bottles with which the sponsors would christen each hull.

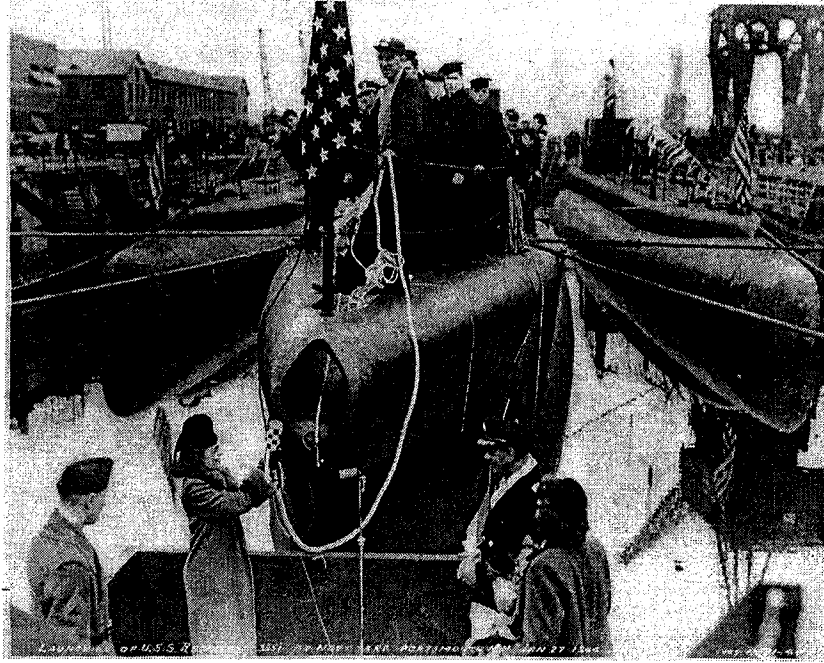


Figure 2: Triple Simultaneous Launching of *Redfish*, *Ronquil*, and *Razorback*. Courtesy of Milne Special Collection and Archives Department, University of New Hampshire Library, Durham, N.H.

The submarines were sponsored by two wives and two daughters of senior officers at the shipyard. One of the sponsors was Hazel Grant Davis, the wife of Captain Henry F.D. Davis, the Industrial Manager, who was ultimately responsible for all submarine construction at the yard. The ladies were appreciative, and deserving of the honor, as were the other forty women who had performed the same ritual at the yard since the war started.

Attending an outdoor ceremony at the shipyard in late January might have been a cold, snowy, miserable experience. The attendees at the triple launch, however, got a reprieve on the weather. It was a cool, cloudy day with temperatures reaching the low forties in the afternoon. The ladies, bundled in warm, stylishly tailored coats and pill box hats, looked a little out of place in the stands at the head of the dry dock. Submarine

pressure hull sections and frames for the next submarine to be built were stacked all around the dock, huge cranes moved back and forth, and hundreds of industrial workers and sailors moved about doing their jobs. The scene also included offerings from the shipyard band.⁴

Despite Fred White's concerns, the triple launching went well, and the slide of the *Scabbardfish* into the river was equally successful. Torpedoman Third Class Dan MacIsaac watched the triple launching from the side of the dry dock that afternoon with a few other crewmembers of the USS *Redfish*. He recalled that the three sponsors carefully smashed the champagne bottles on the bow of the three submarines at precisely the same time to preserve the purity of the advertised triple simultaneous launching.⁵ Rear Admiral Withers had obviously alerted the highest levels of the Navy of the planned launchings because, later that same day, Secretary of the Navy James Forrestal sent a congratulatory message to the yard. Secretary Forrestal wrote, "In the launching of four submarines in a single day, the Portsmouth Navy Yard sets another record in the submarine program."⁶ Indeed, Portsmouth had set other submarine production records before this one and would go on to establish even more records before the war was over.

⁴ The description of the scene is reconstructed from several sources including interviews with participants Fred White and Dan MacIsaac; the *Portsmouth Herald* of 26 Jan 1944, "Portsmouth Will Launch 4 Submarines Tomorrow;" 1; 27 Jan 1944, "Portsmouth Launches 4 Subs, Hits World Record," 1; and 28 Jan 1944, "4 New Subs Launched for World Record," 1. Figures 1 and 2, showing the three submarines in dry dock before and after the launching, also provide details of the scene.

⁵ Interview with Dan MacIsaac, 9 Nov 2006, at Portsmouth Naval Shipyard Museum.

⁶ Secretary of the Navy James Forrestal letter of 27 Jan 1944 to Commandant Portsmouth Navy Yard, Subject: Commendation from Navy Department. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), 1925-56, Box 18, Folder S-6, "Launching General, Jan 1944-47."

The quadruple launching on 27 January 1944 was a microcosm of events at Portsmouth Navy Yard during World War II. Innovative and creative management combined with a dedicated and very capable workforce to set submarine production records that brought great credit and recognition to the shipyard. This study tells the story of how Portsmouth Navy Yard was able to achieve remarkable production performance which transformed the shipyard and the surrounding communities. Sixty years later, those transformations continue to influence many aspects of life in the seacoast area.

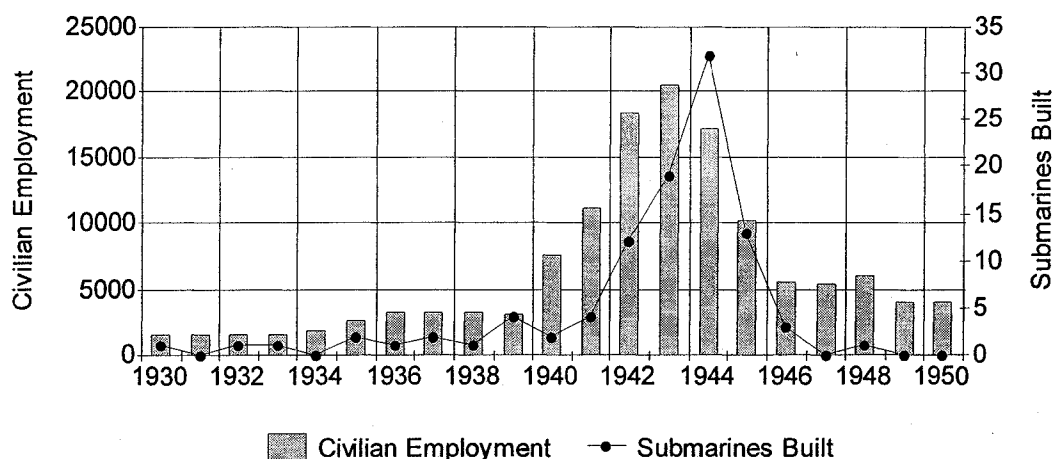
However, there were downsides to the shipyard's crowning achievements during the war. The by-products of greatly increased production included landfills contaminated with toxic industrial waste, increased pollution of the Piscataqua River as the result of the dumping of raw sewage and shop waste effluents, increased accident rates, and lost wetlands. In addition, the greatly increased employment and military presence at the yard brought challenges to local communities that struggled to increase infrastructure and services to accommodate the increased numbers of new residents while adjusting to the sociological problems that accompanied a Navy boomtown. Not the least of these struggles included efforts to curb prostitution and an alarming increase in venereal disease. While wrestling with these day-to-day problems during the war, local communities feared an uncertain, and possibly disastrous, postwar future should the inevitable peace bring dramatically reduced employment or closure of the yard.

This dissertation presents both sides of Portsmouth Navy Yard's war years: the tremendous upside wherein a remarkable workforce set submarine production records and the downside that saw significant environmental abuse and citizens' apprehension about their rapidly and radically changing communities. Both sides are presented with an

overarching theme that emphasizes the shipyard and community transformations that occurred as the result of activity at the yard during World War II.

After averaging the completion of less than two submarines a year in the 1930s, the Portsmouth Navy Yard completed seventy-nine submarines between 1 July 1940 and 1 July 1945.⁷ Similarly, the shipyard employed an average of about 2,000 employees per year in the 1930s and grew to employ a peak of 20,465 in November 1943. Figure 3 shows the dramatic increase in employment and completed submarines during World War II.⁸

Figure 3: Employment & Submarines Built
Portsmouth Navy Yard (1930-1950)



This study argues that Portsmouth Navy Yard’s outstanding performance was the direct result of a highly motivated workforce and innovative management techniques that thrived in the World War II naval shipbuilding environment. A key conclusion is that the

⁷ *Portsmouth Herald*, 19 Jul 1945, “Yard is Tops in Sub Production,” 1.

⁸ Figure 3 is constructed from shipyard employment numbers and submarine construction records in *Cradle of American Shipbuilding*, Portsmouth Naval Shipyard: Government Printing Office, 1979, 76-83.

management of Portsmouth Navy Yard, either by design or necessity, employed successful industrial management practices that were forty years ahead of their time. These practices included employee empowerment, special small teams, and mass production techniques to the extent that they could be applied to submarine construction at the time.

The naval shipbuilding environment during the war was highly decentralized and characterized by loose Navy Department oversight of navy yards, especially those that were performing well. This environment existed because the newly created Bureau of Ships was overwhelmed with other matters and unable to effectively oversee navy yard operations. Newly created in June 1942, the Bureau of Ships was quickly consumed with the administrative burden of organizing a rapidly expanding bureaucracy while mobilizing civilian industry to support an accelerated shipbuilding program. Left with little or no corporate oversight in an expanding market, and very much to its own devices, Portsmouth Navy Yard excelled.

On one level of study, Portsmouth Navy Yard's remarkable performance can be attributed to superior leadership, massive hiring, extensive facility upgrades, effective training programs, innovative production techniques, and an intelligent and highly dedicated workforce. Another level of analysis shows that each of these attributes contained its own set of challenges. The massive hiring added large numbers of women and untrained employees to the shipyard workforce. The training programs were constantly disrupted by Selective Service recruitment of the younger and more physically qualified. The facility upgrades, funded nearly instantaneously in 1940 after a decade of neglect and minimal investment in shipyard infrastructure, were quite extensive and

potentially disruptive to the accelerated submarine construction schedules. Finally, with only five building ways at the start of the war, the desired building rates could be achieved only if submarine hulls were forced off the building ways very early in the construction schedule to free the ways for the next keels. Submarines were launched at unprecedented rates and much of the work normally done on the building ways was completed pier side. Necessity was very much the mother of invention as the shipyard turned a shortage of building ways into an advantage by developing and optimizing techniques to build submarines side-by-side in the newly constructed dry dock and building basin.

Portsmouth Navy Yard did have two distinct advantages over the other navy yards during World War II. First, unlike the seven other navy yards (Boston, New York, Philadelphia, Norfolk, Charleston, Bremerton, and Mare Island) that dealt with multiple ship types and disruptive repair and overhaul work, Portsmouth Navy Yard was able to specialize in the design and construction of submarines. The yard's ability to focus and streamline its resources and energies into one line of work during the war was the logical extension of the navy's efforts to develop the yard's submarine design and construction capabilities during the 1920s and 1930s to provide competition to private industry.⁹

⁹ Portsmouth Navy Yard's ability to streamline resources and energies to the construction of submarines is an integral part of this study's argument. Up front it is acknowledged that Portsmouth Navy Yard did considerable other work during the war. However, to a large extent, that work was minimal compared to other yards and did not compete with the priorities of new construction, as was the case at other shipyards. According to Philip N. Guyol, in addition to completing 82 submarines between 1940 and 1945, the yard also completed 3 torpedo testing barges, 7 pier caissons, 3 100 ton floating cranes, quantities of electrical fixtures, and about 700 boats, including wherries, motor whaleboats, motor launches, and fast torpedo retrievers. Guyol also notes the manufacture of aluminum stretching machines for the aircraft industry, the manufacture of 240 mm gun-recoil mechanisms, and the repair of 26 American, 3 British, 1 Free-French, 6 Italian and 4 German submarines, and 34 other vessels of various kinds between 1941 and August 1945. Many of these submarine and ship repairs were done at the beginning and end of the war leaving the middle years of the war free for streamlining for new construction. Phillip N. Guyol, *Democracy Fights: A History of New Hampshire in World War II* (Hanover: Dartmouth Publications, 1951), 162.

Portsmouth's second advantage was its small size, in comparison to the other navy yards. Despite expanding six fold between 1940 and 1943, Portsmouth was the smallest navy yard in March 1943. At that time, Portsmouth Navy Yard had 20,465 employees and the other seven navy yards averaged 38,377 employees.¹⁰ A small shipyard with a specialized mission and a well defined, though constantly increasing, workload had a distinct advantage over larger shipyards with a workload of multiple ship types and frequent emergent work. Still, it is a credit to Portsmouth Navy Yard's management and employees that they were able to capitalize on these advantages and exceed all performance expectations. By consistently exceeding the Navy's expectations, the shipyard was assigned increased orders for submarines and allowed to specialize in new construction.¹¹

This study also addresses the consequences of the shipyard's increased production during the war. The first and most obvious consequence is the contribution made by the Portsmouth submarines to the winning of the war. Portsmouth-built submarines sank 434 enemy ships totaling about 1.7 million tons.¹² This represents about one-third of the

leaving the middle years of the war free for streamlining for new construction. Phillip N. Guyol, *Democracy Fights: A History of New Hampshire in World War II* (Hanover: Dartmouth Publications, 1951), 162.

¹⁰ Navy Department, SOSED (Industrial Manpower Section) letter of 1 May 1943 to Distribution List. National Archives and Records Administration, College Park, Md., RG 38, Naval Operations General Correspondence, Box 151, Folder NY1, 1 July 1942 to 30 Jun 1943. Hereafter NARA College Park.

¹¹ Electric Boat Company in Groton, Ct. was also a small private shipyard that specialized in submarine construction during World War II. In general, Portsmouth built submarines much more quickly than Electric Boat at a slightly higher cost. See Chapter V for a more complete comparison of Portsmouth and Electric Boat costs.

¹² Theodore Roscoe, *United States Submarine Operations in World War II* (Annapolis: United States Naval Institute, 1949), 527-565. This work accounts for enemy tonnage sunk by individual submarines. The 1.7 million tons is the author's count for Portsmouth-built submarines. Another source, John D. Horn, "Submarines and the Electric Boat Company," (A.B. Degree, Princeton University, 1948), 89, provides the following summary of sunk tonnage by shipyard: 80 Electric Boat submarines sunk 1,990,454 tons (38.5%), 69 Portsmouth submarines sunk 1,607,016 tons (32.8%), 22 Mare Island

tonnage sunk by United States submarines during the war.¹³ In September 1943, at the height of the war in the Pacific, the percentage was even higher. In a congratulatory letter to the shipyard, the Vice Chief of Naval Operations, Admiral F.J. Horne, noted that:

The Secretary of the Navy revealed that the Japanese had lost one-third of their available tonnage up to 3 September 1943, and that seventy-seven percent of that tonnage loss was sunk by our submarines. Of the submarines contributing to these sinkings, forty percent were built by your Navy Yard. This is, indeed, a record of which you can be proud.¹⁴

Portsmouth-built *USS Kingfish* (SS 234), completed on 20 May 1942, was credited with the sinking of an enemy ship, a Japanese freighter off southern Kyushu,¹⁵ on 1 October 1942 just thirteen months after her keel had been laid. When other shipyards were having difficulty delivering submarines in thirteen months, *Kingfish* had been built, steamed half way around the world, and sunk Japanese shipping.

In its 27 August 1945 issue, the shipyard's newspaper, *The Portsmouth Periscope*, celebrated the yard's wartime accomplishments with considerable pride:

The war is over! And the part that Portsmouth played in the war is something that every loyal workingman can look back on with a feeling of pride . . . The Portsmouth submarine fleet was the scourge of the famed Japanese merchant ships. From the very darkest days of the war, Portsmouth started to swing at the little yellow men who had pulled the sneak attack on Pearl Harbor. . . They rained

Submarines sunk 988,357 tons (22%), and 19 Manitowoc submarines sunk 494,737 tons (9.6%). Horn cited the source for these totals "Figures courtesy Electric Boat Company." Thus, two independent accounts credit Portsmouth-built submarines with about 1.7 million tons of enemy tonnage sunk, representing about one third of the total tonnage sunk.

¹³ *Ibid.* Graph inside back cover shows 5,329,000 tons of enemy shipping sunk by U.S. submarines.

¹⁴ Chief of Naval Operations, Admiral F.J. Horne, letter of 26 Apr 1944 to Commandant Portsmouth Navy Yard. NARA College Park, RG 38, Naval Operations General Correspondence, Box 1182, Folder NY1, 1 Jul 1943 - 30 Jun 1944.

¹⁵Theodore Roscoe, *United States Submarine Operations in World War II*, 175.

If one can look beyond the emotion and racially charged language of the moment, the *Periscope* was accurate in its reporting that Portsmouth Navy Yard's performance had contributed significantly to the winning of the war.

Another consequence of wartime operations was the physical transformation of the shipyard, most noticeably the addition of significant acreage, by filling channels between nearby islands and reclaiming wetlands and shoal waters. Land reclamation and the connecting of islands to increase the size of the shipyard during the war continued a consistent practice throughout the history of the shipyard from its establishment in 1800. The physical transformation of the yard during the war included the construction of a 12 acre fitting out pier, a dry dock, a building basin, and the upgrade and expansion of numerous shop buildings and facilities.

There were other, and sometimes less noble, consequences of Portsmouth Navy Yard operations during the war. On the positive side, women gradually assumed positions of increased responsibility and played an increasingly important role as the war progressed. Politically, another Portsmouth prewar condition, strongly entrenched male dominated Republican government, was overturned with a Democratic victory in November 1944 that included the election of the first female mayor in the state of New Hampshire. This study argues that the greatly increased population, and military presence, during the war caused unsettling conditions in Portsmouth that may have contributed to the Democratic victory.

The Portsmouth-Kittery economy was greatly stimulated by the defense dollars that poured into the shipyard. Commerce thrived, the standard of living was raised, and

1958, Sweetser Family Papers, Milne Special Collections, University of New Hampshire Library, Durham, N.H.

considerable building of housing and community infrastructure resulted. The communities also benefited from the federal and state sponsored industrial training programs that dramatically reversed a prewar shortage of skilled workers in the area.

On the negative side, the exploding employment and industrial activity at the physically constrained shipyard aggravated the existing inadequate sewage and industrial waste-disposal system. These inadequacies, readily apparent during the war, continued after the war and contributed to Portsmouth Navy Yard being declared a Superfund clean-up site in 1993. The EPA studies that led to the Superfund status rarely extended back earlier than 1945 for lack of evidence. This study does provide pre-1945 evidence of the environmental impact of activity at the shipyard during the war. Other negative effects associated with the dramatically increased population at the shipyard included increased industrial accident rates and increased communicable disease rates, with an unusually high incidence of venereal disease among the enlisted military population at the shipyard. With regard to the latter, this study highlights the Navy's attempts to deal with the problem in-house, the Navy's periodic efforts to pressure Portsmouth city officials to rid their town of disease carrying prostitutes, and the city's reluctance to acknowledge the existence of same.

In summary, this study tells the story of Portsmouth Navy Yard's remarkable production accomplishments during World War II, describes the shipyard's management practices and production methods that led to those accomplishments, and highlights important environmental and community consequences that transformed the shipyard and the surrounding communities. The story is prefaced by placing Portsmouth Navy Yard in the context of broader national and international events of the 1920s and 1930s, including

disarmament conferences, neutrality acts, the Great Depression, and New Deal recovery programs. These events set the stage for Portsmouth Navy Yard's World War II story to unfold as it did.

As suggested by the subtitle, *A Management and Environmental Study of Submarine Construction at Portsmouth Navy Yard during World War II*, this study addresses three primary themes; local history, industrial mobilization, and the environmental consequences of industrial mobilization. What contributions does this dissertation make to these three primary themes?

As for local history, this work adds considerably to the limited analytical history that has been written about the Portsmouth Navy Yard and the city of Portsmouth during World War II. Early shipyard histories include Walter H. Fentress' *Centennial History of the United States Navy Yard at Portsmouth, N.H.* (1876), Rear Admiral George Henry Preble's *History of the United States Navy-Yard, Portsmouth, N.H.* (1892), and Captain David S. Boyd's *Continuation of Preble's History of the United States Navy Yard, Covering the Years 1878-1930*. Portsmouth Navy Yard, like most naval activities, wrote World War II administrative histories. Portsmouth Navy Yard's World War II self-history is a compilation of various department inputs that records events at the shipyard during the war in great detail. All of the above works are a wealth of data and information, if short on analysis and criticism.¹⁷

¹⁷ Walter E.H. Fentress, *Centennial History of the United States Navy Yard, at Portsmouth, N.H.* (Portsmouth: M. Knight, 1876); George Henry Preble, *History of the United States Navy-Yard, Portsmouth, N.H.* (Washington D.C.: Government Printing Office, 1892); David F. Boyd, "Continuation of Preble's History of the United States Navy Yard, Covering the Years 1878-1930," typescript with handwritten corrections and additions, Maine Room, Rice Public Library, Kittery, Me.; *Administrative History*:

More recent works include a shipyard publication, *The Cradle of American Shipbuilding* (1979), Robert H. Whittaker's *Portsmouth-Kittery Naval Shipyard in Old Photographs* (1993), Richard E. Winslow III's *Portsmouth-Built: Submarines of the Portsmouth Naval Shipyard* (1985), *Constructing Munitions of War: The Portsmouth Navy Yard Confronts the Confederacy, 1861-1865* (1995), and "Do Your Job": *An Illustrated Bicentennial History of the Portsmouth Naval Yard, 1800-2000* (2000), and Nelson Lawry's *Portsmouth Harbor's Military and Naval Heritage* (2004).¹⁸ These works are rich in pictures and anecdotes. Suffice it to say that events at Portsmouth Naval Shipyard, since its establishment in 1800, have been well chronicled by local historians in works written for a popular audience.

The above works touch, but briefly, on World War II activity at the yard. Richard Winslow III's bicentennial history, "Do Your Job," provides the most discussion of activity at the yard during the war. Even then, when covering 200 years of history, Winslow could only afford to devote 20 of 250 pages to the World War II period. In the bibliography for "Do Your Job," Winslow wrote, "For those who elect to follow me in pursuing this topic [Portsmouth Navy Yard], I recommend research at the Naval Historical Center [Washington Navy Yard], . . . National Archives [College Park, Md.] , . . . and the National Archives in Waltham, Massachusetts." This dissertation, unlike the

Portsmouth Navy Yard in World War II (Portsmouth Navy Yard: Government Printing Office, 1946), Portsmouth Naval Shipyard Museum Archives, Kittery, Me.

¹⁸ *The Cradle of American Shipbuilding* (Portsmouth Naval Shipyard: Government Printing Office, 1979); Robert H. Whittaker, *Portsmouth-Kittery Naval Shipyard in Old Photographs* (Dover N.H.: Allan Sutton, 1993); Richard E. Winslow III's, *Portsmouth-Built: Submarines of the Portsmouth Naval Shipyard*, (Portsmouth, N.H.: Portsmouth Marine Society, 1985), *Constructing Munitions of War: The Portsmouth Navy Yard Confronts the Confederacy, 1861-1865* (Portsmouth: Portsmouth Marine Society, 1995) and "Do Your Job": *An Illustrated Bicentennial History of the Portsmouth Naval Yard, 1800-2000* (Portsmouth: Portsmouth Marine Society, 2000); Nelson H. Lawry, Glen M. Williford, and Leo K. Polaski, *Portsmouth Harbor's Military and Naval Heritage* (Portsmouth, N.H.: Arcadia Publishing, 2004).

other shipyard histories, is based on extensive research at all three of those archives, especially NARA Waltham.

This dissertation differs from earlier works in that it is the most extensive and detailed treatment of any period of history at the Portsmouth Navy Yard. Having the luxury of concentrating on a rather short period of history, it is able to place more emphasis on context, analysis, and synthesis than the others. Specifically, this dissertation digs deeper than the others to explain, not just what happened, but why events unfolded as they did during the war. In addition, great effort is made to analyze Navy Department and internal shipyard developments between the wars that positioned the yard to excel as it did during World War II.

How does this dissertation add to Portsmouth and New Hampshire histories? Neither has been shortchanged by historians, especially colonial Portsmouth. However, World War II home front histories of both are surprisingly scarce. Philip N. Guyol's *Democracy Fights: a History of New Hampshire in World War II* (1951) is a comprehensive history of the state's economic, industrial, and military involvement in the war that may have intimidated others from revisiting the subject.¹⁹ Barbara McLean Ward's *Produce & Conserve, Share & Play Square: The Grocer and the Consumer on the Home-Front Battlefield during World War II*, is a collection of essays primarily depicting day-to-day life in Portsmouth and Strawberry Banke during the war.²⁰ It draws extensively on Portsmouth War Records to recreate the Portsmouth social and cultural

¹⁹ Philip N. Guyol, *Democracy Fights: a History of New Hampshire in World War II* (Hanover: Dartmouth Publications, 1951).

²⁰ Barbara McLean Ward, *Produce & Conserve, Share & Play Square: The Grocer and the Consumer on the Home-Front Battlefield during World War II* (Portsmouth: University Press of New England, 1994).

scene during the war with emphasis on home front sacrifices. Both works credit Portsmouth Navy Yard with making a huge economic and social impact on Portsmouth and other local communities during the war. However, neither Guyol nor Ward chose to examine the interface and interactions between the shipyard and local communities during the war in any significant detail.

In summary, Portsmouth Navy Yard histories to date have, for the most part, been chronicles rich in facts, photographs, and anecdotes with limited analysis of the World War II period, and little attempt to reach beyond the boundaries of the shipyard. On the other hand, New Hampshire and Portsmouth World War II histories have reflected home front happenings to the exclusion of events on the yard, except to note the impressive bottom line production accomplishments that contributed to the social and economic transformations of local communities. In addition to a comprehensive analysis of operations at Portsmouth Navy Yard during the war, this dissertation bridges the gap between the shipyard and community lacking in previous works.

The industrial mobilization theme takes the form of a comprehensive case study of how wartime mobilization was implemented at one industrial facility, the Portsmouth Navy Yard. Few similar case studies of World War II mobilization exist.

World War II mobilization studies usually present top-down views from Washington D.C. where decisions were made and policies were implemented. Keith E. Eiler's *Mobilizing America: Robert P. Patterson and the War Effort 1940-45* (1997) describes the national mobilization story. Robert Connery's *The Navy and Industrial Mobilization in World War II* (1951) and Connery and Robert Albion's *Forrestal and the*

Navy (1962) tell the mobilization story at the Navy Department level.²¹ Few studies of World War II industrial mobilization reach down to the internal workings of an industrial activity, let alone a navy yard, to analyze the shopfloor implementation of mobilization. According to one mobilization historian, “Perhaps, because the war is such a towering subject of historical inquiry, few works on wartime industry concretely discuss war work itself.”²² This dissertation does discuss war work in great detail by examining the day-to-day shopfloor decisions and waterfront operations of Portsmouth Navy Yard.

The few mobilization studies that do reach down into shipyard operations focus on commercial shipbuilding, not submarines. Frederic C. Lane’s *Ships for Victory* (1951), the comprehensive study of shipbuilding under the U.S. Maritime Commission in World War II, focuses on commercial ships and private shipyards. Lane’s impressive work spans a wide range of mobilization subjects from U.S. Maritime Commission policy and administration to discrete events at a few selected shipyards. A more recent work, Christopher James Tassava’s Ph.D. dissertation “Launching a Thousand Ships: Entrepreneurs, War, Workers, and the State in American Shipbuilding, 1940-45 (2003)” analyzes the implementation of mobilization policies from a corporate and private shipyard level. Tassava also focuses on the U.S. Maritime Commission and San Francisco Bay Shipyards run by Kaiser and Bechtel to analyze how relationships between the federal government and private contractors led to remarkable building rates of commercial ships, especially Liberty ships. Marilyn Johnson’s *The Second Gold Rush:*

²¹ Keith E. Eiler, *Mobilizing America: Robert P. Patterson and the War Effort 1940-45* (Ithaca: Cornell University Press, 1997); Robert Connery, *The Navy and Industrial Mobilization in World War II* (Princeton: Princeton University Press, 1951); Robert Albion and Robert H. Connery, *Forrestal and the Navy* (New York: Columbia University Press, 1962).

²² Christopher James Tassava, “Launching a Thousand Ships: Entrepreneurs, War, Workers, and the State in American Shipbuilding, 1940-45,” Ph.D. Diss., Northwestern University, 2003.

Oakland & the East Bay in World War II (1996) also examines commercial shipbuilding in the San Francisco Bay Shipyards. The limited literature on World War II shipbuilding mobilization has concentrated on private industry and commercial shipbuilding on the West Coast.²³

The overall history of submarine construction has been well covered by Gary Weir's technical and industrial analysis of submarine construction in his two works, *Building American Submarines 1914-1940* (1991) and *Forged in War: The Naval-Industrial Complex and American Submarine Construction, 1940-1961* (1998).²⁴ Weir's work, especially *Forged in War*, focuses on the technological development of submarines and the building of the necessary relationships between the Navy and private industry that accommodated that development. Weir discusses submarine construction at all shipyards, including Portsmouth Navy Yard. However, Weir's emphasis is on the technological development of United States submarines and not the performance of any one particular shipyard during a specific period. This dissertation draws heavily on Weir's work to set the background and context for Portsmouth Navy Yard's production success during the war.

Two unpublished histories of Portsmouth Navy Yard's primary competitor during the war, Electric Boat Company, discuss events at that shipyard during World War II. They are John D. Horn's "Submarines and Electric Boat Company (1948)," and an

²³ Frederic C. Lane, *Ships for Victory* (Baltimore: Johns Hopkins University Press, 1951); Christopher James Tassava, "Launching a Thousand Ships," Ph.D. Diss., Northwestern University, 2003; Marilyn Johnson, *The Second Gold Rush: Oakland & the East Bay in World War II* (Berkeley: University of California Press, 1996).

²⁴ Gary Weir, *Building American Submarines 1914-1940* (Washington D.C.: Naval Historical Center, 1991) and *Forged in War: The Naval-Industrial Complex and American Submarine Construction, 1940-1961* (Washington D.C.: Naval Historical Center, 1993).

unpublished typescript on file at the Navy Department Library, National Historical Center by an unknown author, "History of the Electric Boat Company, 1899-1949."

These histories of Electric Boat Company are chronicles of the company's achievements that are short on analysis and criticism.²⁵ However, they provide benchmarks against which to measure the operations and performance of Portsmouth Navy Yard.

All of this is to say that studies of shipyard mobilization for submarine construction during World War II are limited. Furthermore, the few comprehensive studies of shipyard mobilization that do exist deal primarily with commercial shipbuilding on the West Coast. This detailed study of the World War II mobilization for submarine construction at an East Coast navy yard adds a new dimension to a limited volume of work. This dissertation highlights similarities between the innovative efforts of Portsmouth Navy Yard to streamline production for the rapid construction of submarines and the efforts of private West Coast shipyards to do the same for the accelerated construction of Liberty ships. However, unlike World War II mobilization studies of private shipyards, where government orders were received and ships constructed with little deviation from contractual plans, this study of a government yard presents evidence of a continuing cooperative dialogue between the yard and the offices of the Chief of Naval Operations and the Secretary of the Navy that often resulted in policy decisions favorable to maximizing submarine production while, at the same time, insuring a maximum shipyard effort to include the latest design features on new submarines as dictated by wartime feedback and experience.

²⁵ John D. Horn, "Submarines and the Electric Boat Company," A.B. Degree, Princeton University, 1948 and "History of the Electric Boat Company 1899-1949," Unpublished Typescript. Navy Department Library, Naval Historical Center, Washington, D.C.

This dissertation argues that Portsmouth Navy Yard's outstanding performance during World War II was the product of a highly motivated work force and a management team that thrived in a decentralized wartime shipyard environment. All three had to work together to achieve success. In addition, the war provided an overarching crisis filled environment that rallied both employees and management to the common objective of increased production to defeat the enemy. So then, what part of the shipyard's success was due purely to the stimulation of war, and what part was due to the other factors, including enlightened management practices and well trained, skillful employees? That question, of course, is impossible to answer. Undoubtedly the threat of war heightens an individual's performance and 20,000 heightened performances can produce extraordinary results. The performance of organizations in threatening environments is a study unto itself, well beyond the scope of this dissertation. Suffice it to say that management scholars have argued that leaders of threatened organizations, in conjunction with employees having an increased awareness of the need for organizational changes, are often able to successfully transform their organizations through efforts that include increased flexibility, decentralized problem solving and decision making, increased productivity, and innovation.²⁶ All of these factors, and more, will be amply illustrated in the case of Portsmouth Navy Yard during World War II.

One of the reasons for Portsmouth Navy Yard's success during the war was its ability to thrive in a decentralized shipbuilding environment. In 1940, decentralization was gaining in popularity in private industry but had not achieved the widespread application that it would find after the war. At the turn of the century, American industry

²⁶ Carole K. Barnett and Michael G. Pratt, "From Threat-rigidity to Flexibility: Toward a Learning Model of Autogenic Crisis in Organizations," *Journal of Organizational Change Management*, Vol. 13, No. 1, 2000.

was gaining in popularity in private industry but had not achieved the widespread application that it would find after the war. At the turn of the century, American industry was characterized by little product diversification and strong central management structures. With the development of the automotive industry, diversification of product increased, the need for professional managers increased, and decentralization began to be the management model of choice to manage numerous product lines. This was especially true at General Motors where William C. Durant instituted a high degree of decentralization, albeit, not well coordinated. In the early 1920s, Alfred Sloan improved the General Motors decentralized model by creating a coordinating office of staff specialists and general officers. The Sloan model became the standard for decentralized industrial management for years to come. However, decentralization had not been implemented by a high percentage of companies prior to World War II. Reporting the results of a late 1950s management study of sixteen major firms in the chemical, electrical, and automotive industries, management historian Alfred C. Chandler wrote, "Twelve [firms] have come since 1921 to such a decentralized structure. Eight [firms] have done so since 1940."²⁷ Debate about optimal industrial management structure was put on hold during the 1930s as concern about the availability of work took precedence over concerns about worker productivity. As World War II began, no management philosophy prevailed for how best to organize for maximum production.²⁸ Wartime mobilization accelerated the move towards decentralization.

²⁷ Alfred C. Chandler, Jr., "Management Decentralization: An Historical Analysis," in James P. Baughman, ed., *The History of American Management* (Englewood Cliffs, N.J.: Prentice Hall, Inc., 1969), 212 and 242.

²⁸ See Alfred D. Chandler. *Strategy and Structure: Chapters in the History of the Industrial Enterprise* (Cambridge, Ma.: The M.I.T. Press, 1962) for a thorough discussion of the evolution of

Frederick C. Lane, Christopher Tassava and others have noted that wartime urgency demanded loose organizational structure and decentralization of the commercial shipbuilding industry.²⁹ According to Tassava, it was decentralization that freed Bechtel and Kaiser to build “breathhtaking” numbers of commercial ships, especially Liberty ships.³⁰ This dissertation extends the importance of decentralized operations and loose corporate oversight to the achievements of Portsmouth Navy Yard during the war. In Portsmouth’s case, with the newly created Bureau of Ships overwhelmed with other responsibilities, the yard was released to operate, not just decentralized from the Bureau of Ships, but as independently as possible. In the process, Portsmouth Navy Yard achieved its own “breathhtaking” results.

Prior to the war, management optimization and productivity were more often associated with the correct corporate organizational wiring diagram than workplace practices and employee motivation. Just as wartime urgency drove decentralized operations throughout the shipbuilding industry, greatly increased production schedules and enlightened leadership drove a move to employee empowerment and self-managing

industrial corporate organizations and practices during the first half of the 20th century. Also applicable are Chandler’s *The Visible Hand, The Managerial Revolution in American Business* (Cambridge: Harvard University Press, 1977) and *Scale and Scope: The Dynamics of Industrial Capitalism Business* (Cambridge: Harvard University Press, 1977); David Hounshell, *From the American System to Mass Production, 1800-1932: The Development of Manufacturing Technology in the United States* (Baltimore: The Johns Hopkins University Press, 1984); Thomas K. McCraw, ed., *The Essential Alfred Chandler: Essays Toward a Historical Theory of Big Business* (Boston: Harvard Business School Press, 1988); Alfred D. Chandler, and Herman Daems, eds. (*Managerial Hierarchies: Comparative Perspectives on the Rise of the Modern Industrial Enterprise. Cambridge: Harvard University Press, 1980*). The last work notes that “Professionalization began, in fact, as a strong demand appeared for managers to oversee production, marketing, financial, and other specialized activities. . . some of the nation’s most prestigious universities—among them Harvard, Dartmouth, . . . set up schools or courses of business administration to train managers . . . during the first two decades of the twentieth century, national professional associations . . . were established,” 34.

²⁹ Frederick C. Lane, *Ships for Victory*; Christopher Tassava, “Launching a Thousand Ships: Entrepreneurs, War, Workers, and the State in American Shipbuilding, 1940-45.”

³⁰ Christopher Tassava, “Launching a Thousand Ships,” 1.

Peters' works, while lacking in academic rigor, spawned a management culture that rushed to implement employee empowerment, self-managing small teams, and other programs to advance employee participation and decision making in the workplace.³¹ The concept gained popularity throughout the 1990s as the key to increased productivity, quality, and worker satisfaction.³² By the late 1990s, the concept had expanded from self-managing teams to self-managing organizations where "There are no clear cut divisions between those who manage and those who are managed. Rather, everyone in the enterprise community is viewed as having full membership status, with a real share of the voice, and with a legitimate right to fully participate in the management of his or her own work."³³ While Portsmouth Navy Yard certainly was not a self-managing organization during the war, it did reap great benefits from the small independent work teams that roamed the waterfront doing their jobs with little or no supervision.

In time, as more and more companies empowered employees, numerous studies have debated the concept. Studies by Chris Argyris, Bradley L. Kirkman, Benson Rosen and others have confirmed the value of the concept when sincerely implemented with

³¹ Thomas J. Peters, *In Search of Excellence: Lessons from America's Best Run Companies* (New York: Harper & Row, 1982); *A Passion for Excellence: The Leadership Difference*, New York: Random House, 1985; *Thriving on Chaos: Handbook for Management Revolution* (New York: A.A. Knopf, 1994); *Liberation Management: Necessary Disorganization for the Nanosecond Nineties* (New York: A.A. Knopf, 1992). Peters' first work, *In Search of Excellence* (1982), advanced the principle that increased management trust and confidence in employees would lead to increased production. Several works later, Peters had progressed to the belief that "The self-managing team should be the basic organizational building block," *Thriving on Chaos* (1994), 297.

³² William C. Byham, *Zapp: The Lightning of Empowerment: How to Improve Productivity, Quality, and Employee Satisfaction* (New York: Harmony Books, 1990); Thomas A. Potterfield, *The Business of Employee Empowerment: Democracy and Ideology in the Workplace* (Westport, Ct.: Quorum Books, 1999).

³³ Ronald E. Purser and Steven Cabana, *The Self Managing Organization: How Leading Companies are Transforming the Work of Teams for Real Impact* (New York: Free Press, 1998).

total dedication and commitment throughout the corporation.³⁴ Argyris, in particular, argues that anything less is a recipe for disappointing results. According to Argyris, superficial implementation of employee empowerment can bring more problems than progress. In normal peacetime industry, the creation, cultivation, and maintenance of the proper corporate environment are critical factors to the success of employee empowerment programs. At Portsmouth Navy Yard during World War II, there was no need to create and cultivate an environment to promote employee empowerment. Such an environment already existed. All shipyard managers and employees were focused on one goal, the acceleration of wartime production. Commitment and dedication towards that end permeated the entire shipyard. Employee empowerment was not a management option, it was a necessity recognized and endorsed by all hands.

Studies by Mark Fenton-O’Creevy and others argue that the success of self managing teams hinges on the support of middle management and that roadblocks are experienced in companies where middle management resists employee empowerment for selfish reasons including concern for managerial job loss or management delayering.³⁵ Wartime urgency and near unlimited job security insured no such selfish resistance by middle management at the Portsmouth Navy Yard.

³⁴ Chris Argyris, “Empowerment: The Emperor’s New Clothes,” *Harvard Business Review*, May/June 98, Vol. 76 Issue 3, 98-105; Bradley L. Kirkman and Benson Rosen, “Beyond Self-Management: Antecedents and Consequences of Team Empowerment,” *The Academy of Management Journal*, vol. 42, no. 1 (Feb., 1999). This study concluded that “More empowered teams were more productive than less empowered teams and had higher levels of customer service, job satisfaction, and organizational and team commitment.” Mark Fenton-O’Creevy, “Employee Involvement and the Middle Manager: Evidence from a Survey of Organizations,” *Journal of Organizational Behavior*, vol. 19, no. 1 (Jan., 1998), 67-84.

³⁵ Mark Fenton-O’Creevy, “Employee Involvement and the Middle Manager: Evidence from a Survey of Organizations,” 67-84.

Studies, especially those by Bradley L. Kirkman and Benson Rosen, have shown that the benefits of successful self-managing work teams greatly exceed the initially sought improvements to productivity, quality, and worker satisfaction.³⁶ It has been shown that, as self-managing work teams gain experience and success, confidence, commitment, and even greater success follow. In addition, commitment to the concept, team, and organization increases. And employees develop a willingness to accept more responsibility for innovation on the job, improved customer relations, harmonious employee-management relations, accountability for results, and continuous improvement in production. In effect, a cascading flood of good things happen when employees are well trained, trusted, empowered, and set free to do their jobs. A seemingly never ending stream of successes typified Portsmouth Navy Yard operations during the war. Many of the positive and highly desirable organizational attributes described above were included in those successes. This dissertation augments the body of work that argues that employee empowerment, sincerely implemented with commitment and dedication, contributes significantly to outstanding production and other highly desirable corporate goals.

Any study of World War II mobilization necessarily includes discussion of women in the workplace and this dissertation is no exception. Studies by Ruth Milkman advance the accomplishments of women during the war while lamenting the defeminization of industry after the war. Milkman accuses management of restructuring postwar industry along the lines of prewar industry, where the workplace was characterized by gender inequality. Other studies, including those by Sherna Berger

³⁶ Bradley L. Kirkman and Benson Rosen, "Beyond Self-Management: Antecedents and Consequences of Team Empowerment."

Gluck, look at the same wartime experiences by women and conclude that “Women’s wartime experiences played a vital role in that process of redefinition [women’s definition of themselves] – the reverberations of which are still being felt today.”³⁷ On the other hand, Alice Kessler-Harris and Claudia Goldin find little to suggest that the war was a turning point for women. Rather, Kessler-Harris argues that the advances made by women during the war “reflect continuity with previous attempts by some women to break out of traditional roles.”³⁸ Specifically, she noted that the labor force participation rate for married women in the age group twenty to fifty steadily increased from the early 1900s through World War II and well into the postwar period.³⁹ According to Kessler-Harris, women entered the workforce in large numbers during the depression and that trend continued throughout the war. Specifically, “older married women contributed most of the increase that occurred among female workers”⁴⁰ during the war years. Goldin also found that “married, rather than single women were the primary means of bolstering the nation’s labor force”⁴¹ during the latter stages of the war and post-war period through 1950. Based on the above noted continuity, Kessler-Harris argues that war was “less a

³⁷ Ruth Milkman, *Gender at Work: The Dynamics of Job Segregation by Sex during World War II* (Urbana: University of Illinois Press, 1987); Sherna Berger Gluck, *Rosie the Riveter Revisited: Women, the War, and Social Change* (Boston: Twayne Publishers, 1987); Deborah Ann Hirshfield, “Rosie also Welded: Women and Technology in Shipbuilding during World War II,” Ph.D. Diss., University of California, Irvine, 1987; Karen Anderson, *Wartime Women: Sex Roles, Family Relations and the Status of Women during World War II* (Westport, Ct.: Greenwood Press, 1981).

³⁸ Alice Kessler-Harris, *Out to Work: A History of Wage-Earning Women in the United States* (New York: Oxford University Press, 1982), 278.

³⁹ *Ibid.*, Figure 5.1, 131.

⁴⁰ *Ibid.*

⁴¹ Claudia Goldin, *Understanding the Gender Gap: An Economic History of American Women* (New York: Oxford University Press, 1990), 153.

milestone for women than a natural response” to the call for patriotism, lucrative jobs, and husband’s absences.⁴²

This dissertation finds some level of agreement with all these studies. The significant wartime accomplishments by women at Portsmouth Navy Yard are well documented along with the dramatic decrease of women employees with the return of servicemen and the great postwar reduction in employment. At the same time, the political accomplishments of women in the city of Portsmouth, during the latter stages of the war, redefined women’s definition of themselves and the role that they would play in the city’s political scene for the rest of the twentieth century and beyond. Finally, as argued by Kessler-Harris and Goldin, wartime employment of women at the yard was more a passing event greatly motivated by patriotism, better pay, and the availability of jobs vacated by departing servicemen than a turning point of lasting consequence.

Unlike progress made by women in the workplace during the war, which has been the subject of considerable debate, worker empowerment during the war appears to have received less study than deserved. Other shipyards and industries must have shared wartime environments and experiences similar to those at Portsmouth Navy Yard that were so conducive to increased worker responsibilities. Yet, little has been written exploring the wartime contributions of worker empowerment. Studies of management’s postwar abandonment of the wartime production advantages experienced as the result of women in the workplace should probably also include the abandonment of worker empowerment. Perhaps, as Gluck argues for women in the workplace, worker empowerment was part of a worker redefinition process that, despite the temporary step-

⁴² *Ibid.*, 299.

back after the war, provided the genesis for later resurrection and even greater fulfillment of employee potential.

The environmental theme explores the consequences of wartime mobilization at the yard on natural resources, health, and community. In general, the environmental theme validates the lack of awareness and concern noted by others for industrial practices that severely affected the natural environment and caused significant health issues prior to the postwar environmental enlightenment. The community portion of the environmental theme takes the form of a shipyard boomtown case study.

Writing of the effect of wartime industry on California's environment, Roger W. Lotchin says:

Wars obviously drain the physical and mental resources of a nation. . . It voraciously consumed scrap iron and iron ore for ships, tanks, trucks, and weapons, huge amounts of copper for ammunition and communications wire, . . . Immense quantities of petroleum . . . lumber to house 16 million service men [in California] . . . Pollution accompanied this depletion. . . war workers nearly overwhelmed the sewer capacities of several California arsenals. . . polluted their ocean beaches. . . The conflict almost exhausted San Diego's water supply. . . areas became the sites for the marvels of ship production, only to be just as rapidly abandoned in 1945 to rust, rot, and desuetude.⁴³

Portsmouth had much in common with the California shipyards. Sewer capacities were overwhelmed, federal housing projects sprang up overnight, water supplies were challenged, and immense quantities of raw materials were consumed in the production of submarines – and pollution.

Few attempts have been made to assess or quantify the environmental consequences of the shipbuilding boom during World War II. With the curtailment of

⁴³ Roger T. Lotchin, ed., "Introduction: World War II in the Golden State," *The Way We Really Were: The Golden State in the Second Great War* (Chicago: University of Illinois Press, 2000), 9.

record keeping for the sake of production, there is little quantitative evidence of industrial pollution during the war at Portsmouth Navy Yard, and probably most other shipyards. There is also a notable lack of awareness or concern about shipyard industrial pollution during the war found in the testimony of former shipyard employees or the shipyard's annual inspection reports. Andrew Hurley noted in *Environmental Inequalities*, his postwar study of Gary, Indiana, that U.S. Steel employees were initially reluctant to report pollution concerns for fear of job loss.⁴⁴ This dissertation finds a similar lack of reporting at the shipyard during the war but fear of job loss was certainly not the reason. Rather, it appears that industrial pollution was simply not recognized or judged worthy of notice relative to other more important concerns, especially wartime production.

Some historians argue that World War II not only put a fresh and slowly developing public interest in environmental issues on hold, but caused those issues to be suppressed after the war. According to Sarah S. Elkind:

Although the United States went into the Depression with relatively broad definitions of the public good, it came out of the Second World War nearly obsessed with growth and security. Dissension on either of these two topics became increasingly difficult until the modern environmental movement defined new crises and challenged the hegemony of industrial growth.⁴⁵

While Elkind was addressing the advent of postwar offshore drilling in California, her observation has equal application to the building and overhaul of submarines at Portsmouth Navy Yard. Growing public concern, in the late 1930s, about industrial sewage pollution of the river and bay was overwhelmed, during the war, with an

⁴⁴Andrew Hurley, *Environmental Inequalities: Class, Race, and Industrial Pollution in Gary, Indiana, 1945-1980* (Chapel Hill: The University of North Carolina Press, 1995), 149.

⁴⁵Sarah S. Elkind. "Public Oil, Private Oil: The Tidelands Controversy, World War II, and Control of the Environment," *The Way We Really Were: The Golden State in the Second Great War*. Roger W. Lotchin, ed. (Chicago: University of Illinois Press, 2000), 137.

obsession for growth and security. Growth and security concerns continued to reign supreme after the war, until the modern environmental movement reversed priorities.

Locally, late in the war, a growing concern about the pollution of local waters was pioneered by Dr. C.F. Jackson of the University of New Hampshire. Dr. Jackson's *Biological Survey of Great Bay, New Hampshire* (1944) included pollution levels of the Piscataqua River and the Great Bay that make it clear that additional studies and better postwar controls were needed over shipyard and community discharges to the bay and river.⁴⁶ Despite Jackson's early work, as argued by Sarah Elkind, interest in the pollution of local waters waned in light of overriding postwar interests. Fred Short's *Bibliography of Research on the Great Bay Estuary and Adjacent Upland Region* (1989) shows a lack of postwar studies of local water quality and pollution. Such studies break down by decade as follows, 1940s (1 [Jackson's study]), 1950s (0), 1960s (9), 1970s (29), and 1980s (39).⁴⁷ The postwar studies and discharge controls recommended by Dr. Jackson, while slow in coming, were nevertheless an eventual byproduct of the unconstrained wartime waste discharge practices of Portsmouth Navy Yard, and the surrounding communities, that are described in this dissertation.

This dissertation bolsters Samuel P. Hays' contention in *Beauty, Health, and Permanence: Environmental Politics in the United States 1955-1985* that up until the mid-twentieth century "Sources responsible for air and water pollution as well as solid waste had long since dumped their waste on the most readily available land, into nearby

⁴⁶ C.F. Jackson, *A Biological Survey of Great Bay New Hampshire by the Marine Fisheries Commission* (Durham: University of New Hampshire, 1944).

⁴⁷ Frederick T. Short ed., *Biography of Research on the Great Bay Estuary and Adjacent Upland Region* (Durham: University of New Hampshire, 1989).

streams, or into the air.”⁴⁸ Hays maintains that, beginning in the 1930s and extending up to the early 1960s, the state public-health agencies were impotent and ineffective in their efforts to regulate sewage discharge into streams, and industrial discharges were of little concern until after World War II. This dissertation presents official correspondence between the shipyard and the states of Maine and New Hampshire immediately prior to the war that illustrates the impotency and ineffectiveness of those states’ efforts to regulate sewage and industrial discharges into streams.

Lorraine McConaghy’s “Wartime Boomtown: Kirkland, Washington, A Small Town during World War II” discusses the disastrous pollution of Lake Washington by boom shipyards in the Seattle area that contaminated local water supplies.⁴⁹ Like the local histories discussed at the outset of this section, McConaghy’s study does not cross the community-shipyard interface to examine the industrial practices that caused the pollution of Lake Washington. This study does examine the practices of Portsmouth Navy Yard that contributed to an increase in the pollution of the Piscataqua River, specifically the discharge of raw sewage and untreated industrial effluents. There is little doubt that Portsmouth Navy Yard subscribed in spades to the waste disposal philosophy described by Samuel P. Hays, namely, until mid-century waste was dumped to the most readily available stream, relying on dispersion to be the solution to pollution.

Another major environmental sub-theme is the loss of wetlands as the result of shipyard expansion during the war. Ann Vileisis, Nancy Seasoles, and others have

⁴⁸ Samuel P. Hays, *Beauty, Health, and Permanence: Environmental Politics in the United States 1955-1985* (Cambridge: Cambridge University Press, 1987). 72.

⁴⁹ Lorraine McConaghy, “Wartime Boomtown: Kirkland, Washington, A Small Town during World War II,” *Pacific Northwest Quarterly* vol. 80, 1989, 42-51.

written extensively about the loss of America's wetlands and the environmental consequences of uncontrolled land reclamation projects.⁵⁰ Seasholes argues that Boston's growth was the result of "its original location on a small confined location [that] the town did not want to abandon when it began to grow rapidly and the fact that the landform was surrounded by large areas of shallow water that could be easily filled."⁵¹ Like Boston, when Portsmouth Navy Yard needed to grow rapidly at the start of the war, it also took advantage of the shallow waters that surrounded the island shipyard and renewed its long history of land reclamation.

Similar to industrial pollution, the environmental consequences of wetlands reclamation, was little appreciated until after World War II. Since that time many studies, including local studies of the Great Bay Estuary by Fred Short, have confirmed the ecological value of the marine life nutrients contributed by eel grass and other marsh growth. Likewise, Short and others have emphasized the importance of controlling reclamation projects to guard against the loss of those nutrients.⁵² The consequences of

⁵⁰ Ann Vileisis, *Discovering the Unknown Landscape: A History of America's Wetlands*. (Washington D.C.: Island Press, 1997); Nancy Seasholes, *Gaining Ground: A History of Landmaking in Boston*, (Cambridge, Ma.: MIT Press, 2003) and *Walking Tours of Boston's Made Land* (Cambridge Ma.: MIT Press, 2006); Ivan Valiela, Deborah Rutecki, and Sophia Fox, "Salt Marshes: Biological Controls of Food Webs in a Diminishing Environment," *Journal of Experimental Marine Biology & Ecology*, Mar 2004, Vol. 300 Issue 1 / 2, 131-150 and "Theorizing Land-Cover and Land-Use Change: The Case of the Florida Everglades and its Degradation," *Annals of the Association of American Geographers*, Jun 2004, Vol. 94 Issue 2, 311-328.

⁵¹ Nancy Seasholes, *Gaining Ground: A History of Landmaking in Boston*, 2. Boston's original peninsula of 487 acres is now surrounded by about 500 acres of reclaimed land. Boston and its environs now include about 5,250 acres of reclaimed land. Seasholes says that "Boston probably has more made land than any other city on North America." 2.

⁵² Fred Short et al., *Bibliography on the Great Bay Estuary and Adjacent Upland Region* (Durham, N.H.: University of New Hampshire / University of Maine Sea Grant College Program, 1989); *The Ecology of the Great Bay Estuary, New Hampshire and Maine* (Durham, N.H.: Jackson Estuarine Laboratory, University of New Hampshire, 1992); *Eelgrass in Estuarine Research Reserves Along the East Coast, U.S.A.* (Durham, N.H.: Jackson Estuarine Laboratory, University of New Hampshire, 1993); and *Eelgrass as an Indicator of Nutrient Over-Enrichment in Estuaries: A Final Report*, (Durham, N.H.: Jackson Estuarine Laboratory, University of New Hampshire, 2003).

wetlands reclamation, like industrial pollution, were under appreciated during the war. This dissertation provides further evidence of unrestrained wetlands reclamation, in the name of progress, that characterized the era.

Many accounts have been written about wartime experiences in small towns across the United States.⁵³ Fewer accounts have been written analyzing shipyard boomtown experiences and transformations. In general, shipyard boomtown histories reflect the struggles of communities to cope with rapidly changing economies, infrastructure, and environmental degradation. Boomtown Portsmouth, N.H. experienced similar struggles.

The shipyard boomtown studies that have been written, like shipyard mobilization studies, have been limited to West Coast commercial shipyard towns. McConaghy's "Wartime Boomtown: Kirkland, Washington" examines the economic, political, environmental, and social transformation of a small shipyard boomtown.⁵⁴ Kirkland's wartime experience was so severe that community leaders rejected a continued shipyard or military presence after the war. Portsmouth leaders, on the other hand, were committed to maintaining as much of the increased shipyard employment as possible to insure the continued postwar economic viability of the seacoast area. On a larger geographic scale, Marilyn Johnson's *The Second Gold Rush: Oakland & the East Bay in World War II*

⁵³ Clarence Andrews, "Sheldon, Iowa during World War II," *Palimpsest* 70 (1989), 146-165; Lonnie E. Maness, "A West Tennessee Town and World War II," West Tennessee Historical Society Papers, 110-119; Perry Duis and Scott LaFrance, *We've Got a Job to Do: Chicagoans and World War II* (Chicago: Chicago Historical Society, 1992); Miller, Marc Scott, *The Irony of Victory: World War II and Lowell, Massachusetts* (Chicago: University of Illinois Press, 1988).

⁵⁴ Lorraine McConaghy, "Wartime Boomtown: Kirkland, Washington, A Small Town during World War II," 42-51.

argues that new war defense industries, including commercial shipbuilding, sparked a mass migration to the Bay Area that resulted in lasting social, cultural, and political changes.⁵⁵ On an even grander scale, Gerald Nash and Roger Lotchin have shown how federal spending during the war transformed the entire West Coast by generating unprecedented economic growth and prosperity.⁵⁶ Studies of communities transformed by wartime mobilization have been primarily focused on the West Coast. This analysis of a New Hampshire shipyard boomtown is an exception to the rule.

One of the social consequences of boomtown developments near military installations during wartime is typically an increase in prostitution and venereal disease. In his classic history of venereal disease, *A Magic Bullet*, Alan M. Brandt described the military's wartime efforts to limit the trade, and control the disease, by pressuring communities to clean up establishments specifically targeted by the military as highly suspect centers of prostitution and likely distribution centers for venereal disease. The Portsmouth experience during the war, especially the aggressive efforts by the U.S. Navy to force Portsmouth officials to rid the city of prostitutes, would make a good case study for Brandt's social history of venereal disease. The remarkable developments that accompanied the introduction of the magic bullet, penicillin, as a treatment at the

⁵⁵ Marilyn S. Johnson, *The Second Gold Rush: Oakland and the East Bay in World War II*.

⁵⁶ Gerald D. Nash, *The American West Transformed: The Impact of the Second World War* (Bloomington: Indiana University Press, 1985); Gerald D. Nash, *World War II and the West: Reshaping the Economy* (Lincoln: University of Nebraska Press, 1990); Roger Lotchin, "The Historians War or the Home Front War?: Some Thoughts for Western Historians," *Western Historical Quarterly* vol 26, No 2, (Summer 1995), 185-196; Roger W. Lotchin, ed. *The Way We Really Were: The Golden State in the Second Great War* (Chicago: The University of Illinois Press, 2000).

shipyard hospital in January 1944, also track well with Brandt's presentation of this dramatic breakthrough in venereal disease control.⁵⁷

Many World War II boomtown histories have relied extensively on interviews with citizens and soldiers who were there. This dissertation incorporates the personal testimony of a number of retired shipyard employees and one veteran who worked at the yard during the war. Sadly, the most knowledgeable source of information for this dissertation, ninety-six year old Fred White, passed away a few months after being interviewed. This dissertation is far richer for the contributions of White and the others who consented to be interviewed. It is painfully obvious that it will not be too many years before personal testimony will no longer be available as a primary source for World War II histories.

This dissertation, advertised as a study of submarine construction at Portsmouth Navy Yard during World War II, is obviously a multilayered treatment that spans a number of disciplines, themes, and sub-themes. Mobilization, which is frequently presented as a straight line event that kick-started industry and won the war, was far more complex and multi-directional. Mobilization set in motion strong forces that not only won the war, but swept across the nation and reverberated through all levels of society, transforming lives and communities in the process. This dissertation is an account of these mobilization forces as they passed through Portsmouth Navy Yard and the seacoast area.

⁵⁷ Allan M. Brandt, *No Magic Bullet: A Social History of Venereal Disease in the United States Since 1880* (New York: Oxford University Press, 1987).

CHAPTER II

BETWEEN THE WARS

“The working force at the Portsmouth Yard has been unusually steady and the result has been an excellent product at reasonable cost . . . The ability of the Portsmouth Yard to meet its completion dates has in recent years been amply demonstrated by the excellent and unique record established of meeting every contract date of delivery.”¹

Rear Admiral W.G. DuBosn Chief Bureau of Construction & Repair

Rear Admiral H.G. Bowen Chief Bureau of Engineering

Joint letter of 10 August 1938

The expertise in submarine design and construction that characterized Portsmouth Navy Yard at the start of World War II can be traced back to the U.S. Navy’s dissatisfaction with the submarine acquisition process that it had experienced prior to, and during, World War I. During that period of early submarine development, private submarine builders Electric Boat Company and Lake Torpedo Company controlled the design of submarines with little or no input solicited, or accepted, from the U.S. Navy. According to naval historian Gary Weir, “The relationship between private shipbuilders and the navy before 1914 was essentially that of vendor and customer in the classic sense.”² This relationship continued during World War I, causing the Navy to look for

¹ Bureau Construction & Repair and Bureau of Engineering joint letter of 10 Aug 1938 to Secretary of the Navy. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 1, Folder A1, “New Construction 27 Sep 1932 to 29 May 1940.”

² Gary Weir, *Building American Submarines, 1914-1940*, 5.

alternatives. The fleet wanted to define the operating capabilities and technologies that went into their submarines instead of buying what happened to be on the shelf.

Captain Andrew I. McKee, Planning Officer at Portsmouth Navy Yard during the war, wrote an article on submarine development in 1945 for *Historical Transactions 1893-1943*, a 50th anniversary special publication by the Society of Naval Engineers and Marine Architects. McKee described the process by which the Navy used Portsmouth Navy Yard to wrest control of submarine design from the private yards:

As the first step in familiarizing its personnel with submarines and their designs, an order was placed in June 1914 for the building of the L-8, to the design of the Lake Torpedo Company, at the Navy Yard Portsmouth, N.H. Two years later, the O-1, of the Holland type, was ordered built at Portsmouth to the design of the Electric Boat Company. Late in 1916, the Navy Department decided that Portsmouth had acquired enough experience in its work on these two ships to be trusted with the development of the working plans for a third design, the preliminary design of which had been prepared by the Navy Department, and [the Navy Department] placed an order for one submarine, the S-3, at Portsmouth. At the same time, orders were placed for the S-1 with Electric Boat and the S-2 with the Lake Torpedo Company.³

In effect, the Navy had set up a design competition between the two well established private submarine design shipyards and the newcomer, the Portsmouth Navy Yard.

Within a year the Portsmouth design was judged superior to the Lake design and the large order of submarines that the Lake Torpedo Company received in June 1917 was required to be built to the Portsmouth design. Electric Boat continued to build to its own design throughout the war. However, the company was given no submarine orders after World War I until 1933.⁴

³ A.I. McKee, "Development of Submarines in the United States," *Historical Transactions 1893-1943* (New York: Society of Naval Architects and Marine Engineers, 1945), 347.

⁴ *Ibid.*

Many thought that the motivations of private shipbuilders had more to do with profiteering than providing the fleet with the submarines they needed.⁵ In short, the U.S. Navy felt that it was paying too much for an inferior and ill designed product. Gary Weir's *Building American Submarines, 1914-1940* describes how the United States Navy, dissatisfied with private industry during World War I, made a commitment to strengthen Portsmouth Navy Yard's submarine design and new construction capabilities during the 1920s and 1930s.⁶ According to Weir, the Navy "utilized available assets to develop Portsmouth into a first-class submarine yard" including the assembly of a "fine design team."⁷ Captain McKee noted in his article in *Historical Transactions 1893-1943* that "For fourteen years, from 1919 until 1933, all the submarines ordered, and there were only nine but these were of five different classes, were built to plans prepared by Portsmouth."⁸ With the nation focused on disarmament during the 1920s, Portsmouth Navy Yard's design team had limited submarine design opportunities while Electric Boat and other yards had no opportunities at all.

The post-World War I slump in shipbuilding was the death knell for a number of private shipyards. According to the Bureau of Ships self-history, "By 1933, only six private yards remained in operation: the 'Big Three,' Bethlehem, New York, and

⁵ The excessive profits that many Americans thought private industry had reaped during World War I resulted in numerous Congressional efforts to bring the situation under control. According to Robert Connery, "In the years between 1918 and April 1942, some 140 bills and resolutions to reduce or eliminate profits on war production and equalize the economic burdens of war were introduced into Congress." Robert Connery, *The Navy and Industrial Mobilization in World War II*, 266.

⁶ Gary Weir, *Building American Submarines*, 114.

⁷ *Ibid.*, 114, 60.

⁸ A. I. McKee, "Development of Submarines in the United States," 347. The first Electric Boat submarine order after World War I was for the *Cuttlefish* and it was required to be built to Portsmouth plans with only minor departures. The nine submarines are commonly grouped together as the Victory class but, as McKee notes, they were, at the time, considered to be five different classes because the characteristics varied considerably between submarines.

Newport News; and three smaller companies, Bath Iron Works, Federal Shipbuilding and Dry Dock Company, and Electric Boat Company.”⁹ As noted by maritime historian Frederick C. Lane, “In the lean years from 1922 to 1938 only the very strong shipbuilding companies were able to keep going.”¹⁰ Lane summarized well the state of shipyards between the wars when he wrote:

Dominating the clutter and seemingly random dispersion of a shipyard, guiding the work of its huge cranes, heavy presses, and other special equipment were the calculations of highly trained engineers and experienced managers. Their practical and theoretical knowledge had to be kept employed if the industry was to survive and have in it the possibility of sudden growth to meet a new emergency.¹¹

This was precisely the case at Portsmouth Navy Yard between the wars. Naval architects, marine engineers, and experienced managers were kept employed, to the maximum extent possible by the U.S. Navy, despite a budget that was severely constrained by economic depression, politics, and foreign policy. In the end, Portsmouth Navy Yard not only survived, but also improved its design and production capabilities throughout the 1920s and 1930s. As a result, the yard was more ready than most shipyards for the industrial mobilization that preceded World War II.

Portsmouth Navy Yard’s fate between the two wars was, to a large extent, determined by the U.S. Navy’s commitment to develop it as competition to private industry. However, the Navy’s ability to do that was heavily influenced by larger national events including disarmament, neutrality, and the New Deal. The first two, in conjunction

⁹ *United States Naval Administration in World War II, Bureau of Ships*, 1946, Navy Department Library, Naval Historical Center, Washington, D.C., 5.

¹⁰ Frederick C. Lane, *Ships for Victory, A History of Shipbuilding under the U.S. Maritime Commission in World War II*, 32.

¹¹ *Ibid.*

with very limited naval appropriations during the Great Depression, restricted the number of submarines able to be built and, thus, the submarine design and new construction experience that the yard could acquire during the interim war years. New Deal policies, especially the National Industrial Recovery Act (NIRA) that kick-started the nation's renewed naval shipbuilding program in 1933, including two submarines at Portsmouth Navy Yard, were crucial to the yard's development between the wars.

Other New Deal policies channeled funding to navy yards for the maintenance and limited upgrade of shops and facilities, during the 1930s, when naval funding for such projects was virtually nonexistent. The Bureau of Yards and Docks' self-history of operations during World War II credits New Deal programs with the accomplishment of limited, but important, rehabilitation, modernization, and improvements at navy yards during the 1930s:

In the period between 1928 and 1938 only a moderate amount of important construction was accomplished at Navy Yards. A large machine shop was built at Puget Sound in 1934, a sheet metal and electrical shop was built at Norfolk in 1936, and a graving dock was undertaken at Mare Island in 1937. However, a considerable amount of work of lesser magnitude was accomplished during this period under naval public works appropriations but principally through allocations from National Industrial Recovery Administration, Civil Works Administration, Works Program Administration, and Public Works Administration appropriations for unemployment relief during the depression.¹²

According to that report, the yards would have been "critically unprepared" for World War II without these programs.

It should be noted, that while Portsmouth Navy Yard benefited from the NIRA and other New Deal programs, it was not among the navy yards cited in the above quotation as having experienced important construction projects during the 1930s. For the

¹² *Bureau of Yards and Docks, Administrative History of World War II*, 1946, Navy Department Library, Naval Historical Center, Washington, D.C., 169.

most part, proposed major construction projects at Portsmouth were put on hold during the 1930s. This construction lull ended immediately prior to the initial stages of the war with the passing of legislation that brought massive facility upgrades to Portsmouth and the other navy yards.

Any analysis of Portsmouth Navy Yard's production during World War II requires an understanding of how events between the wars positioned the yard to perform as it did. The discussion that follows examines the yard's pre-World War II history in light of the nation's involvement with disarmament treaties, neutrality acts, and the New Deal, in that order.

Submarine Disarmament

The Washington Naval Conference of 1921 began a series of post-World War I disarmament conferences and international agreements that restrained United States' naval construction until the eve of World War II. As time went by, the various powers involved enforced or ignored disarmament treaty provisions to satisfy their own self-interests. The United States, however, remained a strong proponent of disarmament and the United States Navy declined dramatically as a result.

From the Navy's standpoint, the years between the Washington Disarmament Conference and 1945 can be divided into periods of decline (1922-1931), awakening (1932-36), and rebuilding and expansion (1936-1945). From Portsmouth Navy Yard's standpoint, the yard did not suffer as greatly as other yards during the declining period because of the U.S. Navy's commitment to develop the yard's submarine design and construction capabilities during the 1920s. The relative stability that the shipyard enjoyed

during the 1920s enabled it to be poised and ready to capitalize on the awakening period and thrive during the rebuilding period.

During the 1920s and early 1930s, the United States Congress, initially influenced by the nation's predisposition towards disarmament, and subsequently burdened by the economic realities of the Great Depression, voluntarily restricted submarine building to below the limitations of any disarmament conference agreements. Thomas H. Healy, Assistant Dean of Foreign Relations at Georgetown University, summarized the strong national support for disarmament in a March 1932 address:

There is probably no country in the world where the agitation for world peace and reduction of armaments has made more headway than in the United States. The work is being carried on directly or indirectly by some 400 organizations whose total membership may number as many as 15,000,000 persons. Their activities have spread to every nook and corner of the United States through conventions, the press, special publications, the radio, and every other means.¹³

A consequence of this national commitment to disarmament was the limited building of naval ships and submarines and minimal investment in shipyard facilities.

As late as August 1939, the Secretary of the Navy was still strictly controlling the earliest acceptable launch dates for submarines under construction, in accordance with agreements made at the latest disarmament conference, the disappointing London Naval Conference of 1936.¹⁴ Thus, the United States continued to comply with debatable treaty obligations until late 1939, even as Germany was beginning to march through Europe.

¹³ Address given by Thomas A. Healy, Ph.D., Assistant Dean and Professor of Foreign Relations at Georgetown University School of Foreign Service, 3 Mar 1932 at All Souls Unitarian Church, Washington, D.C. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 24, Folder A14-7, "Scrapping of Ships."

¹⁴ Bureau of Construction and Repair letter of 9 Aug 1939 to Commandant Portsmouth Navy Yard. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 24, Folder A14-7, "Scrapping of Ships."

The discussion that follows tracks submarine disarmament efforts from the Washington Naval Conference to the brink of World War II.

Submarine numbers and tonnage were not effectively limited by any of the disarmament conferences between the wars. The primary participants, Great Britain, France, United States, Japan, and Italy, were never able to compromise their self-interests to the point that a consensus could be reached on any serious proposal for submarine disarmament. Nevertheless, attempts to include submarine disarmament in the various disarmament treaties discouraged support for any United States' submarine rebuilding programs prior to the mid-1930s.

The nation's dedication to naval disarmament started at the Washington Naval Conference of 1921. Secretary of State Charles Evans Hughes astonished the participants (United States, Great Britain, Japan, France, and Italy) with a proposal for drastic armament reductions that had the United States leading the way by scrapping thirty capital ships totaling 845,750 tons. The treaty limited the world's capital ships at 500,000 tons each for the United States and Britain; 300,000 tons for Japan; 175,000 each for Italy and France.¹⁵

Other treaty provisions included a ten-year capital ship building holiday, tonnage limits for specific warships, and bore diameter limits for gun mounts. Unable to reach agreement on submarine numbers or tonnage limitations, the conferees made an

¹⁵ The capital ships were battleships and battle cruisers. The United States also proposed that Great Britain scrap 23 capital ships totaling 583,375 tons and Japan scrap 25 capital ships totaling 448,928 tons. In addition to actual ships, the proposal covered ships included in all capital shipbuilding programs underway or projected. Not commonly appreciated is the fact that the treaty's well advertised tonnages and ratios would not be achieved until 1942. At the outset, in 1922, Great Britain had a decided advantage of 22 capital ships and 640,450 tons in comparison to the United States' 18 capital ships and 500,650 tons, Japan's 10 capital ships and 299,700 tons, France's 10 capital ships and 221,170 tons, and Italy's 10 capital ships and 182,800 tons. George T. Davis, *A Navy Second to None*, 286-288.

unsuccessful attempt to limit the use of submarines as commerce raiders. The Non-Fortification Clause of the treaty obligated the United States and Great Britain to refrain from fortifying possessions in the Pacific Ocean while leaving Japan relatively free to strengthen its home islands militarily.¹⁶

In retrospect, some historians argue that the Washington Naval Disarmament Conference of 1921 set in motion events that would ultimately lead, not to world peace, but to Pearl Harbor and world war.¹⁷ Other historians, like Thomas H. Buckley, maintain that the failure was not with the Washington treaties but, rather, a failure “to follow up the auspicious détente of pragmatic advantage and reciprocity drawn up in 1921 in Washington.”¹⁸ Political leaders failed to take advantage of the opportunity to solve other areas of conflict and, according to Buckley, “With the advent of the Great Depression, time ran out.” In *American Foreign Policy and National Security Policies, 1914-1945*, Thomas Buckley and Edwin B. Strong argue that those who criticize the supporters of the Washington Treaty for giving up naval supremacy, agreeing to non-fortification of key Pacific Islands, and failing to achieve more iron-clad promises against aggression ignore some basic historical facts. Buckley and Strong maintain that there was little or no possibility that Congress would have funded naval construction or island fortification, and the Senate never would have approved any iron-clad nonaggression

¹⁶ E.B. Potter and Chester W. Nimitz, Eds., *Sea Power, A Naval History* (Englewood Cliffs, N.J.: Prentice Hall, Inc., 1960), 480-483.

¹⁷ *Ibid.*

¹⁸ Thomas H. Buckley, *The United States and the Washington Conference, 1921-1922* (Knoxville: The University of Tennessee Press, 1970), 190.

agreements.¹⁹ Historian Roger Dingman also finds fault with the lack of political follow-up more than with the treaty itself. According to Dingman:

The Washington naval treaties symbolize an important truth, one that transcends the particulars of a half century ago. The truth is this: Arms limitation is, above all else, a political process. . . The success or failure, wisdom or folly of arms limitation by international agreement depends, above all else, on careful, constantly changing, and correct estimates of the domestic political risks and opportunities it presents to one's own leaders and to their prospective negotiating partners.²⁰

Throughout the 1920s and early 1930s, political leaders in the United States did little assessing of the risks and opportunities presented by the arms limitation agreements. Instead, a national commitment to disarmament at any cost seemingly prevailed that led to the disastrous decline of the United States naval fleet and the loss of international leverage that may have contributed to more successful disarmament negotiations.

The debate over submarine tonnage limitations at the Washington Naval Conference saw Great Britain, at one extreme, proposing the scrapping of all submarines and France, at the other extreme, favoring generous limits that would permit the construction of large submarine fleets. Great Britain, dependent on high seas trade for survival, and with recent memories of German submarines devastating their trade during World War I, wanted to abolish all submarines. At best, Great Britain would settle for drastic limitations on submarine tonnage. France and Japan, on the other hand, consistently rejected extreme tonnage limitations in favor of limits that permitted the building of enough submarines to neutralize their naval inferiority in other areas. These two irreconcilable views tended to dominate the Washington, and subsequent, naval

¹⁹ Thomas H. Buckley and Edwin B. Strong, Jr., *American Foreign and National Security Policies, 1914-1945* (Knoxville: The University of Tennessee Press, 1987), 69.

²⁰ Roger Dingman, *Power in the Pacific: The Origins of Naval Arms Limitation, 1914-1933* (Chicago: The University of Chicago Press, 1976), 218.

disarmament conferences. The United States, in general, followed Americans' inclinations towards pacification and took a position closer to that of Great Britain than the other powers. The United States, however, was more flexible in its position than Great Britain and was always willing to negotiate, with hopes of limiting the arms race to whatever degree was possible at the time.²¹

The Washington Naval Conference concluded with an ineffective supplementary treaty designed to limit submarine operations as commerce raiders. The supplemental treaty, a poor alternative to the setting of limits on numbers or tonnage, was an attempt to restrict submarine warfare, specifically outlawing German practices, through international law reinforced by public opinion. However, the proposal was never ratified by the French Parliament, removing any obligation for compliance by the other powers. Thus, the Washington Naval Conference essentially placed no restrictions on the building or use of submarines, and nations were free to engage in unlimited submarine building programs.²² The United States, unyielding in its commitment to the spirit of disarmament, built only three submarines between the Washington Naval Conference in 1922 and the Geneva Naval Conference in 1927. Japan, on the other hand, built thirty submarines during the same period.²³ Thus, Japan capitalized on the failure of the Washington Naval Conference to restrict the building of submarines to greatly enlarge its submarine fleet.

²¹ See Dean C. Douglas, *Submarine Disarmament, 1919-1936* (Ph.D. Diss., Syracuse University, 1970) for a complete study of submarine disarmament.

²² *Ibid.*, 92-145.

²³ Rep Carl Vinson, *Congressional Record*, 69th Cong. 2d session, 4 Jan 1927, 1095-96, quoted in George T. Davis, *A Navy Second to None: The Development of Modern Naval Policy* (New York: Harcourt, Brace, and Co., 1940), 314.

At the Geneva Naval Conference (1927), the United States, Great Britain, and Japan sought limitations for the auxiliary ships not covered by the Washington Naval Treaty. Auxiliary ships primarily included cruisers, destroyers, and submarines. The submarine discussions centered on tonnage limitations. Finding no support for abolition, Great Britain proposed that tonnage limitations be set for the categories of small (under 600 tons) and large (1000 to 1600 tons) submarines in numbers that favored her existing submarine fleet. Once again, the participants could not reach agreement on submarine limitations of any description.²⁴ The extent of the U.S. Navy's submarine building between 1924 and 1930 was five V-class submarines, all built at Portsmouth. Unrestrained by any treaty limitations, the United States voluntarily restricted submarine construction to a rate of less than one submarine a year.

The end result of the haggling and posturing of the five nations actively involved in the naval disarmament conferences of the 1920s was expansive naval shipbuilding programs for four of them and a near moratorium on naval shipbuilding for the other, the United States. Massachusetts Senator David L. Walsh's Congressional testimony in 1944 in favor of maintaining a strong navy after World War II highlighted the dangers of repeating the disastrous naval decline of the 1920s:

Following that conference [Washington] and up to January 1, 1929, the great powers of the world laid down and appropriated for naval expansion as follows: Japan 125 naval vessels; Great Britain, 74 naval vessels, France, 119, Italy, 82; and to the everlasting credit of our own country, the United States, exclusive of small river gunboats, 11.²⁵

²⁴ Dean C. Douglas, *Submarine Disarmament, 1919-1936*, 146-172.

²⁵ Senator David L. Walsh, Chairman of the Committee on Naval Affairs, "The Decline and Renaissance of the Navy, 1922-1944." Presented to the 78th Congress, 2nd Session on 7 June 1944. Senate Serial No. 10862, Document No. 202. NARA, Waltham, RG 181, PNSY, Box 24, Folder A14-7, "Scrapping of Ships."

The overall disarmament scorecard for the 1920s shows the United States Navy increasing its fleet by 11 ships while the other negotiating powers increased their fleets by 400 ships. Obviously, the other nations had elected to exploit the holes in the treaties that permitted unrestrained building of non-capital naval ships like cruisers, destroyers, and submarines while the United States did not. The end result was that the United States Navy, which had been the largest navy in the world at the time of the Washington Naval Conference in 1922, was in total decline by 1930.

At the London Naval Conference (1930) the same five powers that had met at the Washington Naval Conference revived many of the same issues that had eluded consensus at Geneva three years earlier. The conference concluded with Japan gaining an altered 10:10:7 ratio in cruisers as compared to the 10:10:6 ratio in capital ships established at the Washington conference. However, only the United States, Great Britain, and Japan were signatories to the entire treaty. France and Italy refused to agree to any further tonnage limitations in any category and abstained from signing the part of the treaty dealing with tonnage limitations of any sort. The ban on capital ship construction was extended to the end of 1936 and escape clauses were provided for the United States, Great Britain, and Japan should France and Italy reestablish capital shipbuilding programs deemed threatening by any of the three signatories.²⁶ Naval disarmament had degenerated to a house of cards replete with haggling, distrust, and outright refusals to participate.

As for submarines, the conference opened with Great Britain once again proposing the abolishing of the submarine as an instrument of war. As expected, France

²⁶ Dean C. Douglas, *Submarine Disarmament, 1919-1936*, 173 -204.

and Japan once again rejected the proposal outright. After further negotiation, submarine tonnage for the three signatories was capped at 52,700 tons and the individual submarine tonnage was fixed at 2,000 tons. This agreement was a hollow victory for submarine disarmament. In the absence of any submarine disarmament restrictions after the Washington conference, Japan had launched an ambitious submarine building program during the 1920s that greatly increased that country's bargaining position at the London conference in 1930. The end result was that Japan was able to negotiate submarine parity with Great Britain and the United States at a level significantly higher than Great Britain and the United States would have preferred.²⁷

Meanwhile, Hitler was rising to power and Germany would soon resume its role as a naval power. Britain accommodated Germany's return to power with a bilateral naval treaty in 1935 that permitted Germany 35 percent of Britain's naval tonnage and 45 percent of Britain's submarine tonnage. With Britain grasping at any disarmament straws offering the opportunity to limit submarine building and France continuing to reject submarine limitations, Germany, Italy, and Japan became increasingly aggressive on the international stage and contemptuous of all treaties.²⁸ The United States, on the other hand, continued not only to honor the London Naval Treaty (1930), but to build substantially below treaty limits. To comply with the provisions of the Treaty of London (1930) that required the United States to reduce submarine fleet tonnage in excess of the 52,700 tons limit,²⁹ the United States eliminated overage "S" and "R" submarines. In the

²⁷ George T. Davis, *A Navy Second to None*, 343.

²⁸ Dean C. Douglas, *Submarine Disarmament, 1919-1936*, 173 -204.

²⁹ United States had 68,700 tons, Great Britain 77,842 tons, and Japan 63,324 tons. George T. Davis, *A Navy Second to None*, 343.

process, the United States neglected an opportunity to eliminate even more overage submarines and build modern replacements up to the 52,700 ton limit. The end result was a substantially reduced and aged submarine fleet by the mid-1930s.

The first four years of the 1930's were particularly lean years for the Portsmouth Navy Yard. Employment averaged a little over 1,500, about the same as in 1916 before the build up for World War I. During those four years the shipyard built only three submarines, the last of the V-class submarines and the last surface combatant the yard would ever build, the Coast Guard Cutter U.S.S. *Hudson*.³⁰ As inactive as the shipyard was in the early 1930s, it was fortunate to have been favored with the few contracts it did receive. Other yards did not fare as well.

When ex-Assistant Secretary of the Navy Franklin Delano Roosevelt assumed the presidency in March 1933, some legislators began to search for ways to reverse the decline of the United States Navy and move the fleet, at least, towards the limits of the London Naval Treaty. Increased Japanese militancy and national economic needs provided what little impetus Roosevelt needed to proceed with substantial naval expansion.³¹ The first step in the process was to include, under the National Industrial Recovery Act (NIRA) of 1933, authorization and funding to increase the navy by 32 ships, including four submarines. The next year, 1934, saw the passage of the Vinson-Trammell Bill authorizing the construction of another 102 ships, including 28 submarines, designed to bring the fleet up to the Washington and London Naval Treaty limits by

³⁰ *Cradle of American Shipbuilding*, 76, 78, 80.

³¹ Japan officially withdrew from the League of Nations in March 1933 and announced intentions to abandon the naval limitations agreements. In the summer of 1933, it was learned that Japan had increased its naval budget by 25% and speculation was strong that a Russo-Japanese conflict was inevitable. Robert Dallek, *Franklin D. Roosevelt and American Foreign Policy, 1932-1945*, 75.

1942. Having been favored with the V-class submarine building program during the 1920s, Portsmouth Navy Yard greeted the renewed naval shipbuilding programs with an experienced submarine design team and a stable workforce experienced in submarine construction. The yard was well positioned to capitalize on the renewed naval shipbuilding programs of the mid-1930s.

President Roosevelt had to walk a tightrope to insure that his support for a rejuvenated Navy did not strike a response from the isolationists that would “weaken him politically and undermine his ability to put across economic reform.”³² According to historian Robert Dallek:

When Navy Department officials spoke publicly, he urged them to use restraint, suggesting that they not overstate the case for a strong Navy, or “hit and assail” the professional pacifists, since replies only create a controversy. . . . Moreover, when the White House received . . . letters . . . opposing the Vincent-Trammell bill as wasteful and contrary to America’s professed peace aims, Roosevelt felt compelled to explain that the bill authorized the construction of 102 new ships but did not appropriate money for them. Congress, he pointed out, would have to do this.³³

Part of Roosevelt’s balancing act included the assuring of his adversaries to naval expansion that his administration would continue to aggressively pursue arms limitation at the forthcoming 1935 London Naval Conference with the hope that the naval build-up could be moderated. This conference shaped up as a last resort for disarmament as the agreements of the London Conference (1930) were to end in December 1936 unless the signatories agreed to extend them at a conference in 1935. Moreover, the agreements of the Washington Treaty (1922) were also to end in 1936 if any of the adherents disavowed its provisions by December 1935. Japan, having indicated its intention to seek full parity

³² *Ibid*, 76

³³ *Ibid*.

in tonnage with the United States and Great Britain, was set to scuttle any extension of disarmament plans.³⁴

As suspected, the London Naval Conference of 1935 marked the end of any hopes for disarmament. Japan's representatives walked out of the conference when their demands for full parity in all naval categories were not acceptable to the others and Italy refused to sign any agreements. According to historian George T. Davis:

The other powers [United States, Great Britain, and France], seeking to salvage something from the collapse of the system of naval limitations, agreed on March 28, 1936, to a treaty in which the emphasis was placed on qualitative limitations and upon an exchange of information on building progress. . . This meant that the three powers would adhere to the type of ship [tonnage, gun diameters, etc.] incorporated in the London treaty of 1930, but they would be free to build as many as they wanted in each class.³⁵

Thus the three signatories agreed to build submarines with a maximum displacement of 2,000 tons with no treaty limit to the number of submarines that could be built. Even though the quantitative tonnage limitations of the Washington and London had expired, an exchange of letters between the United States and Great Britain affirmed adherence to the principle of parity between the two countries. This agreement created the need for both countries to keep the other informed of ship building schedules and progress.³⁶

Desperately clinging to last resort hopes for disarmament and neutrality, the United States, Great Britain, and France signed a treaty that naval historian E.B. Potter said was "so watered down with escalator clauses as to be virtually meaningless." Potter added that, "For all practical purposes, all treaty limitations of navies expired December

³⁴ Ibid, 87.

³⁵ George T. Davis, *A Navy Second to None*, 367.

³⁶ Ibid., 369.

31, 1936.”³⁷ Even though treaty limitations may have expired for all practical purposes at the end of 1936, the U.S. Navy continued to control the start dates for submarine construction at Portsmouth, Electric Boat Company, and Mare Island Navy Yard in accordance with the 1936 London Naval Treaty. In August 1939 the Bureau of Construction and Repair reminded the shipyards that the keels of *Grayling* (SS209), *Grendier* (SS219), and *Gudgeon* (SS211) should not be laid down until 7 October 1939 to comply with the treaty.³⁸ On 1 November 1939, two months after Germany’s invasion of Poland, the shipyards were finally advised by the Navy that the 1936 London Treaty was suspended and that, “The keels for combatant vessels under construction may therefore be laid at any time without a delay.”³⁹ The United States had complied with the ineffective and superficial 1936 London Naval Treaty and limited the rate of submarine construction until World War II had actually begun.

Neutrality

The same political climate and national attitude that had encouraged disarmament conferences and international peace movements also led to a series of five Neutrality Acts between 1935 and 1939 designed to distance the United States from entangling events that might lead to another war. Disarmament, while it certainly affected Portsmouth Navy Yard’s workload and future, took place on distant stages with indirect results. Neutrality, on the other hand, was woven into the day-to-day occurrences of

³⁷ E. B. Potter, *Sea Power, A Naval History*, 483-484.

³⁸ Bureau of Construction and Repair letter of 9 Aug 1939 to Commandant Portsmouth Navy Yard. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 24, Folder A14-7, “Scrapping of Ships.”

³⁹ Bureau of Construction and Repair letter A14-7-3 (RP) of 9 Nov 1939 to Commandant Portsmouth Navy Yard. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 24, Folder A14-7, “Scrapping of Ships.”

shipyard and local community life by the late 1930s. On the eve of World War II, Portsmouth Navy Yard and the other navy yards were frequently reminded of the provisions of the Neutrality Acts and counseled about the importance of compliance. At the same time that the yard was being cautioned to observe the neutrality rules, it was being directed to mobilize for war. By the summer of 1941, British submarines were being overhauled at the yard under the Lend-Lease Act. It was a time of mixed signals, secrecy, deception, and confusion.

As things heated up in Europe in the latter half of the 1930s, the United States Congress passed a long list of neutrality legislation geared to avoid any international involvement that might lead to war. The 1935 Neutrality Act forbade the sale of munitions to a belligerent and prohibited Americans from traveling on belligerent ships, the 1936 amendment prohibited loans to belligerents, the 1937 Neutrality Act permitted sales of non-munitions to belligerents on a “cash and carry” basis only, and the 1939 Neutrality Act authorized the president to preclude American ships from entering “danger zones.” The provisions of the Neutrality Acts grew like topsy in an attempt to cover, with paper, every possible event that might lead to war. Neutrality efforts continued right up until 13 November 1941 when the Neutrality Act of 1939 was finally repealed.⁴⁰

Right up until the repeal of the Neutrality Acts, President Roosevelt consistently sought, with little success, to modify the acts to increase his executive authority and flexibility of implementation. As the war in Europe expanded, the acts prevented the President from providing the level of support that Winston Churchill expected and

⁴⁰ E. B. Potter, *Sea Power, A Naval History*, 488, footnote 17.

Roosevelt was inclined to provide. According to historian Robert Dallek, “Antagonism towards the President and the New Deal . . . isolationism, Republican partisanship, and antipathy toward Roosevelt in his own party joined to sink Neutrality reform.”⁴¹

Roosevelt was especially sensitive to public opinion and the potential political consequences of his efforts to curb the Neutrality Acts. In the summer of 1940, concerned about the November presidential election, Roosevelt packaged war aid to Great Britain under the more politically agreeable titles of “Destroyers for Bases” and “Lend-Lease.”

The neutrality maneuvering that took place prior to the repeal of the Neutrality Acts presented a curious and confusing picture to the navy yards. The maneuvering resulted in a series of Navy Department messages that announced the broadening of the European conflict, followed immediately by a reminder of the navy’s obligations under the Neutrality Acts. For example, Portsmouth Navy Yard received the following cryptic “ALNAV” [All Navy] message from the Secretary of the Navy on 3 September 1939; “England and France are now at war with Germany, You will govern yourself accordingly.”⁴² Two days later another ALNAV provided further guidance on how the navy yards should “govern themselves accordingly” when it stressed compliance with President Roosevelt’s recently issued Proclamation of Neutrality:

On 5 September the President signed a proclamation of neutrality as follows quote whereas a state of war *unhappily* exists between Germany and France semicolon Poland semicolon and the United Kingdom, India, Australia, and New Zealand and whereas the *United States is on terms of friendship and amity with the contending powers* and with the peoples inhabiting their several dominions . . . Franklin D Roosevelt President of the United States of

⁴¹ Robert Dallek, *Franklin D. Roosevelt an American Foreign Policy, 1932-1945*, 190.

⁴² ALNAV of 3 Sep 1930. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 24, Folder A14-6, “Status of Nations with Reference to War and Peace.”

America . . . does hereby declare and proclaim . . . [the provisions of the neutrality laws].⁴³

Choosing his words carefully to keep his options open, the President claimed friendship and amity with Germany as well as the Great Britain and its allies in September 1939.

Late 1939 was a time of confusion and mixed signals at the shipyard. The beginnings of the war in Europe overlapped with disarmament treaty obligations that, in turn, overlapped with the need to comply with the Neutrality Acts that overlapped with a declared limited national emergency on 8 September 1939. For example, on 8 September 1939, when the shipyard was delaying the starts of *Grayling* and *Gudgeon* to comply with treaty obligations, President Roosevelt declared a limited national emergency that called for increased effort and vigilance on the part of the shipyard. The conflicting direction must have seemed like a classic case of “hurry up and wait” to the shipyard managers.

During this time, the shipyard was a microcosm of the entire country as the initial stirrings of the mobilization for war were intermixed with strong sentiments for a continued peace. On 1 November, the Bureau of Construction & Repair finally advised the shipyards that the London Naval Treaty of 1936 had been suspended and that the keels for combatant vessels under construction could be laid at any time without a delay.⁴⁴ To further complicate matters, Secretary of the Navy Claude Swanson proclaimed on 11 December 1939 that the overtime and Sunday work previously

⁴³ ALNAV 38 & ALNAV 39 of 5 Sep 1939. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 24, Folder A14-6, “Status of Nations with Reference to War and Peace.” (emphasis added).

⁴⁴ Bureau of Construction and Repair letter of 9 Nov 1939 to Commandant Portsmouth Navy Yard. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 24, Folder A14 -7, “Scrapping of Ships.”

authorized under the President's Proclamation of a Limited National Emergency was revoked because it was no longer needed.⁴⁵ This period of indecision would continue for another six months until the first of the naval expansion acts was passed in the summer of 1940 and the nation's course became clearer.

At the same time that he was reemphasizing the current provisions of the Neutrality Acts to the Secretary of the Navy and others in the fall of 1939, the President, looking for ways to increase aid to Britain, called Congress into special session in an attempt to revise the portions of the Neutrality Act dealing with the mandatory embargo on the exportation of arms and munitions to foreign states at war. The President's proposed amendment to allow the sale of arms and munitions on a "cash and carry" basis had been rejected by Congress that spring and he sought to revisit the subject after the outbreak of war in Europe in September. Even with war underway and the President's declaration of a limited national emergency on 8 September 1939, the proposed amendment met with considerable Congressional opposition. Many Congressmen felt that any move away from absolute neutrality was an invitation to war. The amendment, however, eventually passed in November 1939.⁴⁶

As events in Europe rapidly took a turn for the worse in 1940, the Secretary of the Navy continued to dutifully report events, as they unfolded, to the shipyards. At times, the messages from the office of the Secretary of the Navy appeared to be no more than scorecard revisions to keep track of the belligerent nations. On 26 April 1940, the message from Secretary of the Navy Charles Edison read, "State of war exists between

⁴⁵ Secretary of the Navy Circular Letter of 11 Dec 1939. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 24, Folder A14 -7, "Scrapping of Ships."

⁴⁶ Robert Connery, *The Navy and the Industrial Mobilization in World War II*, 51-53.

Germany and Norway,”⁴⁷ the 14 May message announced a state of war between Germany and Belgium, Netherlands, and Luxemburg,⁴⁸ and on 10 June the shipyards learned that, “Italy has entered war as ally Germany.”⁴⁹ With any possibility for peace slipping away with each passing day, Congress passed the Eleven Percent Naval Expansion Act on 10 June 1940 and the Seventy Percent Naval Expansion Act on 19 July 1940. These huge increases to the size of the fleet included submarine increases of 21,000 tons and 70,000 tons, respectively, totaling about 61 submarines.⁵⁰ The passage of these acts went a long way towards removing any ambiguous signals the yards had been receiving about submarine construction.

The destroyers-for-bases deal announced by President Roosevelt in early September 1940 was another important step away from strict neutrality and towards providing support to the British. The deal involved the exchange of fifty overage United States destroyers with the British for bases in Newfoundland and Bermuda, and 99 year leases for bases in the West Indies. Portsmouth Navy Yard initially supported the destroyers-for-bases deal in early January 1941 when the yard shipped fifty hose nozzles

⁴⁷ ALNAV 24 of 26 April 1940 and SECNAV 29 of 14 May 1940. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 24, Folder A14-6, “Status of Nations with Reference to War and Peace.”

⁴⁸ SECNAV 29 of 14 May 1940. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 24, Folder A14-6, “Status of Nations with Reference to War and Peace.”

⁴⁹ Chief of Naval Operations Message of 10 Jun 1940. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 24, Folder A14-6, “Status of Nations with Reference to War and Peace.”

⁵⁰ Gary Weir, *Building American Submarines 1914-1940*, 9.

to Philadelphia Navy Yard for use on the destroyers to be “turned over” to Great Britain.⁵¹

The neutrality issue was highlighted again to Portsmouth Navy Yard officials in January 1941 when the Commandant of the First Naval District asked the Commandant of the Portsmouth Naval Yard to designate officers to act as boarding officers to “welcome” submarines of belligerent nations should they be forced to enter ports north of Boston.⁵² Things changed dramatically between January 1941 when the shipyard was prepared to meet, board, and welcome belligerent submarines and May 1941 when the Chief of Naval Operations told Portsmouth Navy Yard to anticipate a “continuous [repair] workload of one British sub at a time.”⁵³

While officials in the yard were dealing with the neutrality issues, so also were the citizens of Portsmouth and the surrounding communities. Neutrality enjoyed strong support in the Portsmouth area in January 1941. Daily during the late 1930s and early 1940s the editorial page of the *Portsmouth Herald* boldly proclaimed “The Herald’s [3 point] Platform,” the first point of which was “Keep the United States of America out of War.” The other two points of the platform were local civic-minded initiatives.

⁵¹ Bureau of Ships letter of 2 Jan 1941 to Commandant Portsmouth Navy Yard. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 43, Folder EF13/L9-3, “British Empire – Alterations, Repairs, Overhauls, 1926-42.”

⁵² Commandant First Naval District letter of 16 Jan 1941 to Commandant Portsmouth Navy Yard. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 24, Folder A14-6, “Status of Nations with Reference to War and Peace.”

⁵³ Chief of Naval Operations letter of 14 May 1941 to Commandant Portsmouth Navy Yard. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 43, Folder EF13/L9-3, “British Empire – Alterations, Repairs, Overhauls, 1926-42.”

In January 1941, with black-out drills being conducted at the shipyard and in the city of Portsmouth,⁵⁴ and with Great Britain being bombed into oblivion, a poll conducted by the *Portsmouth Herald* showed that 32% of the readers favored no help at all for Britain, 18% favored limited help short of war, 28% favored all help short of war, and 22% favored all help possibly including war.⁵⁵ The poll had been conducted as a follow-up to President Roosevelt's fireside chat in late December during which he voiced his strong support for Great Britain. Thus, contrary to the President's convictions, and with war seemingly inevitable, 78% of the local citizenry wanted no part of helping Great Britain if it might lead to war.

The results of the *Portsmouth Herald's* poll differed only slightly from a national poll taken the same month. That national poll showed that two-thirds of the respondents approved of the Lend-Lease bill that was being debated in Congress at the time.⁵⁶ If 67% of the American people favored aid to Britain under Lend-Lease, then roughly 33% must have favored less or no aid to Britain, whereas 32% of the Herald's readers favored no aid at all. Historian David M. Kennedy says that the results of the national poll indicated that, "Despite Roosevelt's studied reluctance to cross all his *t's* and dot all his *i's*, he had edged them [the American people] closer to a commitment to aid the democracies, even at the risk of war."⁵⁷ In January 1941, while the President may have edged the country

⁵⁴ According to the *Portsmouth Herald*, the shipyard's first black-out drill was conducted on Sunday, 8 Sep 1940 and the first Portsmouth black-out drill was on Sunday 27 Oct 1940.

⁵⁵ *Portsmouth Herald*, "Poll Continues to Show Trend Against British Aid," 5 January 1940, 1.

⁵⁶ David M. Kennedy, *Freedom from Fear: The American People in Depression and War, 1929-1945*, (New York: Oxford University Press, 1999), 474.

⁵⁷ *Ibid.*

towards British support, and war, roughly a third of the country, including the residents of Portsmouth, were against aid to Britain.

On 18 March 1941, as President Roosevelt continued to show support for Great Britain, including his signing of the Lend Lease Act on 11 March 1941, the *Portsmouth Herald*, in a major departure from its long-time commitment to neutrality, replaced the anti-war plank in its platform with one calling for “A united effort in behalf of the Democratic nations to win the war and establish a just and lasting peace.”⁵⁸ Referring to a recent FDR address, in which he called for a total victory, the paper reported “After serious reflection, we sadly have realized that, on Saturday last, President Roosevelt delivered the funeral oration on the number one plank in our platform and with sincere regret it is herewith buried.” With that statement, complete with a sketch of a R.I.P. tombstone, the *Portsmouth Herald* buried its strong stance on neutrality. On 27 May 1941, the *Herald's* editorial went one step further and demanded an end to the neutrality deception that the president’s administration had been orchestrating.

Let us no longer be deceived by words – by leases that are more than leases; by lending that is more than lending; by patrols that are more than patrols; and in this speech by an “unlimited emergency” that is actually war.⁵⁹

With those words, the *Herald's* editor had summarized well United States foreign policy for the first half of 1941.

The *Portsmouth Herald's* burial of its hopes for neutrality in May 1941 was part of a growing, but reluctant, national movement. Robert H. Connery wrote that “public opinion was still suspicious of any action which might lead to war” after the President declared a limited national emergency on 8 September 1939 and “public opinion changed

⁵⁸ *Portsmouth Herald*, 18 March 1941, “This is War,” 4.

⁵⁹ *Ibid.*

slowly” after his declaration of an unlimited emergency on 27 May 1941.⁶⁰ Harold G. Vatter says that 1940 and the first half of 1941 “constituted an eighteen month period during which the vision of inevitable American participation gradually came to replace the abhorrence toward involvement.”⁶¹ The *Portsmouth Herald*, like the rest of the country, had held on to hopes for neutrality as long as possible.

Historians agree with the *Portsmouth Herald's* assertion the President had been carefully orchestrating events to move the nation towards war. Thomas H. Buckley and Edwin B Strong, Jr. wrote:

As the fateful day that was to change the course of history drew nearer, it was preceded by an increasingly expert and effective campaign on the part of the White House to secure public acceptance for policies that in and of themselves could never be popular. . . Public opinion was being drawn irrevocably to a point where complete and total commitment to a two-front war against two incredibly powerful adversaries was a foregone conclusion on the morning of December 7, 1941.⁶²

In late March 1941, President Roosevelt took the nation one step closer to war when he extended Lend-Lease to include the repair of British vessels in American shipyards.⁶³ Starting in the summer of 1941, and continuing through the rest of the year, three British submarines, HMS *Truant*, *Pandora*, and *Parthian*, and one Free French submarine, *Surcouf*, were overhauled at Portsmouth Navy Yard.⁶⁴ Curiously, no mention of the British submarines appeared in the *Portsmouth Herald* until 21 September 1941. On that

⁶⁰ Robery H. Connery, *The Navy and Industrial Mobilization in World War II*, 52.

⁶¹ Harold G. Vatter, *The U.S. Economy in World War II* (New York: Columbia University Press, 1985), 3.

⁶² Thomas H. Buckley and Edwin B. Strong, *American Foreign and National Policies, 1914-1945* (Knoxville: The University of Tennessee Press, 1987), 136.

⁶³ Robert Dallek, *Franklin D. Roosevelt and American Foreign Policy, 1932-1945*, 260.

⁶⁴ *Administrative History: Portsmouth Naval Shipyard in World War II*, Portsmouth Naval Shipyard Museum Archives, Kittery, Me., 1.

date, a front page article, with a Washington dateline, revealed that more than a dozen British ships were being repaired in United States shipyards, including the British submarine, *HMS Pandora*, at Portsmouth, N.H. An editor's note indicated that, "This has been common knowledge in Portsmouth for many weeks, but the *Portsmouth Herald*, in co-operation with the Navy Department's request, has refrained from publishing it." Lend-Lease had been flourishing at Portsmouth Navy Yard for some time before it was acknowledged by the local press.

Not mentioned in the article or press release from Washington was the fact that the Free French submarine *Surcouf* was also at the yard at the time. Eleven days earlier,

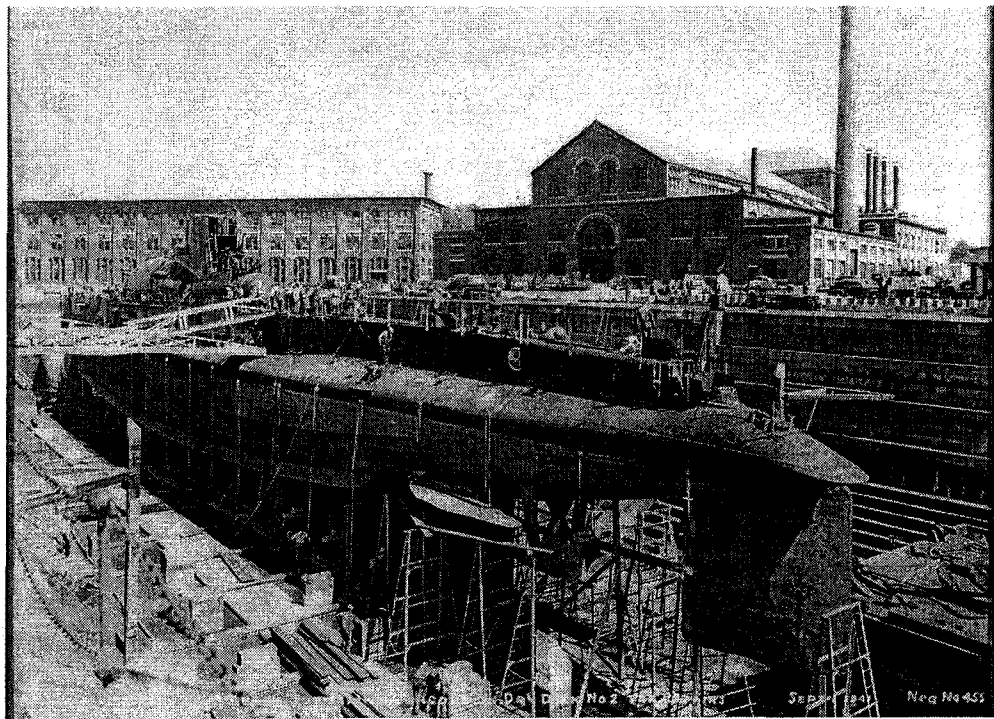


Figure 4: Free French Submarine *Surcouf* in Dry Dock #2 (Summer 1941). Courtesy of Milne Special Collections, University of New Hampshire, Durham, N.H.

on 10 September, seventeen men who “had been working on the bottom of a French ship,”⁶⁵ removing hull paint, were treated at the shipyard hospital for skin and eye irritations. If the *Pandora*’s stay at the shipyard had been common knowledge, the *Surcouf*’s visit must have been even more obvious because it was a huge submarine. The submarine was the world’s largest with a displacement of 4,000 tons, two eight inch guns, an airplane, and “more decks than the average city hotel has floors.”⁶⁶ Over twice the displacement of the fleet-type submarines being built at the navy yard at the time, the *Surcouf* could hardly have transited up the narrow confines of the Piscataqua River to the shipyard without being noticed. Yet the Free French submarine was at the yard for a couple weeks before it was even mentioned in the press, and then only after authorization by the U.S. Navy. Such was the world of secrecy and intrigue that surrounded events at Portsmouth Navy Yard in the fall of 1941.

The *Portsmouth Herald* further lifted the veil of secrecy about foreign submarine visits two weeks after the first article when, on 3 October 1941, it published an interview with the Commanding Officers of the *Surcouf*⁶⁷ and *HMS Parthian*, the next British submarine to be overhauled at the yard.⁶⁸ The interview was complete with pictures of

⁶⁵ Medical Officer Portsmouth Navy Yard memo of 10 Sep 1941 to the Commandant. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 43, Folder EP13/L9-3 (161), “British Empire, *Surcouf* 1941-42.”

⁶⁶ *Portsmouth Herald*, 3 October 1941, “*Parthian* Once Sank Italian Sub; Free French *Surcouf* Unlucky,” 1 & 9.

⁶⁷ The *Portsmouth Herald* reporter was especially captivated with the *Surcouf*’s acting Commanding Officer, Lcdr Louis G. Blaison. When asked if the *Surcouf* had sunk any enemy ships yet, Blaison replied, “We’ve been unlucky,” meaning they had not yet engaged the enemy. *Surcouf*’s luck changed and then went bad. The *Portsmouth Herald* sadly reported on 18 April 1942 that the Free French had announced that the *Surcouf* with its crew of 150 men was long overdue and presumed lost.

⁶⁸ *Portsmouth Herald*, 3 October 1941, “*Parthian* Once Sank Italian Sub; Free French *Surcouf* ‘Unlucky,’” 1 & 9.

the *Parthian* in dock at the yard and several of the foreign officers seated around a table discussing matters. The article claimed that *HMS Pandora* was still in the yard but the *Pandora's* Commanding Officer was suspiciously absent from the interview. Whereas a month earlier there were rumors of a British submarine at the yard, in early October the local newspaper had front page headlines and pictures that replaced rumor with fact. Portsmouth, like the nation, was slowly but surely dropping the pretense of neutrality and embracing the Allies.

During the summer of 1941, when *Pandora*, *Surcouf*, and *Parthian* were at the yard stretching the boundaries of the neutrality envelope, United States submarines were on "Neutrality Patrols" doing the same. On 11 April 1941, President Roosevelt, searching for ways short-of-war to aid Britain, for which he could reasonably expect Congressional and public support, extended the coastal American security zone into the mid-Atlantic and gave patrolling American naval vessels instructions to notify the British about any enemy ships or aircraft sighted.⁶⁹ The next month, the USS *Bonita* (SS165), one of three old V-Class submarines that had been towed up from Philadelphia Navy Yard to be recommissioned at Portsmouth in the spring of 1941, left the yard for a neutrality patrol near Bermuda. According to Dan MacIsaac, the *Bonita* spent the summer of 1940 on neutrality patrol looking for German submarines to be reported to the British.⁷⁰ The neutrality patrols, begun in great secrecy, were common knowledge to reporters within a few weeks.⁷¹

⁶⁹ Robert Dallek, *Franklin D. Roosevelt and American Foreign Policy, 1932-1945*, 261.

⁷⁰ Interview with Dan MacIsaac on 9 Nov 2006 at the Portsmouth Navy Yard Museum.

⁷¹ David M. Kennedy, *Freedom from Fear*, 493.

By the summer of 1941, disarmament treaties and neutrality sentiments no longer constrained production at Portsmouth Navy Yard in any way. The ramp-up of facilities was in full swing, employees were being hired at record rates, British submarines were being repaired routinely at the yard, and large orders for new submarines were being received.⁷² Twenty years of restrained submarine building would be quickly replaced by a submarine building boom unlike anything ever seen before or again at Portsmouth Navy Yard.

With mobilization in full gear, and almost as an afterthought, on 13 November 1941, the House of Representatives voted 212-194 to kill the two-year old Neutrality Law. The closeness of the vote speaks to a continuing reluctance on the part of Congress and the American people to abandon all hope for the avoidance of war. However, with the death of the last of the Neutrality Acts, all the neutrality shell games were over. American merchantmen could officially be armed to transport munitions, and eventually troops, to Great Britain. British newspapers screamed "The Yanks are Coming" and indeed they were.⁷³

⁷² See Chapter III, "Ramp-up for War."

⁷³ *Portsmouth Herald*, 14 November 1941, "The Yanks are Coming," 1.

The New Deal

As noted earlier, the Bureau of Ships World War II self-history judged New Deal programs to be critical to the renewed naval shipbuilding programs and the maintenance and upgrading of shipyard shops and facilities during the 1930s. The importance of the New Deal programs to the navy yards is obvious from Figure 5 that shows the various funding sources available for the upgrade and maintenance of navy yard public works during the 1930s.⁷⁴

Figure 5: Public Works Expenditures:
Navy Yards (1933-39)

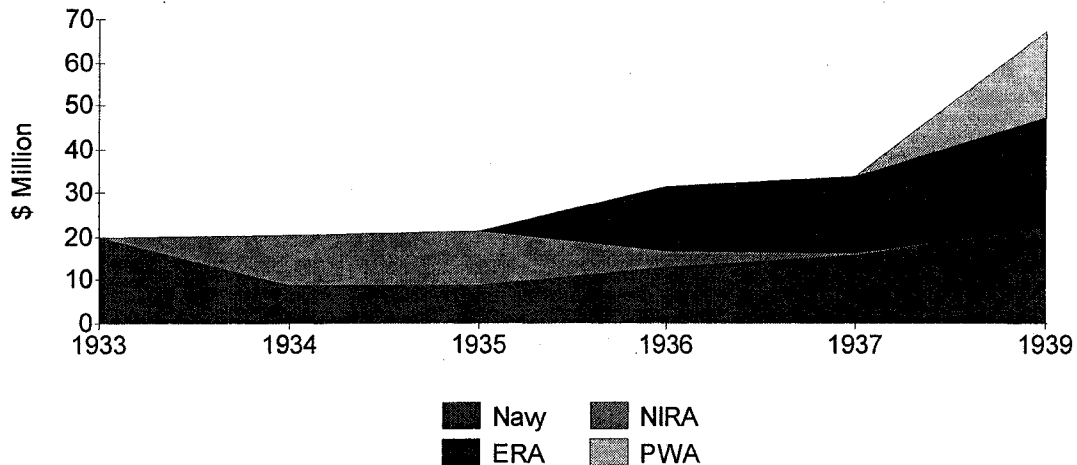


Figure 5 shows that \$19.8M were appropriated in 1933 to navy yards for public works projects, all from naval funds. In 1934, after the passage of the National Industrial Recovery Act (NIRA) in 1933, the annual budget increased slightly to \$20.3M, but \$11.4M (56%) of that total were funds appropriated for NIRA designated projects. This trend continued throughout the 1930s as NIRA, then the Emergency Recovery Act (ERA), and finally Public Works Administration (PWA) funding consistently supplied

⁷⁴ The graph is constructed from Bureau of Construction and Repair's Annual Reports, NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 22, Folder A9-1/EN 7, "Annual Reports Bureau of Construction and Repair."

well over 50% of the annual funding for navy yard public works projects. Despite modest navy appropriations for shipyard projects between 1933 and 1939, the navy yards experienced a 348% increase in public works expenditures. Also important is the fact that public works expenditures more than doubled between 1937 and 1939 thanks to large PWA and NRA funding increases. These two New Deal programs helped to pave the way for the massive navy yard facility upgrades that followed, in the summer of 1940, when the funding floodgates were opened with the 11% and 70% Naval Expansion Acts.

Navy yard public works programs and facilities were neglected between the end of World War I and 1934 because of inactivity at the yards. The U.S. Navy was largely unsuccessful in gaining appropriations for any significant new ship construction during that period. Consequently, there was no need for shipyard facility upgrades.

In October 1931, Secretary of the Navy Charles F. Adams promulgated a policy for the development of navy yards and shore stations that stated, "In general, plans for development of Navy Yard and Shore Stations should be based on a Treaty Navy and should be capable of further expansion in time of war."⁷⁵ In other words, the navy was not building many ships and the limited funding available would not be wasted on needless or marginal navy yard facilities. The navy yards were still encouraged to plan and develop their contingency plans and wish lists. However, the yards were told that, "These plans should remain in the paper state, unless the drift of international affairs indicates clearly that a world condition exists, which would, in all probability, draw the

⁷⁵ Chief of Naval Operations letter to the Secretary of the Navy of 8 Oct 1931 and Senior Member, Board for the Development of Navy Yard Plans letter of 31 Dec 1931. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 1, Folder A1/Y1, PKG #1, "Local Development Boards."

United States into war [and the fleet needed to be increased].”⁷⁶ In 1931, there was not yet much of a threat of war and, consequently, funding would not be wasted on facilities perceived to be in excess of actual needs. The emphasis was clearly on the avoidance of spending scarce federal monies rather than the maintenance of minimal shipyard capabilities.

In March 1932, that policy became painfully apparent to Portsmouth Navy Yard management when the shipyard’s request for funds for an extension to a highly congested structural shop, and the conversion of another shop to a storage building, was denied by the Board of Development for Navy Yards. It was the opinion of the Board that, “In view of the small workload, which in absence of an emergency appears permanent in character, it seems doubtful if justification exists for any extension of facilities at Portsmouth at the present time.”⁷⁷ After the shipyard had greatly reduced the scope of its request and pleaded its case for less costly upgrades,⁷⁸ the project was finally approved for \$290,000.⁷⁹ Even though Portsmouth Navy Yard was the only yard building submarines at the time, it still had great difficulty getting funding for needed projects early in 1932. The situation began to improve in the summer of 1932 when President Hoover approved the first federal relief programs and then improved significantly when

⁷⁶ *Ibid.*

⁷⁷ Senior Member, Board for the Development of Navy Yard Plans letter of 24 Mar 1932 to Commandant Portsmouth Navy Yard. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 1, Folder A1/Y1, PKG #1, “Local Development Boards.”

⁷⁸ Commandant Portsmouth Navy Yard letter to Senior Member, Board for the Development of Navy Yard Plans of 7 April 1932. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 1, Folder A1/Y1, PKG #1, “Local Development Boards.”

⁷⁹ The Senior Member, Board for Development of Navy Yard Plans letter to Commandant Portsmouth Navy Yard of 14 May 1932. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 1, Folder A1/Y1, PKG #1, “Local Development Boards.”

Franklin D. Roosevelt, former Assistant Secretary of the Navy, assumed the Presidency in March 1933.

The Emergency Relief and Construction Act, signed by President Herbert Hoover, on July 21, 1932 was the precursor of later New Deal programs that would benefit the navy yards. The approval of this act was a reversal of policy for Hoover who typically resisted federal relief programs in favor of volunteerism and cooperation with business leaders to resolve the deepening economic crisis. Hoover, often blamed for the depression, and rarely recognized for his efforts to stem the crisis during the latter stages of his administration, received little credit for this act. By the summer of 1932, cartoonists routinely caricatured Hoover as a “dour, heartless, skinflint, whose rigid adherence to obsolete doctrines caused men and women to go jobless and hungry.”⁸⁰ Contrary to his growing reputation as a skinflint, the Emergency Relief and Construction Act authorized \$1.5 billion in public works and loans up to \$300 million to the states for relief purposes. The act included an appropriation of \$10 million for navy public works that created opportunities for federal funding on navy yard improvements that had been nearly nonexistent for many years. With hopes of tapping into this funding windfall, Portsmouth submitted public works requests totaling \$2,770,000 of which \$350,000 for power and water plant improvements were funded immediately.⁸¹ The remaining line items of the request became subjects of extensive debate and fragmented approvals under subsequent various funding sources.

⁸⁰ David M. Kennedy, *Freedom from Fear: The American People in Depression and War, 1929-1945* (New York: Oxford University Press, 1999), 91

⁸¹ Local Board for Development of Navy Yard Plans letter of 21 Sep 1932 to Commandant First Naval District, NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 1, Folder A1/Y1, PKG #1, “Local Development Boards.”

The Democratic landslide victory that accompanied FDR's victory in November 1932 increased the Democrats' majority in the House of Representatives from 9 to 100, and the loss of 12 Republican seats in the Senate gave the Democrats firm control of that body for the first time since 1920. With the economic realities of the early 1930s still causing resistance to any proposed increases of naval appropriations, Carl Vinson, the Chairman of the House Navy Affairs Committee, led the effort to gain Congressional support to include naval construction under the public works provisions of New Deal programs. In so doing, Vinson, Roosevelt, and other Navy supporters found a way to cut or contain the Navy budget while increasing the nation's shipbuilding accounts.

The National Industrial Recovery Act (NIRA), the last of the sweeping reform measures implemented during the first hundred days of the Roosevelt administration, passed on 16 June 1933, became the vehicle for increasing naval funding for ships and submarines as well as public works. The NIRA was part of the Hundred Days package of legislation that included the Emergency Banking Act, Agriculture Adjustment Act (AAA), the Civilian Conservation Corps (CCC), Federal Emergency Relief Administration (FERA), and the Tennessee Valley Authority (TVA). David M. Kennedy wrote that, "Taken together, the accomplishments of the Hundred Days constituted a masterpiece of presidential leadership unexampled then and unmatched since."⁸²

The NIRA provided for federal regulation of maximum hours and minimum wages in various industries, recognized the right of industrial workers to organize and bargain collectively through representatives of their own choosing, created the National Recovery Administration (NRA) to reform and regulate American industry, and created

⁸² David M. Kennedy, *Freedom from Fear*, 139.

the Public Works Administration (PWA) to undertake an ambitious construction program of public buildings and infrastructure.⁸³ Historian David M. Kennedy likened the NRA to the chassis of the legislation and the PWA as the “engine, or at least the starting motor” that would drive economic recovery.⁸⁴ In the President’s own words, “The task [of the NIRA] is in two stages; first, to get many hundreds of thousands of the unemployed back on the payroll by snowfall and, second, to plan for a better future for the long pull.”⁸⁵ Among other things, the act released \$200,000,000 for the Navy to start building ships up to the limits of the London Treaty of 1930, including two submarines at Portsmouth Navy Yard.⁸⁶ This appropriation provided funds to begin to rebuild the United States Navy that had been in decline since the Washington Naval Conference. While the NIRA served the Navy well, it was short lived. The Supreme Court, in a unanimous decision, nullified the act on 27 May 1935. Figure 5 shows navy yard NIRA funded projects being phased out in 1936 with the rise of ERA funded projects.

The initial new construction, authorized under the NIRA, included two aircraft carriers, four cruisers, twenty destroyers, four submarines, and two gunboats, a total of thirty-two ships. This package represented the “greatest stimulus to the shipbuilding industry since World War I.”⁸⁷ The work was to be roughly split between private shipyards and navy yards, increasing the work forces by 14,000 and 12,000 employees

⁸³ *Ibid.*, 131-159.

⁸⁴ *Ibid.*, 151.

⁸⁵ Franklin Roosevelt’s Statement on the National Industrial Recovery Act, 16 June 1933 at <http://www.fdrlibrary.marist.edu/odnirast.html>.

⁸⁶ Michael West, “Laying the Legislative Foundation: The House Naval Affairs Committee and the Construction of the Treaty Navy, 1926-1934,” 332.

⁸⁷ *Ibid.*

respectively. The number of ships under construction in private shipyards would increase 300% and in navy yards 150%.⁸⁸ The NIRA shipbuilding program lifted the shipyards out of the shipbuilding doldrums of the 1920s and “greased the skids for the enactment of a future comprehensive, multi-year shipbuilding authorization . . . if it did not in fact make such action inevitable.”⁸⁹ Once the NIRA commitment had been made to put the nation’s shipyards back to work, that investment would only make sense if the increased workforce could be kept employed with follow-on shipbuilding programs. In the case of Portsmouth Navy Yard, the V-class submarine building program had helped maintain some semblance of workload and employment stability during the latter half of the 1920s and early 1930s. The two NIRA submarines did the same for the mid-1930s until the Vincent-Trammel Bill (1934) and its amendments steadily increased naval shipbuilding throughout the rest of the 1930s within treaty constraints.

Keeping with the required NIRA split of work between private and navy yards, Portsmouth Navy Yard and Electric Boat Company were each awarded two submarines. The orders for the Portsmouth submarines, USS *Porpoise* (SS171) and USS *Pike* (SS172), were placed on 19 June 1933.⁹⁰ Figure 6 shows the laying of the keel for the *Pike* with a proud banner that reads, “Second Navy Yard Man of War Keel Under NIRA, Submarine Pike, Dec. 20, 1933.”

⁸⁸ *Ibid.*

⁸⁹ *Ibid.*, 341.

⁹⁰ Production Officer memo of 15 Jun 1934 to Manager. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 2, Folder A9/A1-3/ENR, “Reports of Projects NIRA to Y[ards] & D[ocks] 1933-35 [Shore Projects].”

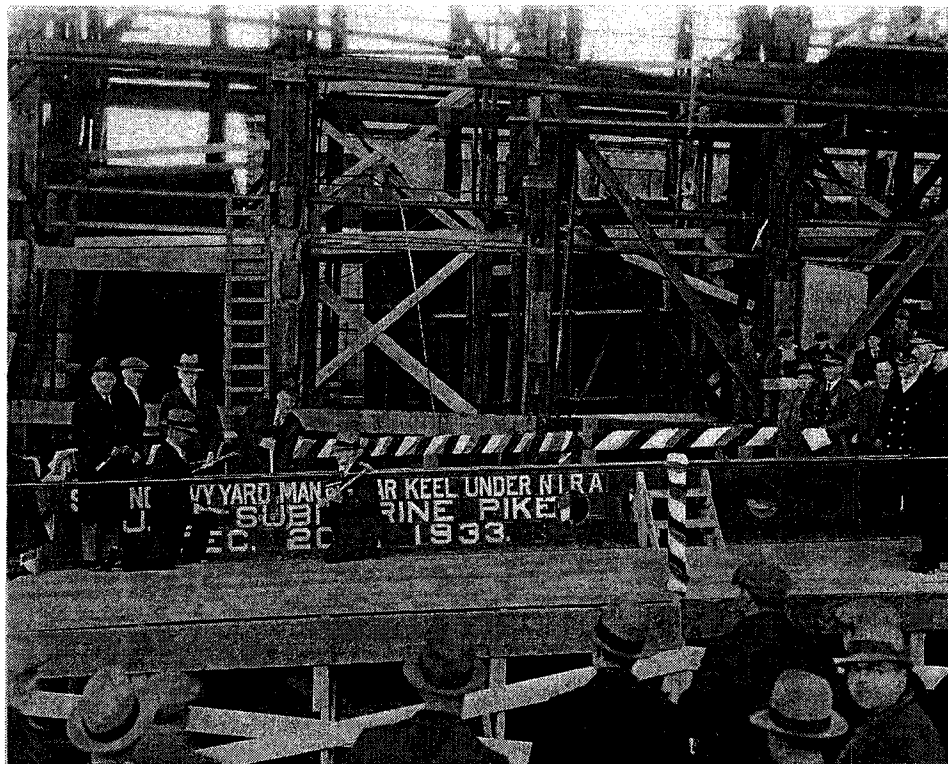


Figure 6: Keel Laying for NIRA Submarine USS *Pike*. Courtesy of Milne Special Collections and Archives Department, University of New Hampshire Library, Durham, N.H.

The first man-of-war under NIRA, the USS *Porpoise*, was commissioned 15 August 1935. The Secretary of the Navy complimented the shipyard on the completion of *Porpoise* ahead of schedule:

The *Porpoise* was authorized and appropriated for under the National Industrial Recovery Act of 1933, and the Department notes, with pleasure, that this vessel is not only the first vessel of this 1933 program to be completed but also that it has been completed fifteen days ahead of contract time.⁹¹

As will be discussed later, the shipyard commenced using a new more efficient sectional construction process with *Porpoise* that contributed to the early delivery. Instead of custom building the submarine at one site, sections were preassembled in various

⁹¹ Secretary of the Navy letter of 18 Jan 1936 to Commandant Portsmouth Navy Yard. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 1, Folder A1, "New Construction 27 Sep 1932 to 29 May 1940."

locations of the shipyard and transported to the building ways for assembly. The yard continued to perfect this process during the 1930s and *Porpoise* was but one of many early completions to follow that enhanced Portsmouth's reputation for submarine construction, insuring a steady flow of new construction contracts into the shipyard.

The NIRA projects at Portsmouth Navy Yard were not limited to *Porpoise* and *Pike*. They also included power plant upgrades, boiler installations, and repairs to floating derricks, cranes, and building ways.⁹² By December 1933, the shipyard had 650 men per day working on NIRA submarine construction and about 40 men per day on other NIRA projects.⁹³ The 690 men working NIRA projects represented 43% of the total shipyard employment of 1600. Without the NIRA projects, Portsmouth Navy Yard would have been forced to release many of its skilled workers.

Another New Deal program, the Civil Works Administration (CWA) program, launched on 9 November 1933, was more bureaucratic trouble for the yard than it was worth. The CWA was a work-relief program that put 4.2 million people to work by January 1934. This labor-only program was administered through state agencies, and Portsmouth Navy Yard had the misfortune of having to deal with two different state bureaucracies. The shipyard benefited modestly from CWA projects that involved road

⁹² Manager memo to Commandant of 14 Aug 1933. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 1, Folder A1, "New Construction 27 Sep 1932 to 29 May 1940."

⁹³ See the Industrial Manger's weekly status reports of NIRA manning. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 22, Folder A9/A1-3/ENR, "Reports of Projects NIRA to Y & D 1933-35 [Shore Projects]."

and railroad track upgrades and general painting during the first few months of 1934.⁹⁴ Nationally, 12,000 men had been assigned to Navy and Marine Corps stations, but Portsmouth Navy Yard benefited little from the program before it closed down at all naval installations in April 1934. According to historian David Kennedy, President Roosevelt terminated the CWA because of its expense, \$200 million a month, and concerns that “working for the government might become a habit with the country.”⁹⁵ The Secretary of the Navy’s final report in July 1934 complimented the stations and shipyards involved with CWA projects because there had been no fatal accidents or serious injuries despite the fact that many of the men employed had been physically unqualified and inexperienced in the type of work to which they were assigned.⁹⁶ The absence of fatalities or serious injuries was faint praise for this New Deal work program. The closing down of this program was no great loss for Portsmouth Navy Yard as the yard needed skilled workers and not just warm bodies.

Later in 1934, the shipyard attempted to add labor to the yard by taking advantage of relief labor available under the Federal Emergency Relief Administration (FERA).

According to historian David M. Kennedy:

With FERA, the federal government took its first steps into the business of direct relief, and began, however modestly, to chart the path toward the modern American welfare state. . . . FERA was an emergency body, hastily established and rushing without precedent or staff to cope with a vast national crisis. Its skeletal Washington office, never numbering more than a few hundred people,

⁹⁴ Commandant Portsmouth Navy Yard letter of 23 May 1934 to the Assistant Secretary of the Navy. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 1, Folder A1/N1, “Plans, Projects, Policies, PKG #2.”

⁹⁵ David M. Kennedy, *Freedom from Fear*, 176.

⁹⁶ Assistant Secretary of the Navy letter of 16 Jul 1934 to Distribution. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 1, Folder A1/N1, “Plans, Projects, Policies, PKG #2.”

necessarily relied on state and county officials to screen applicants and distribute benefits.⁹⁷

Portsmouth Navy Yard became very familiar with the local officials administering FERA programs for the states of New Hampshire and Maine. Commandant Rear Admiral C.P. Snyder, in a letter to the state of New Hampshire, wrote:

It has recently come to the Commandant's attention that at other Navy Yards and Stations there are employed approximately 2,500 relief workers on FERA projects. This Navy Yard has had no relief labor since the CWA closed down last April.⁹⁸

The Commandant went on to note several shipyard projects deserving of FERA assignment. After further investigation, a December 1934 memo from the Public Works Officer to Commandant Snyder described the torturous process that had to be followed to obtain FERA workers from the state of New Hampshire:

Certain formalities were necessary before any projects could actually be started in the field. It is necessary for Lieutenant Hall to get in touch with Colonel Cavanaugh at Concord, who in turn will contact the Navy Yard in order to fill out certain necessary papers with regard to projects . . . before work can be authorized. As soon as this is done, it is believed that the Colonel in charge turns the matter over to an assistant of Mrs. Wilder who in turn authorizes the project and instructs Fort Constitution to furnish us with the men required. This necessary red tape will possibly take several days before any actual employment can be made at the yard.⁹⁹

To further complicate matters, it was explained that:

⁹⁷ David M. Kennedy, *Freedom from Fear*, 171.

⁹⁸ Commandant Portsmouth Navy Yard letter of 20 Nov 1934 to Bernice Wilder, State Administrator, Federal Emergency Relief Administration, 11 School St, Concord. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 1, Folder A1/N1, "Plans, Projects, Policies,"PKG #2."

⁹⁹ Public Works Office Gaylord Church endorsement of Lieutenant Junior Grade H.E. Wilson (CEC), USN memo of 11 December 1934 to Commandant, Subject: Interview with Mrs. Abby Wilder, State Administrator, E.R.A. – Regarding work projects for Navy Yard, Portsmouth, N.H. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 1, Folder A1/N1 – "Plans, Projects, Policies, PKG #2."

50% of current ERA funds are appropriated by the state, 25 % by the township where the work is being done, and 25% comes from Federal sources. In view of the local participation in the expense of the work, it is necessary to obtain the sanction of local authorities before a project is authorized as there have been cases where without such prior agreement, the township has refused to assume its share of the expenses.¹⁰⁰

Unfortunately, all of this complexity and confusion was doubled because the shipyard had to deal with the state of Maine as well as New Hampshire.

In January 1935, after working with New Hampshire state officials and successfully navigating through the obligatory sea of bureaucratic red tape, a project was approved for 26,000 man-hours. This project involved men available from the Transient Bureau Camp at Fort Constitution and 22,500 man-hours involving 60 FERA men assigned through the city of Portsmouth. The New Hampshire FERA projects that were approved included the general cleaning and painting of buildings and cleanup of grounds.¹⁰¹ Efforts to acquire FERA labor through the state of Maine at that time were unsuccessful because, as the state explained in a letter to the shipyard, "The allocation allowed the Town of Kittery is not sufficient to put an ERA project in the Navy Yard from the state of Maine."¹⁰² It seems the height of inefficiency that Federal regulations forced the yard to seek labor support from the town offices of Kittery. It mattered little,

¹⁰⁰ Lieutenant Junior Grade H.E. Wilson (CEC), USN memo to Commandant of 11 Dec 1934, Subject: Interview with Mrs Abby Wilder, State Administrator, E.R.A. – Regarding work projects for Navy Yard, Portsmouth, N.H. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 1, Folder A1/N1 – Plans, Projects, Policies, PKG #2."

¹⁰¹ Lcdr H.E. Wilson (CEC), USN memo to Commandant of 11 Dec 1934. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 1, Folder A1/N1, "Plans, Projects, Policies, PKG #2."

¹⁰² State of Maine, Emergency Relief Administration letter of 31 Jan 1935. NARA Waltham RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 1, Folder A1/N1, "Plans, Projects, Policies, PKG #2."

however, because the early labor projects under New Deal programs were mostly of a housekeeping nature with minimal advantages to the shipyard.

The first weekly report of FERA labor shows 44 men (no women) from the city of Portsmouth assigned to cleaning shops and buildings and 15 men (no women) assigned from Fort Constitution for cleaning and painting of the interior of shop buildings.¹⁰³ The shipyard reports consistently emphasized that no women were included in any of the labor pools. Follow-on reports indicate a peak assignment of 102 men (90 from Portsmouth, 12 from Fort Constitution) in April 1934, dwindling to single digits (usually 6 people) from Fort Constitution during the July to October 1934 time frame. The Portsmouth project closed as of 1 July 1935 and the Fort Constitution project closed in November 1935 as no further labor was available from those sources.¹⁰⁴ The FERA program, like the CWA program before it, faded in importance and benefit to the shipyard.

The frustrations of dealing with the CWA and FERA programs were many. In addition to the bureaucratic red tape of two different states, projects had to be continuously reassessed and approved, and the reporting requirements were seemingly endless. In addition, after going through all the bureaucratic wickets to gain approval for a CWA or FERA labor-only project, the shipyard then had to go back to the Bureau of

¹⁰³ Commandant Portsmouth Navy Yard letter of 17 Jan 1935 to Assistant Secretary of the Navy (Shore Establishment Division). NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 1, Folder A1/N1, "Plans, Projects, Policies, PKG #2."

¹⁰⁴ Commandant Portsmouth Navy Yard letter of 21 Nov 1935 to Assistant Secretary of the Navy (Shore Establishment Division). NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 1, Folder A1/N1, "Plans, Projects, Policies, PKG #2."

Yards and Docks for the funds needed to purchase materials for the additional laborers.¹⁰⁵ The necessity to work through two different state bureaucracies often resulted in workers assigned to the same jobs in the shipyard having different wage rates. Unlike the NIRA funded programs that left the yard responsible for the administration of those funds under strict, but manageable, guidelines, Portsmouth Navy Yard's experience with New Deal labor-only programs was initially a frustrating exercise in dealing with bureaucratic complexity and the overlapping jurisdiction of agencies.

In addition, as Commandant Rear Admiral C.P. Snyder noted in August 1935, many worthwhile shipyard projects could not be successfully completed because of a shortage of FERA skilled labor. Commandant Rear Admiral Snyder wrote his superior at the Bureau of Yards and Docks, in August 1935, that he would "continue to make every effort to obtain the required employees for those programs which have not progressed satisfactorily," but doubted "the possibility of obtaining the necessary skilled labor from relief rolls in this vicinity."¹⁰⁶

Even when limited skilled labor was available, the shipyard was further frustrated by the "ten percent rule" that required that not more than ten percent of a work crew be skilled labor. Shipyard skilled labor could be used but, even then, the "ten percent" rule still applied. As the commandant noted, many of the shipyard's potential FERA projects required small numbers of FERA labor and the assignment of any skilled labor at all

¹⁰⁵ Commandant letter of 9 Jan 1935 to Chief of Bureau of Yards and Docks. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 1, Folder A1/N1, "Plans, Projects, Policies, PKG #2."

¹⁰⁶ Commandant Portsmouth Navy Yard letter of 13 Aug 1935 to Chief Bureau of Yards & Docks. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 1, Folder A-1, "Works Progress Administration (WPA)."

exceeded the ten percent rule.¹⁰⁷ The commandant argued, and rightly so, that the rules were overly restrictive. In time, rules were relaxed and the New Deal programs that followed FERA became much more useful to the shipyard.

The Works Progress Administration (WPA), part of the Emergency Relief Act of 1935, proved to be a much more manageable New Deal program than the others. Public works upgrades were accomplished under WPA projects, not just housekeeping chores. Over the next five years the shipyard became much more adept at working with the WPA than the previous relief programs, and the WPA administration became much more accommodating to shipyard needs.¹⁰⁸ As more workers were assigned, they gained shipyard experience and acquired on-the-job shop training that made them valuable shipyard resources. During 1936, WPA projects included not only labor-intensive work like railroad track repairs, demolishing and removing piers and World War I structures, and wide-spread painting of buildings, but more technical tasks such as surveying subsurface foundations and service tunnels, upgrading electrical distribution systems, and improving lighting in the shipyard. By October 1936, the shipyard had 189 WPA workers assigned to such tasks and Commandant Rear Admiral C.P. Cole was able to report in his annual report that “In general, the appearance of the Yard has been improved by this work and many needed repairs accomplished.”¹⁰⁹ The progress continued and, by April

¹⁰⁷ *Ibid.*

¹⁰⁸ Commandant Portsmouth Navy Yard letter of 29 Aug 1935 to Bureau of Yards & Docks, Subject: Application for Allotment of Funds under Emergency Relief Appropriations Act, 1935. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 1, Folder A-1, “Works Progress Administration (WPA).”

¹⁰⁹ Commandant Portsmouth Navy Yard letter of 29 Oct 1936 to Chief Bureau Yards & Docks, Subject: Emergency Relief Navy Projects for Fiscal Year 1936 – Report of Completion. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 1, Folder A-1, “Works Progress Administration (WPA).”

1939, over 500 relief workers were employed and involved in important facility upgrades to the power plant and other buildings.¹¹⁰ The shipyard also benefited from the WPA Federal Theater Project that presented at least eight performances at the shipyard between 1935 and the summer of 1938.¹¹¹

In July 1938, the shipyard provided Congressman George J. Bates (Mass-R), 6th District, a requested comprehensive list of shipyard EPA, WPA, and PWA projects as well as Navy funded projects.¹¹² That list showed Navy funded projects totaling \$1,090,000 and EPA, PWA, and WPA projects totaling \$1,020,000. The latter included improvements to the foundry and power plant, extensions to the electrical manufacturing and machine shops, and the building of a general storehouse and steel storage area, all important facilities that would be needed for the war effort. There is no doubt that the shipyard was getting a lot more accomplished with relief labor and New Deal programs in 1938 than it did in 1935.

The importance of WPA and PWA projects to the navy yards began to wane with the appropriation of significant public works funds under the Naval Act of 1940. In June 1939, the Chief of the Bureau of Yards and Docks, Rear Admiral Ben Moreell, advised the yards that Fiscal Year 1940 would mark the return of naval funding for shipyard

¹¹⁰ Commandant Portsmouth Navy Yard letter of 25 Apr 1939 to Chief Bureau Yards & Docks. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 1, Folder A-1, "Works Progress Administration (WPA)."

¹¹¹ NARA Waltham's files hold programs and other evidence of performances on 27 May 1936, 25 Jun 1936, 9 July 1936, 27 Aug 1936, 26 Oct 1936, Jan 21 1937, Feb 4, 1937, 27 Jun 1938 with reference to at least one performance in 1935.

¹¹² Commandant Portsmouth Naval Yard letter of 27 Jul 1938 to Congressman George J. Bates. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 1, Folder A1/Y1, PKG #1, "Local Development Boards."

projects and the curtailment of PWA and WPA funding. Moreell further advised that “The transfer of part of the WPA force to the building trades shops would undoubtedly be desirable to assist yards and stations in carrying out their yard labor responsibilities under the “Public Works” program.”¹¹³ WPA workers with minimal benefits were eager to gain the benefits that came with Civil Service status. However, during 1940, the shipyard continued to employ several hundred relief workers per month on various projects of importance throughout the yard.¹¹⁴

By January 1941, one had difficulty distinguishing civil service employees from relief workers within the shops at Portsmouth Navy Yard. The WPA assigned allotments, not workers, to the shipyard and it became an accounting exercise to insure workers were charged to the proper WPA budget line items.¹¹⁵ As war approached, and Department of Defense budgets increased, the authorized shipyard employment ceiling was raised, and many employees moved, as Rear Admiral Moreell had suggested, from the WPA relief worker category to Civil Service status.¹¹⁶ Hundreds of skilled relief workers, with several years of experience in the shipyard, were hired as permanent shipyard employees with a stroke of the pen and no disruption to shop projects or schedules. The WPA projects had been excellent on-the-job training for these workers.

¹¹³ Chief Bureau of Yards and Docks Rear Admiral B. Moreell letter of 9 June 1939, Subject: WPA Construction Program – FY 1940. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 2, Folder A-1, “Works Progress Administration (WPA).”

¹¹⁴ Commandant Portsmouth Navy Yard letter of 24 Apr 1940 to Chief Bureau Yards & Docks. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 1, Folder A-1, “Works Progress Administration (WPA).”

¹¹⁵ Commandant Portsmouth Navy Yard letter of 30 Jan 1941 to Chief Bureau of Yards and Docks. NARA Waltham, RG181, Portsmouth Naval Base General Correspondence, Box 1, Folder A-1, “Works Progress Administration (WPA).”

¹¹⁶ Chief Bureau Yards & Dock letter of 9 Jun 1939. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 1, Folder A-1, “Works Progress Administration (WPA).”

With the start of the war, WPA projects continued to fill an important role in the shipyard, employing upwards of 500 workers at times during 1942.¹¹⁷ At the same time, the Navy budgets had kicked into high gear and funding had ceased to be a problem for the public works upgrades that were so urgently needed by the shipyard. The commandant was able to report with pride to his boss, the Chief of the Bureau of Yards and Docks, in March 1942 that public works construction expenditures in the shipyard had increased from \$331,000 in December 1941 to \$521,000 in January 1942, and nearly doubled to \$1,100,000 in February 1942.¹¹⁸ The New Deal programs had done their job and bridged the gap until Congress opened the mobilization funding floodgates.¹¹⁹

Portsmouth Navy Yard Operations (1920-1940)

This section examines events at the shipyard between the wars, with emphasis on workload, performance, and management strategy. It was not just the U.S. Navy's desire to develop the yard as a competitor for private industry that placed it in a preeminent position of submarine design and construction by the start of World War II. It was to the credit of the shipyard's management and employees that they were able to reward the Navy's favoritism with consistent, superlative performance that reinforced the yard's position as the leader in submarine design and construction. At the same time, it became management's strategy, during the mid-1930s, to optimize the yard's new construction

¹¹⁷ Commandant Portsmouth Navy Yard letter of 24 Jul 1942 to Chief Bureau Yards & Docks. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 1, Folder A-1, "Works Progress Administration (WPA)."

¹¹⁸ Commandant Portsmouth Navy Yard letter of 7 Mar 1942 to Bureau Yards & Docks. NARA Waltham, RG 181, PNB, Box 1, Folder A-1, "Works Progress Administration (WPA)."

¹¹⁹ The war, economic prosperity, and conservative Congressmen brought an end to many of the New Deal programs including the Civilian Conservation Corps and the Works Progress Administration which were gone by 1943. Social security, farm price supports, child labor and minimum wage legislation, and banking and securities regulation survived as the legacies of the New Deal. David M. Kennedy, *Freedom from Fear*, 783.

workload at two submarines a year while attempting to shed as much of the disruptive multi-ship repair and overhaul work as possible so that the yard could be streamlined for new submarine construction. This streamlining philosophy prevailed during World War II and the yard's remarkable production was the direct result.

According to the Bureau of Ships' World War II self-history, "At one time or another during the period after World War I new construction disappeared from every Navy Yard except Portsmouth."¹²⁰ This steady new construction workload enabled the shipyard to maintain a well trained and stable workforce during the 1920s. Table 1 shows the number of employees at each of the navy yards between 1917 and 1929. The percent change in employment during that period shows the workforce stability that Portsmouth Navy Yard enjoyed over other navy yards.¹²¹

Table 1: Navy Yards Employees (1917-1929)

	1917	1924	1926	1929	% Change
Portsmouth	1650	1600	1950	1700	+3%
New York	6800	3100	2750	3400	-50%
Norfolk	4350	2100	2800	3500	-19%
Philadelphia	3350	3000	2750	3100	-4%
Boston	2950	2050	2600	1550	-47%
Puget Sound	1600	2700	2550	3250	+103%
Charleston	1700	400	450	450	-73%
Mare Island	2900	2350	2450	4350	+50%
Pearl Harbor	0	1050	950	800	-----

¹²⁰ *United States Naval Administration in World War II, Bureau of Ships*, Navy Department Library, Naval Historical Center, Washington, D.C., 7.

¹²¹ Assistant Secretary of the Navy letter of 7 Jul 1930 to Commandants Navy Yards. NARA Waltham, RG 181, Shipyard Formerly Confidential Correspondence 1930-50 – Declassified by NARS per NCD Project #745085 and by the Navy Department, Box 3, Folder L5-3/NY, "Navy Yards Inspection of Equipment Machine Tools."

The employment levels at Portsmouth Navy Yard stayed remarkably constant from 1917 to 1929 when other navy yards showed great fluctuation, which would be expected going from war to peace. The employment at east coast yards, with the exception of Portsmouth and Philadelphia, dropped precipitously, while the west coast yards moved as dramatically in the positive direction. Because Portsmouth Navy Yard enjoyed some measure of stability during the declining period of the U.S. Navy (1922-31), the shipyard was poised and ready to capitalize on the awakening period (1932-36), and then thrive during the rebuilding years (1936-1945).

During the early 1920s, the yard fulfilled World War I contracts with the completion of eleven S-boats (S-3 through S-13). Portsmouth had fared well in the competition with Lake Torpedo Company and Electric Boat. According to the S-Class Trial Board:

Aside from all general features of design, a casual inspection shows a great difference in the care and thoroughness with which the three plants design and work out the details of all interior and exterior arrangements and fitting. In this respect, there is no great difference in the product of the two private plants, that of the Lake Torpedo Boat Company being perhaps somewhat better. But the Navy yard (Portsmouth) boats are far superior to the others, particularly in the interiors. In the S-3 to S-9 (Portsmouth-built boats) there is full evidence of careful design by personnel that know what is best, followed by good workmanship, everything being done in a painstaking manner.¹²²

In addition to the high quality of design noted by the trial board, the Chief of Naval Operations annual report for 1923 reported that, "Analysis of results obtained shows beyond question that submarines can be more economically and expeditiously overhauled at Portsmouth than at any other east coast yard within the limitation of size of yard

¹²² Quoted in *Portsmouth Herald*, 23 April 1942, "Portsmouth Won Fame with First Sub It Built, Has Kept Proud Record," 1.

force.”¹²³ Recognition for high quality, low cost, and short building periods reinforced the navy’s plan to develop an in-house submarine design and construction capability at Portsmouth Navy Yard during the 1920s.

Building on the reputation it had earned with the S-class submarines, the yard was awarded seven V-class submarines that were delivered between 1924 and 1932. These large submarines, the first to be given names of fish, were 381 feet in length with a complement of about 100 men and officers. The V-class program expanded the yard’s submarine design expertise at a time when the navy was ignoring private industry. This workload carried the yard from the S-class program until the award of the two NIRA submarines, *Porpoise* and *Pike* that began the revitalization of submarine construction in 1933.

While Portsmouth Navy Yard was assigned more than its fair share of new submarine construction in the 1920s, the yard by no means was able to specialize in new construction. For example, in 1921, the yard completed one submarine (S-9), launched three more (S-11, 12, and 13), and laid the keels for three others (V-1, V-2, and V-3), but the yard also repaired 11 submarines, 10 destroyers, 1 hospital ship, 2 cargo vessels and 1 Coast Guard ship. Likewise, the yard remained primarily a repair and overhaul yard in the late 1920s and early 1930s. The yard worked on 22 submarines and two submarine tenders in 1928, six S-Class submarines and three R-Class submarines in 1931, eight S-Class submarines in 1932, and 7 R-class submarines and two tenders in 1933.¹²⁴ Repair

¹²³ David F. Boyd, “Continuation of Preble’s History of the United States Navy Yard, Portsmouth, N.H. Covering the Years 1875-1930,” Maine Room, Rice Public Library, Kittery, Maine.

¹²⁴ Industrial Manager’s Annual Reports for 1928-1934. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 22, Folder A9-1/NY1, “Annual Reports Commandant First Naval District 1925-34.” The annual overhaul numbers are for fiscal years beginning 1

and overhaul work, often chaotic, unpredictable, and difficult to schedule, was a large part of the yard's workload. Given a choice, Portsmouth Navy Yard preferred the orderliness and discipline of a submarine new construction program over other work.¹²⁵

While Portsmouth was receiving favored treatment from the U.S. Navy in the 1920s, the private submarine construction shipyards, Electric Boat Company and Lake Torpedo Boat Company, were neglected by the U.S. Navy and struggled to remain open. Electric Boat continued to build submarines after World War I at a reduced rate, to complete contracts received during the war, delivering the last submarine in 1925. However, the United States Navy awarded Electric Boat no new submarine contracts between 1918 and 1931, when it was awarded the USS *Cuttlefish*. By the time of the *Cuttlefish* award in 1931, Electric Boat employment had dropped to 200 men.¹²⁶

Electric Boat Company survived during the 1920's by completing 32 cargo ships, which were still under contract at the end of World War I, and taking on miscellaneous work including the overhauling of thirty "S" Class submarines, the building of pleasure craft, ferries, tow boats, and trawlers, and the construction of four submarines for the

July. For example, the 1928 numbers are for 1 July 1927 to 1 July 1928. The Industrial Manager's annual reports for 1929 and 1930 provide no numbers and only indicate routine repairs accomplished on submarines.

¹²⁵ Navy policy statements for 1934 designated Portsmouth Navy Yard as a submarine construction shipyard and emphasized that it was "not contemplated to overhaul vessels at the Yard." See Assistant Secretary of the Navy Henry Latrobe Roosevelt letter of 3 May 1934 to Commandant Portsmouth Navy Yard, etc. NARA Waltham, RG 181, 1930-1950, Portsmouth Naval Base General Correspondence, Box 1, Folder A1, "New Construction 27 Sep 1932 to 29 May 1940." Despite this policy statement, a lot of overhauls were assigned to Portsmouth Navy Yard. All the other government yards, according to the policy statements for each, were to be involved with multiple ship types and workloads.

¹²⁶ "History of Electric Boat, 1899-1949," Chapter IV, 1-18, Navy Department Library, Naval Historical Center, Washington, D.C. Navy Department Library, Naval Historical Center, Washington, D.C.

Peruvian Navy.¹²⁷ The Lake Torpedo Company, however, folded in 1924 for lack of submarine work.

Submarine construction began to pick up in 1933 when Portsmouth and Electric Boat were each awarded contracts for two NIRA submarines. The trend towards increased submarine construction continued with the Vinson-Trammell Act of 1934 that guaranteed both yards sufficient submarine new construction for many years in the future.¹²⁸ The passage of the Vinson-Trammell Act marked a departure from the nation's strong commitment to disarmament and the end of the decline of the U.S. Navy. The rebuilding of the fleet was to include submarines, which had survived international attempts to limit their use as weapons of war since World War I. When the submarine building program was renewed in 1933, Portsmouth Navy Yard had enjoyed fifteen years of steady workload and stable employment whereas most of the other yards had experienced fifteen years of turmoil. With this in mind, it is not surprising that Portsmouth performed well on submarine contracts throughout the 1930s.

There was another important factor that contributed to the revitalized submarine construction program. The Navy, after extensive debate during the 1920s about how best to employ the submarine in battle, had decided on independent operations similar to the

¹²⁷ *Ibid.*

¹²⁸ The Vinson-Trammell Act provided for a significant increase to the fleet; one carrier, 99,200 tons of destroyers to replace overage destroyers, and 35,350 tons of submarines to replace overage submarines. The Act also limited private contractors to a 10% profit for any contract over \$10,000. See *United States Naval Administration in World War II, Bureau of Ships*, 1946, 6. The requirement to split construction between private and navy shipyards and the 10% cap on profits stemmed from the deep seated conviction by many that World War I had been precipitated by munitions makers as a business venture and that the United States federal government had been exploited for exorbitant profits by private industry.

German wolf-pack operations of World War I, instead of operating as a support element of a task force as had been the case for U.S. submarines during that war. Having redefined the submarine's tactical use, naval authorities could agree on the design characteristics needed to fill that role. Thus, when the nation's leaders decided to rebuild the fleet, the submarine force had a much better idea of what submarine they wanted to build. Designs could be standardized to a certain extent, multiple submarines of the same class design could be built, and the opportunities were increased for something other than custom-built submarines.¹²⁹

It is important to note that the naval officer who is given much of the credit for this change in submarine tactics, Commander Thomas Withers, is the same Rear Admiral Withers who commanded Portsmouth Navy Yard during World War II. According to naval historian Gary Weir:

The climax of this dispute [about how best to employ U.S. submarines in battle] occurred between 1928 and 1930, when Commander Thomas Withers, commanding officer of Submarine Division 4, with the support of the Naval War College and the Submarine Officer's Conference proposed imitating the offensive strategy and solo tactics employed by the Imperial Navy during the Great War. Only then did the major authorities begin to consider seriously the prospect of independent submarine operations and a vessel design suitable to the task.¹³⁰

During World War II, U.S. submarines used the tactics developed by Commander Withers and his supporters to win the war in the Pacific. Also during the war, Rear Admiral Withers, as Commandant of Portsmouth Navy Yard, played a critical role in

¹²⁹ In way of explanation for those unfamiliar with the generic submarine design process, the operators of submarines provide desired operating characteristics for a future submarine to a technical bureau for the development of technical specifications. Those specifications are then provided to a design shipyard for the production of drawings or, today, digitized information that can be used for production processes. One can not even proceed to the first step, identifying the desired submarine operating characteristics, if the ultimate use of the submarine is in doubt.

¹³⁰ Gary Weir, *Building American Submarines 1914-1940*, 114.

insuring that the submarines that Portsmouth Navy Yard sent to war incorporated the latest design characteristics needed to achieve their missions.

In September 1934, in accordance with existing legislation that required government yards to be assigned at least 50% of new construction submarines, the navy assigned SS179 and SS180 to Portsmouth, SS181 to Mare Island, and SS176, 177, and 178 to Electric Boat.¹³¹ Secretary of the Navy Claude A. Swanson outlined the Navy's policy for splitting naval construction between public and private shipyards in a September 1935 letter:

The policy of the Department in connection with new construction has been, in general, to follow the intent of Congress, as indicated in the so-called Dillinger Amendment to the cruiser bill. The intent was confirmed by the Vinson-Trammell Bill, and the present practice of the Department has been and is, in general, to follow a 50-50 division of classes of ships between navy yards and private yards.¹³²

In the same letter, Swanson let it be known that he was "not entirely satisfied with the progress being made on new construction at navy yards" and that it was his intent, beginning in 1935, to discontinue the 50-50 rule and award new construction to navy yards on a competitive basis with private shipyards.¹³³ Swanson considered new construction award policy to be his prerogative because, as he explained, "Beginning with the next fiscal year, there are no Emergency Funds for the construction of naval vessels, and the Department's appropriations will be obtained in the usual manner,

¹³¹ Bureau of Construction & Repair & Bureau of Engineering joint letter of 15 Sep 1934. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 1, Folder A1, "New Construction 27 Sep 1932 to 29 May 1940."

¹³² Secretary of the Navy letter of 16 Sep 1935. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 1, Folder A1, "New Construction 27 Sep 1932 to 29 May 1940."

¹³³ *Ibid.*

normally under [the classification of] Increase of the Navy.”¹³⁴ Secretary Swanson planned to manage the Navy’s funds in the best interests of the Navy, meaning contracts would be awarded on the basis of performance.

Portsmouth Navy Yard Commandant Rear Admiral C.P. Snyder passed Secretary Swanson’s challenge to the yard’s employees and urged them to continue to perform in a manner that would build on the shipyard’s excellent reputation and gain future contract awards. Snyder took the opportunity to emphasize time over cost, a strategy that prevailed throughout the 1930s and peaked during the war years:

The essence of a contract is cost and time. There is reason to believe that the Navy Department policy favors faster construction over time at slightly higher cost if necessary. A shorter construction period indicates increased efficiency and economy. . . The Navy Department desires speed in construction . . . It does not want excuses.¹³⁵

Clearly, Commandant Snyder saw a niche opportunity for his shipyard to develop a reputation for timely completions that would serve it well in years to come.

Portsmouth Navy Yard was more than up to Secretary Swanson’s challenge but, as it turned out, Swanson was premature in his assumption that he could institute pure competition between the private and public sector. His plans were foiled because the 1935 shipbuilding program was an extension of the Vinson-Trammell Act of 1934 that carried the requirement that “the first and each succeeding alternate vessel of each category . . . shall be constructed or manufactured in the government navy yards.”¹³⁶

¹³⁴ *Ibid.*

¹³⁵ Portsmouth Navy Yard Commandant Rear Admiral C.P. Snyder memo of 20 Sep 1935 to All Officers and Civilian Supervisors, Subject: The Navy Shipbuilding Program – Progress of. NARA Waltham, Portsmouth Naval Base General Correspondence, RG 181, Box 1, Folder A1, “New Construction 27 Sep 1932 to 29 May 1940.”

¹³⁶ Quoted in Michael West, “Laying the Legislative Foundation: The House Naval Affairs Committee and the Construction of the Treaty Navy, 1926-1934,” 542.

Even though Swanson was not able to institutionalize pure competition between public and private shipyards, Portsmouth Navy Yard management took every opportunity to cite the yard's outstanding performance as evidence of compliance with his mandate for improved performance by navy yards.¹³⁷

Having completed *Porpoise* 14 days ahead of schedule and *Pike* 17 days ahead of schedule, each \$550,000 under budget, Portsmouth pushed for the assignment of two more submarines under the Naval Appropriation Act of 1937. A 29 April 1936 letter from Commandant Greenlee highlighted the shipyard's commitment to Secretary Swanson's challenge for improved performance and clearly pointed out that Portsmouth deserved the work requested, because "This Yard feels that it has fully met the Secretary of the Navy's desires expressed in reference (a) [Swanson's letter of 16 Sep 1935] for the efficient, expeditious production of submarines."¹³⁸ In the same correspondence, Commandant Greenlee took the opportunity to push for a future workload that was devoid of overhauls, heavy with the construction of new submarines, and complimented with important submarine electrical work that had direct application to the submarines being built at the yard:

¹³⁷ At the time of Secretary Swanson's threat to tie future navy yard awards to performance, Portsmouth had two submarines on the waterfront being completed (*Porpoise* and *Pike*), two submarines on the ways under construction (*Plunger* and *Pollack*), and two submarines in the design stage. Commandant Rear Admiral C.P. Snyder's memo of 19 Sep 1935 made it clear to all shipyard officers and employees that future awards would depend on the shipyard's performance on the four submarines then at the yard. Snyder further emphasized that, "A continuation of the present construction program of two ships [submarines] a year is the criterion of this yard's success for the future." NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 1, Folder A1, "New Construction 27 Sep 1932 to 29 May 1940."

¹³⁸ Commandant Portsmouth Navy Yard letter of 29 Apr 1936 to Chief Bureau of Construction and Repair and Chief Bureau of Engineering. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 1, Folder A1, "New Construction 27 Sep 1932 to 29 May 1940."

The mission of this yard appears to be to build submarines, manufacture electrical fittings, and make repairs to submarine [main motor] armatures. It is not contemplated that vessels be overhauled at this Yard. *This Yard is interested in authorization for new construction of submarines only.*¹³⁹

Clearly, by 1936, it was the long term strategy of the management of Portsmouth Navy Yard to minimize all other types of work in order to protect its growing reputation for timely, high quality, submarine construction. More importantly, the office of the Secretary of the Navy supported the shipyard's desires to exclude or minimize overhauls in favor of new construction. The budget guidance promulgated by Secretary of the Navy Charles Edison, on 14 June 1937, indicated, for Portsmouth Navy Yard, that "it is not contemplated to overhaul vessels at this yard."¹⁴⁰ It was necessary to moderate this policy of excluding overhauls from Portsmouth Navy Yard in the years immediately preceding and during the war, however, the fact remains that, in the late 1930s, both the shipyard and the office of the Secretary of the Navy were dedicated to streamlining the shipyard, to the maximum extent possible, for the construction of new submarines.

By 1937, Portsmouth Navy Yard scheduled submarine overhauls for shorter durations than either Electric Boat or Mare Island, the only other shipyards involved with submarine overhauls. As of 1 July 1937, there were four submarines under construction at Portsmouth Navy Yard, six at Electric Boat, and three at Mare Island Navy Yard. The four Portsmouth submarines had contracted building periods of 27, 30, 30, and 27 months, individually adjusted to maintain a steady workload and stable workforce. The Electric Boat submarines were scheduled for durations that varied from 27 to 34 1/2

¹³⁹ *Ibid* (emphasis added).

¹⁴⁰ Secretary of the Navy Charles Edison letter of 14 Jun 1937, Subject: Policy for Industrial Navy Yard Budget 1939. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 1, Folder A1, "New Construction 27 Sep 1932 to 29 May 1940."

months, averaging 32 1/2 months, and all three Mare Island submarines were scheduled for building periods of 30 months.¹⁴¹ In 1937, Portsmouth not only scheduled submarine overhauls for shorter durations than the other yards, but the yard went on to deliver those submarines on or before the scheduled dates. In a letter dated 13 January 1939, Commandant Rear Admiral C. W. Cole alerted the Secretary of the Navy that, "For four years [1935 through 1938] the Portsmouth yard has consistently met or anticipated the completion dates of its ships under construction."¹⁴² While it is true that the Navy was not placing the urgency on short submarine construction durations in 1937 that it would a few years later, it was also obvious that Commandant Rear Admiral Cole and the management of Portsmouth Navy Yard were dedicated to continuing the yard's reputation as a high performing shipyard that had begun with the early deliveries of the NIRA submarines, *Porpoise and Pike*.

As requested, the Navy assigned Portsmouth Navy Yard an optimum workload of two submarines a year from 1934 through 1938.¹⁴³ Table 2 compares submarine new construction assignments at Portsmouth, Mare Island, and Electric Boat Company, the only shipyards involved with submarine construction immediately prior to World War II.

¹⁴¹ Annual Report of the Bureau of Construction and Repair for 1937. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 22, Folder A9-1/EN5, "Annual Reports Bureau of Yards and Docks, 1926-42."

¹⁴² Commandant Rear Admiral C. W. Cole letter of 13 Jan 1939 to Secretary of the Navy. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 20, Folder FS, "Ships 14 Nov 1925 to 15 Nov 1939."

¹⁴³ The Secretary of the Navy, impressed with Portsmouth's performance, assigned two submarines, USS *Sculpin* (SS191) and USS *Squalus* (SS192) under the 1937 appropriation, two more, USS *Searaven* (SS196) and USS *Seawolf* (SS197) under the 1938 appropriation, and two more, USS *Triton* (SS201) and USS *Trout* (SS 202) under the 1939 appropriation.

Table 2: Submarine New Construction Shipyard Assignments

	1934	1935	1936	1937	1938	1939
Portsmouth	2	2	2	2	2	3
Mare Island	1	1	0	1	1	1
Electric Boat		2	3	3	3	3

The submarine workload, as required by law, was evenly divided between public and private yards with Electric Boat getting all the private yard work. Electric Boat had reestablished itself as the preeminent private submarine yard by the mid-1930s, but with much less leverage over the Navy than it had enjoyed prior to 1920, as the result of Portsmouth's emergence as a submarine design yard. Portsmouth's increased design capability was the critical factor in the Navy's efforts to wrest control of submarine construction from private industry. According to Gary Weir:

Electric Boat would still play a vital role in the submarine construction program, but would now do so within the context of both the Navy's expertise in submarine technology and its substantial design and construction capability at Portsmouth. Hence from 1931 to 1940 teamwork with the Navy was EB's only option.¹⁴⁴

The eve of World War II found Portsmouth Navy Yard filling the lead submarine design role that the Navy had envisioned for it at the close of World War I.¹⁴⁵

¹⁴⁴ Gary Weir, *Building American Submarines 1914-1940*, 62-63.

¹⁴⁵ Portsmouth Navy Yard's design role had expanded even more in 1935 when the yard was funded for the "preparation and reproducing of working and finished plans, ordering materials, preparing war plans and booklets of general information, planning and clerical work" to support Mare Island Navy Yard for the construction of submarines SS 185, 186, and 187. See Commandant Portsmouth Navy Yard letter of 8 Jun 1940 to Commandant Mare Island Navy Yard. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 18, Folder S-1, "Design of Vessels, Specifications, Plans, etc. (1925-1947)." Portsmouth Navy Yard continued to expand its role as lead design yard for Mare Island Navy Yard such that by 1940 much "Portsmouth procured material" was being pushed to Mare Island for submarine construction. Shortly after the war started, Portsmouth provided the same lead yard service for Cramp Shipbuilding Company of Philadelphia, Pa. to support the submarine contracts that had been awarded to that company. See Commandant Portsmouth Navy Yard letter of 20 Jun 1942 to Cramp Shipbuilding Company and Commandant Portsmouth Navy Yard letter of no date in 1942 (probably 13 Nov 1942) to Cramp Shipbuilding Company. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 18, Folder S-1, "Design of Vessels, Specifications, Plans, etc. (1925-1947)." Electric Boat provided similar submarine design support for Manitowoc Shipbuilding Company in Wisconsin during the war.

In 1937, there was little or no emphasis from the Navy Department on the upgrading of facilities that would be needed to achieve shorter building periods. This began to change in the summer of 1938, when an enlarged shipbuilding program created the need for increased building rates, improved facilities and increased employment. In June 1938, the Secretary of the Navy advised the navy yards that, due to increased shipbuilding programs, layoffs were undesirable and a substantial increase in employment was expected at navy yards, during 1939, which was expected to continue until peaking in 1942.¹⁴⁶

Responding to the Secretary's directive, Commandant Rear Admiral C.W Cole noted that "this navy yard has reached a very desirable stability of labor employment."¹⁴⁷ Furthermore, if consideration was being given to increasing Portsmouth's workload to three submarines a year, this rate "could not be effective until after the building ways are completed next year."¹⁴⁸ The building ways under construction were needed to replace those lost in the Franklin House fire of 1936.¹⁴⁹ Although not an active building site when it burned, the shipyard's urgent need for building ways at the onset of World War II

¹⁴⁶ Secretary of the Navy letter of 24 Jun 1938. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 1, Folder A1, "New Construction 27 Sep 1932 to 29 May 1940."

¹⁴⁷ Commandant Portsmouth Navy Yard letter of 10 Aug 1938 to Assistant Secretary of the Navy (Shore Establishments Division). NARA Waltham, RG 181, Box 1, Folder A1, "New Construction 27 Sep 1932 to 29 May 1940."

¹⁴⁸ *Ibid.*

¹⁴⁹ Increased ship construction during the Civil War and the need for weather protected ship construction facilities resulted in "Ship Houses" strategically located on the waterfront so that ships could be constructed and launched – even in the harshest of New England winters. The largest Shiphouse was the Franklin House, which was one of the largest (240' x 131' x 72') wooden structures in the United States at the time. The shipyard's first submarine (L-8) was launched from the Franklin Shiphouse in 1917. The structure burned to the ground on 10 March 1936 in a few hours in one of the most spectacular fires ever seen in the Seacoast area.

would have been less critical had the Franklin House been available.¹⁵⁰ In the summer of 1938, when consideration was being given to increasing the yard's workload from two to three submarines a year, that plan had to be put on hold for lack of a building way.

While Portsmouth Navy Yard was completing submarines ahead of schedule, other yards were having great difficulty completing ships on time. For example, in August 1938, the Bureau of Construction and Repair, in noting the yard's outstanding performance relative to contracted delivery dates, wrote, "The ability of the Portsmouth Yard to meet its completion dates has in recent years been amply demonstrated by the excellent and unique record established of meeting every contract date of delivery."¹⁵¹ A few months later, Secretary of the Navy Claude A. Swanson wrote that shipbuilding delays were "a matter of grave concern"¹⁵² and that the situation was "decidedly unsatisfactory."¹⁵³ Swanson was especially disturbed about destroyers, under construction in navy yards, whose completion dates had been extended to 44 months and were now in jeopardy of taking even longer.

Commandant C.W. Cole took advantage of the situation and responded to Secretary Swanson's concern about shipbuilding delays, on 11 January 1939, with a letter that advertised Portsmouth Navy Yard's recent accomplishments, rescheduled three additional submarines for early completions, and suggested that Portsmouth should not be

¹⁵⁰ Oral interview with Fred White, 3 April 2006, at his home in New Castle, N.H.

¹⁵¹ Bureau Construction & Repair and Bureau of Engineering joint letter of 10 Aug 1938 to Secretary of the Navy. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 1, Folder A1, "New Construction 27 Sep 1932 to 29 May 1940."

¹⁵² Secretary of the Navy letter of 30 Dec 1938 to Chiefs of Bureaus and Continental Shipyards. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 20, Folder FS, "Ships, Nov 1925 to 15 Nov 1939."

¹⁵³ *Ibid.*

grouped with those yards having problems meeting scheduled completion dates. Cole noted:

This yard has consistently met or anticipated its completion dates on new construction during the past four years. . . With close attention to detail, cooperation of all hands, and Portsmouth Navy Yard's established skillful workmanship, the new dates can be met, and the shipbuilding record continued that is unequalled elsewhere in this country.¹⁵⁴

During the late 1930s, Commandant Rear Admiral C.W. Cole and his management team conducted a justified self promotion public relations program that emphasized the yard's superior performance and solicited a continued optimum workload of two, or possibly three submarines a year.

Portsmouth had been on a five year roll of early deliveries when disaster struck with the sinking of the *Squalus* on 23 May 1939. The submarine sank off the Isles of Shoals, while on routine sea trials, with the loss of 26 officers and men, when the main induction valve failed to close on a dive. While the subsequent investigation failed to establish conclusively why the large valve failed to close, operator error was suspected. Features were incorporated into future submarine designs to preclude similar operator error but, in the meantime, five years of superlative shipyard performance had been instantly compromised with the sinking of the *Squalus*. Thirty-three survivors were brought to the surface on 25 May 1939 in a remarkable rescue operation and the submarine was eventually raised on 13 September 1939.¹⁵⁵

¹⁵⁴ Commandant Portsmouth Navy Yard Rear Admiral C.W. Cole letter of 11 Jan 1939 to Secretary of the Navy. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 20, Folder FS, "Ships 14 Nov 1925 to 15 Nov 1939."

¹⁵⁵ For accounts of the *Squalus* recovery see Richard E. Winslow III, *Do Your Job: An Illustrated Bicentennial History of the Portsmouth Naval Shipyard, 1800-2000* (Portsmouth: Portsmouth Marine Society, 2000), 139-140 and *Portsmouth-Built: Submarines of the Portsmouth Naval Shipyard*, Portsmouth,

On 9 June 1939, Commandant Rear Admiral C.W. Cole advised the Secretary of the Navy Claude A. Swanson that any further accelerated completion dates for submarines under construction at Portsmouth “have been compromised by the sinking of the *Squalus* and the large volume of work incident to her rebuilding.”¹⁵⁶ While in the throes of rebuilding *Squalus*, Portsmouth Navy Yard was requested to define its needs in order to increase annual production of submarines to three or four annually, with durations of between twenty-two and twenty-six months.¹⁵⁷ Commandant Rear Admiral C.W. Cole’s response identified the shipyard’s additional needs to include a fourth building way, increased officer personnel, improved component deliveries from suppliers, and additional housing for the increasing numbers of civilians and military personnel. Resuming the yard’s self-promotion program, the commandant once again took the opportunity to highlight the shipyard’s consistently excellent performance, despite the *Squalus* setback:

The force is being increased gradually from the present yard force of about 3900 to about 4800 to meet the requirements for reconditioning the *Squalus* and the construction of the *Marlin* which are in excess of the standard

N.H.(Portsmouth Marine Society, 1985), 64-66; *Portsmouth Herald*, 23 May-5 Jul 1939; Nathaniel Barrows, *Blow All Ballast! The Story of the Squalus* (New York: Dodd, Mead, 1940); Carl LaVo, *Back from the Deep: The Strange Story of the Sister Subs Squalus and Sculpin*. (Annapolis: Naval Institute Press, 1988) and recorded eye witness testimonies at Cummings Library and Archives, Strawberry Bank Museum, Portsmouth, N.H., MS 96 Portsmouth War Records, Box 1, Folder 3. “U.S. Navy Yard.” On 29 June 1941 with the shipyard ramp-up nearing its peak, the yard had to deal with another submarine sinking. The submarine O-9 sank off Portsmouth Harbor on a test dive shortly after its arrival from New London, Ct. just two years after the *Squalus* disaster. Unlike the *Squalus*, recovery operations were impossible because the O-9 sank in 370 feet of water as opposed to the 200 feet of water in which *Squalus* had sunk. Thirty-three men were lost on O-9. See Portsmouth War Records, Cummings Library, Strawberry Banke Museum, MS 96 Box 1, Folder 19, “Harbor Defense.”

¹⁵⁶ Commandant Portsmouth Navy Yard letter of 9 Jun 1939 to Secretary of the Navy. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 1, Folder A1, “New Construction 27 Sep 1932 to 29 May 1940.”

¹⁵⁷ Bureau Construction & Repair and Bureau of Engineering joint letter of 28 Nov 1939 to Commandant Portsmouth Navy Yard. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 1, Folder A1, “New Construction 27 Sep 1932 to 29 May 1940.”

program of two submarines a year. In addition, the *Searaven* was completed one and a half months prior to her official completion date . . . *Seawolf* is scheduled for a similar advance. . . *Triton* and *Trout* are scheduled for completion three months in advance of their scheduled completion dates. . . *Grayling* and *Grayback* are being scheduled for completion in twenty-two and twenty-five months instead of the twenty-five and twenty-nine months now officially set as their building period. . . These modifications of building periods are being made to meet the Secretary of the Navy's directives to speed up new construction and also to permit the yard to undertake without loss of time, the new enlarged program expected to be authorized by the next Congress.¹⁵⁸

With the war raging in Europe, Portsmouth was no longer being thought of as a two submarine a year shipyard. In early 1940, studies were setting goals of three or four submarines a year, still a modest increase over past performance and nothing like the production that would follow in a few years.¹⁵⁹

By late 1940, the Seventy Percent Expansion Act¹⁶⁰ had greatly accelerated the Navy's shipbuilding program, and the Bureau of Yards and Docks was urging shipyards

¹⁵⁸ Commandant Portsmouth Navy Yard letter of 28 Dec 1939 to Bureau Construction & Repair and Bureau of Engineering, NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 1, Folder A1, "New Construction 27 Sep 1932 to 29 May 1940."

¹⁵⁹ Portsmouth Navy Yard had made remarkable progress in submarine building techniques and processes between 1934 and 1940. The time from the laying of the keel to completion had been reduced from twenty-six months on the *Porpoise* to sixteen months on the *Seawolf*. Most of that schedule improvement had been gained on the building ways prior to launching, where *Porpoise* had spent nineteen months as compared to ten months for the *Seawolf*. The submarine must remain on the building ways until it is watertight and all the exterior hull and ballast tank construction work is completed, as those areas are inaccessible once the submarine is waterborne. The yard's continuous improvement in the construction, preassembly and joining of pressure hull cylinders during the late 1930s permitted the significant reduction in the time needed on the building ways. See Bureau Construction & Repair and Bureau of Engineering joint letter of 16 Mar 1940. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 1, Folder A1, "New Construction 27 Sep 1932 to 29 May 1940." On 16 March 1940, Portsmouth was assigned three submarines under the 1941 appropriation act. All of this is to highlight the fact that, immediately prior to the war, Portsmouth Navy Yard had been a two-submarine-a year yard since 1934 and consideration was being given at the highest levels of the navy to increasing production to three or four submarines a year – certainly nothing like 32 in '44.

¹⁶⁰ The Naval Expansion Act of 19 July 1940 (also known as the 70 Percent Act or Two Ocean Navy Act) authorized increasing the fleet by 1,325,000 tons, including aircraft carriers (200,000 tons),

to pull out all the stops to accelerate the completion of public works projects needed to support that accelerated building program. At the same time, there was debate within the Navy as to whether the construction of new ships and submarines should be concentrated in public or private shipyards. As a general rule, the Secretary of the Navy and the technical bureaus, since 1920, had moved in the direction of increasing support for submarine construction in public yards so as to regain the production and technical control of submarine construction that private industry had assumed during World War I. With war on the horizon, the Chief of Naval Operations became increasingly concerned about the maintenance of the rapidly expanding fleet, which he considered to be the primary responsibility of the navy yards. In April 1941, the fleet overhaul plan of the Chief of Naval Operations included the requirement to "Assign submarines in the Atlantic for overhaul at the Navy Yards Portsmouth and Philadelphia."¹⁶¹ The Chief of Naval Operations, in a letter to the newly formed Bureau of Ships, made his position clear that maintenance and overhauls should have precedence in navy yards and new construction should have precedence in private yards.¹⁶² Rigid adherence to such a policy for submarines would have scuttled many of the new construction initiatives and organization that had been put in place at Portsmouth between 1935 and 1940. Despite the concerns of the Chief of Naval Operations, the Secretary of the Navy continued to

cruisers (420,000 tons), destroyers (250,000 tons), submarines (70,000 tons), and capital ships (385,000 tons). See <http://www.history.navy.mil/faqs/faq59-21.htm>.

¹⁶¹ Chief of Naval Operations letter of 8 Apr 1941 to Commandants Navy Yards, etc., Subject: Schedule of Proposed Availability for Ships at Navy Yards. NARA College Park, RG 24, Bureau of Naval Personnel General Correspondence 1941-45, Box 1601, Folder NY 166-176.

¹⁶² Chief of Naval Operations letter of 10 Oct 1940. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 1, Folder A1, "New Construction 1941-1943."

assign the shipyard unprecedented numbers of contracts for new submarines that required the continued development of Portsmouth's new construction capabilities.¹⁶³

On the eve of entry into the war, in the summer of 1941, the shipyard remained protective of its position as a new construction shipyard.¹⁶⁴ But British submarines had begun to find their way to the shipyard for overhauls, with priorities assigned by the Chief of Naval Operations that were ahead of new construction. In September, after having experienced a few British submarine visits and while in the throes of a much larger work package than expected on the Free French submarine *Surcouf*, Portsmouth prompted the Bureau of Ships to advise the Chief of Naval Operations that "new construction is being hurt by maintenance work."¹⁶⁵ The yard took a big step towards the new construction specialization it desired, in early 1942, when the last of the British submarines left Portsmouth and the United States Navy began deferring submarine overhauls to maximize the number of submarines on war patrols. As the result of its own

¹⁶³ During the early stages of the war when Portsmouth was completing Dry Dock #1 as quickly as possible with intentions to build two or three submarines simultaneously from that dock, the Chief of Naval Operations expressed concern about the lack of availability of the dry dock should it be needed for emergency submarine repairs. It was not until the dock was nearing completion in December 1942 that the Chief of Naval Operations approved the dock's use for new construction. See Commandant Portsmouth Navy Yard letter of 7 Dec 1942 to Vice Chief of Naval Operations. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 1, Folder A1, "New Construction 1941-1943."

¹⁶⁴ The shipyard was even more convinced of the desirability of new construction work over the repair of older submarines after recommissioning three old V-type submarines, *Bass*, *Barracuda*, and *Bonita*, in September 1940. The submarines had been towed from the moth ball fleet in Philadelphia to the shipyard in June 1940. According to the shipyard's self-history, "These ships were of an obsolete design and preservation methods at the time of their decommissioning did not meet present standards. Consequently, an exorbitant amount of time and money was used in an attempt to repair and modernize them." *Administrative History: Portsmouth Naval Shipyard during World War II*, 1. Needless to say, this type of work was not consistent with management's vision of streamlined shipyard operations for the production of new submarines. Indeed, the nation's interests, and the shipyard's efforts, would be better served by building new submarines than attempting to refurbish and modernize the outdated V-type submarines. That said, some V-type submarines were deployed early in the war.

¹⁶⁵ Bureau of Ships letter to Commandant Portsmouth Navy Yard of 11 Sep 1941. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 43, Folder EF13/L9-3, "British Empire - Alterations, Repairs, Overhauls, 1926-42."

self-advertising campaigns and the fortunes of war, the U.S. Navy gave Portsmouth Navy Yard large orders for new submarines and the yard acquired the new submarine construction specialization that it had long desired.

CHAPTER III

RAMP-UP

“We have drawn the sword, that sword will not be returned to its scabbard until our enemy who would destroy liberty, have been themselves destroyed. Under these grim conditions which call forth our resolution, our outrage, and our spirit of self-sacrifice we face unafraid those dangers that lie ahead.”

**Secretary of the Navy Frank Knox
Washington D.C. ALNAV 1
1 January 1942**

This is a “nuts and bolts” chapter that accounts for most of the infrastructure construction that occurred at the yard during the war. It fits well, chronologically, between the prewar issues presented in the last chapter and the next two chapters that analyze the shipyard operations during the war because almost all the construction of facilities took place immediately prior to, or at the start of, the war. The shipyard’s ramp-up of facilities was steep and successful. The shipyard could not have performed as it did without the critical upgrades described in this chapter.

The need for the steep ramp-up of facilities can be traced back to the nation’s reluctance to shed its strong stance on neutrality during the late 1930s and a general belief that preparations for war might, in fact, precipitate war. Historian Robert Dallek wrote that “Roosevelt [in late 1939] resisted pressure for substantial increases in national defense forces and rapid industrial mobilization. . . fearful that these actions would

agitate suspicions about his peaceful intentions and make any neutrality change appear as a step towards war”¹. In January 1940, when President Roosevelt did seek to increase the total national defense appropriation from \$1.5 billion to \$1.8 billion for the 1941 fiscal year, Congress “whittled away, even at that modest sum.”² In addition, historian David M. Kennedy wrote that, “The Nye Committee’s sensational accusations of World War I profiteering left many corporations gun-shy [as late as January 1940] about accepting orders for armaments.”³ Five months later, the fall of France and the Dunkirk evacuation motivated the passage of the first of the naval expansion acts that signaled an end to Congressional whittling of defense budgets and corporate reluctance to accept armament orders.

When pleading for passage of the increased naval appropriation bills in 1940, Chief of Naval Operations Admiral Harold Stark warned Congressmen that “Dollars cannot buy yesterday.”⁴ Yet, that is exactly what the nation’s shipyards did during the eighteen months preceding the attack on Pearl Harbor. In an unprecedented burst of industrial activity, the shipyards bought back two decades of fiscal neglect with the expeditious completion of facilities needed to launch previously unimagined numbers of ships and submarines.

Twenty-one million dollars of infrastructure upgrades were authorized for Portsmouth Navy Yard between June 1940 and December 1941, and another \$1 million was authorized for upgrades in January 1942. Of the twenty construction contracts that

¹ .” Robert Dallek, *Franklin D. Roosevelt and America Foreign Policy, 1932-1945*, 224.

² David M. Kennedy, *Freedom from Fear*, 431.

³ Ibid.

⁴ Quoted in Samuel Eliot Morrison, *History of U.S. Naval Operations in World War II* (Boston: Little Brown, 15 vols., 1947-1962), 30.

totaled \$22.23 million, only one contract of \$32,000 dollars was awarded after December 1942. After two decades of neglect, the shipyard infrastructure was transformed almost instantaneously as the funding flood gates were opened and contracting rules were greatly relaxed to accelerate mobilization.

The ramp-up in facilities at Portsmouth Navy Yard during the eighteen months preceding Pearl Harbor was by no means unique. According to the Bureau of Yards and Docks World War II Administrative History:

The public works programs at these yards [navy yards], during the last eighteen months of peace was concentrated on providing, with the utmost dispatch, the vast expansion of facilities for the effective accomplishment of this Herculean task [building the two-ocean navy]. . . . When the war came, substantial progress had been made by the Bureau and its field forces in the execution of this work, for which \$350,000,000 had been made available. Many individual projects were already complete by December 7, 1941, well ahead of schedule. Their early availability contributed significantly to the rapid mobilization of the fleet and the speedy conversion of merchant vessels taken over by the Navy.⁵

Large facility upgrades were underway at all navy yards and many private shipyards at the same time that Portsmouth Navy Yard was undergoing a tremendous expansion of facilities.⁶

At Mare Island, the other navy yard building submarines, a large dry dock was under construction that would give the yard a total of four dry docks, as well as four additional building ways, increasing the total to eight. More remarkably, the shipyard's acreage would increase from 635 acres to 1500 acres, including much reclaimed land,

⁵ *United States Naval Administration in World War II Bureau of Yards and Docks Volume I*, 172. Navy Department Library, Naval Historical Center, Washington, D.C.

⁶ Frederick C. Lane, *Ships for Victory: A History of Shipbuilding under the U.S. Maritime Commission in World War II* is a classic summary of commercial shipbuilding during World War II that includes considerable discussion of the mobilization of private shipyards. Other mobilization sources include Robert Connery, *The Navy and the Industrial Mobilization in World War II* and Keith E. Eiler, *Mobilizing America: Robert P. Patterson and the War Effort 1940-1945*.

during the war years.⁷ At the only private submarine shipyard, Electric Boat, expansion was also the order of the day. In early 1942, the North and South Yards of the Electric Boat plant were expanded and a total of eleven building ways were installed at a cost of nearly \$5,000,000. A little later, the Groton Iron Works was purchased for the company by the Navy and ten more ways were set up. The Navy appropriated \$9,500,000 for this construction. This new yard, the Victory Yard, was opened July 22, 1942.⁸

Thus, the building boom that Portsmouth Navy Yard experienced in 1941 and 1942 was duplicated at numerous shipyards on both coasts. As compared to 1933, when only six private yards and eight navy yards remained in operation, “By December 1941, the number of yards engaged in new construction has expanded to 156 and those concerned with conversion and repair had expanded to 76.”⁹ The story of the Portsmouth ramp-up that follows must be multiplied dozens of times to get a sense of the nation’s rush to build the long-neglected shipyard facilities that were going to be needed to build the fleet that would be needed to win the war.

The national ramp-up escalated with each passing German advance in Europe. The President declared a limited national emergency on 8 September 1939, when Germany began aggressive actions in Eastern Europe, an unlimited emergency on 27

⁷ *Ibid*, 178.

⁸ John D. Horn, “Submarines and the Electric Boat Company,” Navy Department Library, Naval Historical Center, Washington, D.C. Navy Department Library, Naval Historical Center, Washington, D.C., 92.

⁹ *United States Naval Administration in World War II, Bureau of Ships*, Navy Department Library, Naval Historical Center, Washington, D.C. Navy Department Library, Naval Historical Center, Washington, D.C., 132.

May 1941 as events in Europe heated up even more, and, of course, war began on 7 December 1941. This twenty-seven month period was a time of great turmoil and transition as the nation turned, somewhat reluctantly, from neutrality and hopes for world peace, to full mobilization for war. It was also a time of great change and adjustment in the Navy Department and the navy yards.

The fall of France in June 1940 accelerated the move towards naval rearmament. The 11 per cent Naval Expansion Act was signed on 14 June 1940 and a month later the 70 per cent Naval Expansion Act was signed on 19 July 1940.¹⁰ To further complicate matters, the leadership of the Navy transitioned midway between the two Naval Expansion Acts. On 11 July 1940, Frank Knox became the Secretary of the Navy and, a month later, James Forrestal became Under Secretary of the Navy.¹¹ Thus, this period brought new naval leadership and a surge of new contracts for naval ships and facilities unlike anything ever seen before. Historian Robert Connery wrote:

In the pre-war years of peace the Navy's chief problem was to obtain dollars with which to purchase manpower, munitions, ships, and bases. . . . When the war came, and even to some extent before December 7, 1941, Congress voted huge sums of money without question. The House of Representatives, in one instance during the war, passed a 32 billion dollar appropriation bill in twenty minutes without debate and without a single question from the floor.¹²

¹⁰ The Naval Expansion Act of 14 June 1940 (11 Percent Act) authorized increasing the fleet by 242,000 tons. See <http://www.navalhistory.net/WW2USN194006.htm>. The Naval Expansion Act of 19 July 1940 (also known as the 70 Percent Act or Two Ocean Navy Act) authorized increasing the fleet by 1,325,000 tons including aircraft carriers (200,000 tons), cruisers (420,000 tons), destroyers (250,000 tons), submarines (70,000 tons), and capital ships (385,000 tons). See <http://www.history.navy.mil/faqs/faq59-21.htm>.

¹¹ Robert Dallek says that President Roosevelt "brought Henry Stimson and Frank Knox, two of the country's most pro-Allied Republicans, into his Cabinet as Secretary of War and Secretary of the Navy, respectively. Replacing the two most isolationist members of his Cabinet, Harry Woodring and Charles Edison, the appointments were not only a fresh demonstration to London of Roosevelt's intentions, but also an attempt to create a bipartisan consensus for all aid to Britain short of war and strengthen his bid for another presidential term." Robert Dallek, *Franklin D. Roosevelt and America Foreign Policy, 1932-1945*, 232.

¹² Robert Connery, *The Navy and the Industrial Mobilization in World War II*, 293.

The accelerating pace of naval mobilization continued in 1941 as the nation's shipbuilding and other industries were flooded with orders for armaments. According to Connery:

The year 1941, opening with the Battle of Britain, proved to be a challenging one for the United States Navy. Hundreds of millions of dollars had been voted by Congress in 1940 for a vast Naval expansion program. . . The new year was to test whether the Navy's administration organization would be able to turn these dollars into weapons of defense.¹³

Understanding how Portsmouth Navy Yard coped with this challenge, and ramped up so quickly to turn dollars into submarines, requires an understanding of how the shipyard analyzed its needs and turned the sudden funding bonanza into the facility and personnel resources needed for increased production.¹⁴

The ramp-up of facilities and employment started seriously in the summer of 1940 and continued well into 1942. After 7 December 1941, a fear of enemy attack accompanied the increased activity and building at the yard. On the day before Christmas 1941, the Industrial Officer, Captain H.F.D. Davis, reminded his employees that any attack would most likely come on a Sunday or holiday so workers should be especially

¹³ *Ibid.*

¹⁴ Gary Weir notes in "Mobilization, Expansion, Integration Building American Submarines 1940-43," Naval Historical Center's <http://www.history.navy.mil/colloquia/cch5d.htm> that "The same summer [1940], the Navy Department responded to increased demand by building upon the foundation of vast experience available at Portsmouth Naval Shipyard and Electric Boat. To amplify the Navy's effort at Portsmouth, the Bureau of Ships (BUSHIPS) expanded the services at Mare Island Naval Shipyard and reintroduced Cramp Shipbuilding of Philadelphia to submarine construction. Both of these yards would take technical direction from Portsmouth." Becoming the lead Design Yard for Mare Island and Cramp Shipbuilding during the war entailed another ramp-up of design and technical resources that is beyond the scope of this study.

vigilant on those days.¹⁵ The Commandant likewise reminded his managers in February 1942 that, “The Axis Governments have used bombs ranging from 100 to 3000 pounds in their attacks on England,” and, consequently, “vessels in the yard should be berthed singly if possible, and as widely dispersed as feasible, commensurate with dock space available and repair facilities along the docks.”¹⁶ In the early months of the war, it was uncertain at best if the rapidly expanding war in Europe could be contained to that continent and the Atlantic Ocean. It was in this highly charged and threatening environment that Portsmouth Navy Yard set out to achieve unprecedented submarine production.

Facilities Ramp-up

In December 1939, just two years prior to Pearl Harbor, the Bureau of Construction and Repair asked Portsmouth Navy Yard to identify what additional facilities, if any, would be needed for the yard to build three or four submarines annually, for a total of eighteen, finishing in 1946.¹⁷ Portsmouth’s response cited the need for a fourth building way, a vastly upgraded machine shop, and other miscellaneous needs, including the continuation of the conversion of the shipyard from DC to AC power.¹⁸ Until 1940, the shipyard was supplied with direct current electrical power only. The

¹⁵ Industrial Officer memo of 24 December 1941 to Shop Masters. NARA Waltham, RG 181, Portsmouth Naval Yard General Correspondence (Central Files), Box 14, Folder A3-2/LC Pkg #6, “Orders to Shop Foremen.”

¹⁶ Commandant Portsmouth Navy Yard John D. Wainwright memo of 5 Feb 1942 to Manager and Captain of the Yard. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 18, Folder S-7, “Docking – General.”

¹⁷ Chief of Bureau of Construction and Repair letter of 28 Nov 1939 to Commandant Portsmouth Navy Yard. NARA Waltham, RG 181, Portsmouth Naval Yard General Correspondence (Central Files), Box 1, Folder A1/Y1, PKG 1, “Local Development Boards.”

¹⁸ Commandant Portsmouth Navy Yard letter of 28 Dec 1939 to Chief Bureau of Construction and Repair. NARA Waltham, RG 181, Portsmouth Naval Yard General Correspondence (Central Files), Box 1, Folder A1/Y1, PKG 1, “Local Development Boards.”

conversion to AC was needed to more efficiently supply the greatly increased electrical loads that accompanied the increased facilities. Funding was quickly provided to get started on these upgrades and, in June 1940, Portsmouth was authorized to construct eight submarines with building periods ranging from 21 to 38 ½ months. The activity at Portsmouth Navy Yard increased in the summer of 1940, but production expectations for the yard remained low compared to the building rates that would be achieved just two years later.

The increased activity at the yard in the summer of 1940 was highlighted by a presidential visit on Saturday, 10 August 1940. President Franklin Delano Roosevelt and Secretary of the Navy Frank Knox were escorted by 10 motorcycle officers of the New Hampshire State Police, and a dozen others of the Maine State Police, in a parade of 31 cars from the Portsmouth train station to the shipyard, where the presidential party met



Figure 7: President Roosevelt Touring Yard (August 1940). Courtesy of Milne Special Collections, University of New Hampshire, Durham, N.H.

briefly with the commandant, department heads, and others, followed by a short tour of the yard. During the tour, several stops were made to inspect work, ships, and shops, but the President did not leave his car. The President is shown greeting his son upon his arrival at the shipyard in Figure 7. At the completion of the tour, the President boarded his barge *Potomac*, which had docked at the yard the previous evening, and sailed for the Boston Navy Yard. The President boarded his yacht just 55 minutes after he had arrived at the train station and just 40 minutes after passing through the shipyard main gate. The President did not see much shipyard activity during the expedited visit because the yard had been closed at 7:30 am that Saturday morning to all but selected employees and visitors.¹⁹ As short as it was, the visit was an important reminder to shipyard employees that the Navy's expectations of them were on the rise. In August 1940, the Portsmouth Navy Yard was the recent recipient of orders for eight submarines, millions of dollars for facility upgrades, and a visit from President Roosevelt. The ramp-up had started, but few at the time appreciated where it would lead them.

In October 1940, the Chief of the Bureau of Yards and Docks urged the navy yards to take all measures possible to accelerate the completion of the public works projects in view of "the recent developments in the international situation."²⁰ With the fall of France, it looked like it was only a matter of time until Great Britain was invaded. Navy yards were told, "Even if those facilities are only partially completed or if the design and construction are not to the usual Bureau standards, it is more important to

¹⁹ The details of the President's visit are from the *Portsmouth Herald*, 10 August 1940, "Crowds Line Streets to Greet Chief Executive," 1, and an untitled one page summary of the visit held at NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 20, Folder EE "President's Visit, 1940."

²⁰ Chief Bureau of Yards and Docks letter of 7 Oct 1940. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 1, Folder A1, "New Construction 1930-1950."

have them available than it is to spend the additional time which might have to be expended in order to achieve a strived for, but impossible, perfection.”²¹ Contractors were to be given “considerable latitude for the exercise of their judgment” and permitted to “proceed without the detail of inspection which the Bureau ordinarily exercises.”²² Empowerment of contractors and a willingness to sacrifice quality of product for timely project completion were critical to Portsmouth Navy Yard’s ability to undertake and complete massive upgrades to facilities while simultaneously increasing the rate of submarine production.

By the spring of 1941, Congressman Carl Vinson of Georgia, and other national leaders who recognized the inevitability of war, moved to appropriate funds to increase shipyard employment and upgrade shipyard facilities. Vinson, Chairman of the Naval Affairs Committee, queried the yard in March 1941 about its capabilities, problems with material deliveries, and needs, in order to accelerate delivery dates by twenty percent. Industrial Manager Captain H.F.D. Davis wrote, in response, that material deliveries were under control, a third building way had been completed in August 1940, and the fourth building way was nearing completion.²³ Furthermore, Davis reported that the yard had studied “the possibility of laying down one or two more temporary ground ways between

²¹ *Ibid.*

²² *Ibid.*

²³ Industrial Manager H.F.D. Davis letter of 15 Mar 1941 to Congressman Carl Vinson, Chairman of Committee on Naval Affairs. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 2, Folder A1-3, “General Building Program, PKG # 3.” The yard first identified a need for additional building ways shortly after the Franklin Shiphouse had burned to the ground with its two building ways on March 10, 1936. See Manager memo of 9 Nov 1936. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 1, Folder A1/Y1, “Local Development Boards PKG #1.” The fact that these two building ways were not replaced until the spring of 1941 is a good example of the minimal investment in needed facilities that characterized Portsmouth Navy Yard during the 1930s, prior to the prewar appropriation windfalls.

the present ways” should they become necessary. Congress wanted to accelerate submarine building rates and Portsmouth Navy Yard was already looking for ways (pardon the pun) to exceed expectations.

The First Supplemental National Defense Appropriation Act, approved August 25, 1941, appropriated \$160 million for equipment and facilities for the repair and conversion of ships and increased the appropriations for the construction of new ships from \$5,000 million to \$8,000 million.²⁴ The next month, the Secretary of the Navy approved Portsmouth Navy Yard’s request for \$7.662 million for facility upgrades that included a new fitting out pier (\$1.5 million) and power plant upgrades (\$1.5 million). The approval process that brought the \$7.6 million to Portsmouth was the height of bureaucratic efficiency as the necessary approvals that normally took weeks, if not months, to obtain were gotten from the Chief of Naval Operations, Assistant Secretary of the Navy, and Secretary of the Navy in four days. There appeared to be no end to the Congressional commitment to fund upgrades to shipyard facilities or the Navy’s commitment to expedite those funds to the yards. Both the commitment and funding would moderate greatly a year later when an urgent need developed to funnel critical materials and other resources directly to weapons and armament rather than facilities. By that time, however, Portsmouth Navy Yard was well on its way to becoming a transformed shipyard.

The power plant upgrades authorized in the fall of 1941 accelerated the conversion of the shipyard from DC to the much more efficient AC power. The increased

²⁴ Senior Member, Shore Station Development Board letter of 19 Sep 1941. NARA Waltham,, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 1, Folder A1/Y1, Pkg 1, “Local Development Boards.”

electrical loads, as the result of all the added new facilities, made it absolutely necessary that the electrical conversion be given high priority. This conversion started before the war, continued during the war, and remained incomplete in some areas at the end of the war.²⁵ The second major project, the fitting-out pier, involved reclamation of 12 acres of shoal water and wetlands on the corner of the shipyard directly across the river from Strawberry Banke. This project would become a critical piece of the plan that permitted the remarkable increase in building rates during the war.²⁶

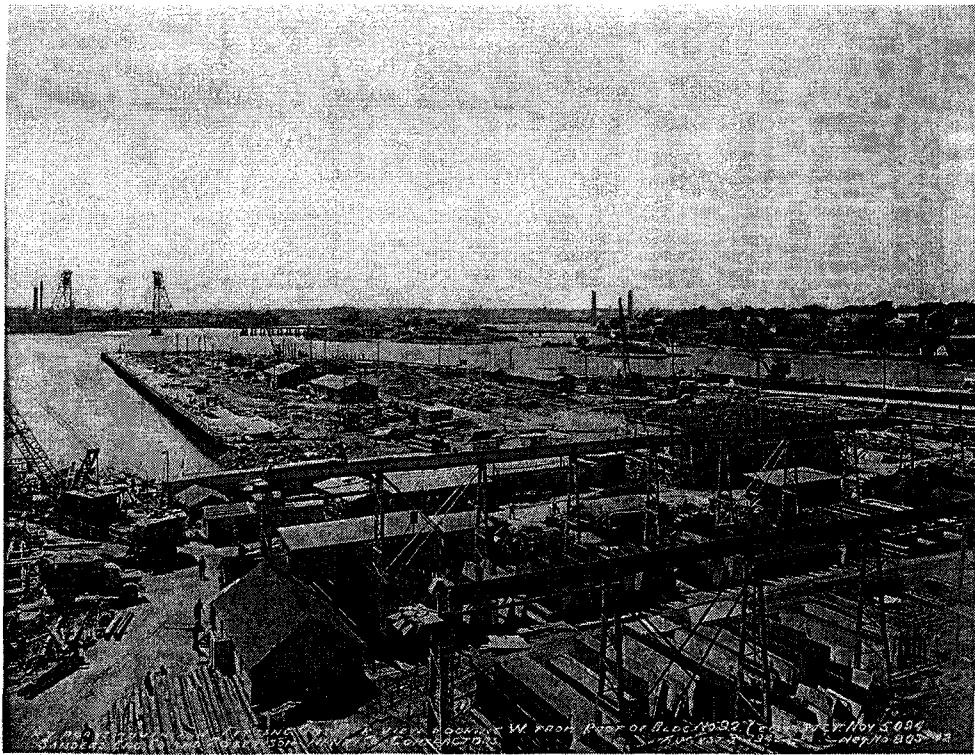


Figure 8: New Fitting Pier Under Construction (1942). Courtesy of the Milne Special Collections, University of New Hampshire Library, Durham, N.H.

²⁵ Public Works Officer memo of 19 May 1947 to Commandant Portsmouth Naval Base. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 15, Folder L-5, "Inspection Naval Yard, 1945-48."

²⁶ *Bureau of Yards and Docks Administrative History of World War II Operations*, Navy Department Library, Naval Historical Center, Washington, D.C., 175.

The new fitting out pier was an enormous undertaking right in the middle of the increased activity needed to accelerate production. Figure 8 and a comparison of Figures A-1 and A-2 in the appendix, maps of the yard in 1939 and 1945 respectively, gives one an appreciation of the size of the new fitting out pier. Neither the fitting out pier nor the land on which it was built appears in Figure A-1 (1939). The twelve acre pier can be seen jutting out in the lower left hand corner of Figure A-2 (1945). The portion of the pier closest to the Portsmouth side of the river was created by filling in Pumpkin Island Shoal. Without the new fitting out pier, there would have been vastly insufficient pier space to complete the post-launch work required on the increased numbers of submarines that were being forced off the ways to make room for the next submarine keel to be laid. The new pier accommodated up to a half dozen submarines in various stages of construction as they stepped through the completion process from launch, to dock trials, to completion.

Prior to the construction of the new fitting-out pier, the submarines were completed at a much smaller pier, known as the "flatiron pier," near Dry Dock #2. In October 1941, about the time that the new pier was authorized, the superintendent of the flatiron pier was alarmed because the submarines at the pier had increased from two to four and work was not getting done for lack of manpower. He proposed that the pier workforce be doubled to 1,010 men and that the submarines remain on the building ways longer to minimize the work that had to be done at the pier.²⁷ This, of course, was just the opposite of the "push 'em off the ways" strategy that carried the yard to production records a few years later. But, on the eve of Pearl Harbor, the four building ways were

²⁷ Ship Hull Superintendent, Flatiron Pier memo of 22 October 1941. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 2, Folder A1-3, "General Building Program, PKG # 3."

launching submarine hulls faster than the flatiron pier space and workforce could handle them. Had it not been for the new spacious fitting-out pier, and the capability to more efficiently sequence the post-launch to completion process, the yard would never have been able to achieve the building rates it did.

Robert Connery notes that “In the dark days that followed Pearl Harbor many Americans must have realized how fortunate was the decision to begin the expansion of the fleet in 1940.”²⁸ Portsmouth Navy Yard certainly shared in that good fortune. Immediately after Pearl Harbor, the shipyard, with many facility upgrades already in progress, sought further improvements to increase building rates. A month after Pearl Harbor, the shipyard requested, and subsequently received, an additional \$2 million in projects that included the construction of a shallow shipbuilding basin in which two submarines at a time could be constructed, the fifth building way, a Sub-Assembly Erection Shop extension at the shipbuilding ways, and a Utility Building at the new fitting-out pier.²⁹ All of this shipyard activity, and more to follow in 1942, was greatly facilitated by the First War Powers Act of December 1941 that permitted contracts to be negotiated rather than awarded through the time consuming competitive bidding process.

In January 1942, the shipyard began work on the fifth building way in the building shed and a 50 feet extension of the roof and crane runways to accommodate a

²⁸ Robert Connery, *The Navy and the Industrial Mobilization in World War II*. 135.

²⁹ Commandant Portsmouth Navy Yard letter of 29 Jan 1942 to Bureau of Yards and Docks. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 1, Folder A1/Y1, Pkg 1, “Local Development Boards.”

sub-assembly erection shop.³⁰ The first was a relatively inexpensive \$75,000 project, but the second was a \$1,100,000 major construction project designed to further refine Portsmouth's sectional construction process that had first been used on the NIRA submarines in 1934. Fred White, Master of the Rigger and Laborer Shop during the war, recalled working on submarine keels on the building ways while engulfed in sparks from the welding on the roof of the building shed.³¹ It is a credit to the shipyard that such large projects were successfully and expeditiously completed in conjunction with a greatly increased submarine construction rate.

By December 1942, the shipyard had created a number of opportunities for increased production. The five building ways were launching submarines at an unprecedented rate, the new fitting out pier and increased workforce had progressed far enough to keep up with the submarines being launched, and the new building basin was in operation. With plans to launch submarines after only four months on a building way, the existing seven ways could produce an annual building rate of twenty-one submarines per year. However, shipyard management had bigger plans:

Our goal is 30 ships per year; this rate is to be reached by July or August 1943. Our obvious requirement is more building ways. At least 2 and preferably 3 ways will be needed by April [1942] in order to come any where near meeting the schedule.³²

³⁰ The Senior Member Shore Station Development Board letter of 11 Jan 1942 to Secretary of the Navy and Secretary of the Navy letter of 14 Jan 1942. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 36, Folder N15-8, "Slips and Basins."

³¹ Oral interview with Fred White on 3 April 2006 at his home in New Castle, N.H.

³² Portsmouth Navy Yard Memo (unsigned) of 1 Dec 1942, Subject: Use of Dry Dock #1 for Building Submarines. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 2, Folder A1-3, "Building Program, Pkg #4."

The shipyard had two options to obtain the additional building ways. Two side launching ways could be built at one of the berths in four or five months for about \$90,000, or the new dry dock that had been designated by the Bureau of Ships and the Chief of Naval Operations for use in case of emergencies could be used, instead, for construction of two, or possibly three, submarines at the same time.³³ The yard had started planning locally for the building of multiple submarines in Dry Dock #1 shortly after Pearl Harbor.³⁴ This local plan, presented in detail in the next chapter, was somewhat controversial because the new dry dock was authorized by the Navy Department for other purposes. Suffice it to say, at this point, that the yard's performance during the war would have been average, at best, if this new dry dock had not been used for construction of submarines. In the next chapter, these efforts are presented as a case study to illustrate the shipyard's aggressive management style and willingness to assume risk for the sake of production and increased contribution to the war effort.

In June 1942, the need to direct all available funds and critical materials to the fleet caused Secretary of the Navy Frank Knox to require increased control and scrutiny of requests for shipyard facility upgrades.³⁵ In November 1942, Secretary Knox further shut down facility construction by establishing firm guidelines that permitted consideration of only the most urgent needs. According to Knox:

³³ *Ibid.*

³⁴ Ltjg Arnold memo of 12 December 1941 to Hull Superintendent. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 2, Folder A1-3, "General Building Program, Pkg # 3."

³⁵ Secretary of the Navy letter of 25 Jun 1942 to All Shore Activities. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 36, Folder N23-5, "Acetylene and Oxyacetylene."

The rapid diminution in available and prospective supplies of raw materials and equipment and the vital need for conserving these and our critical manpower, dictate a drastic reduction of new facilities, both in prospect and in process, so that the maximum of men, material, equipment, and transportation resources may be utilized for the more important instruments of war.³⁶

In December 1942, the Secretary of the Navy sent his special representative, Admiral Claude C. Bloch, to all continental naval districts with the message that “we are scraping the bottom of the bucket” and that drastic conservation measures were needed to support the war effort. The Admiral specifically highlighted the need to limit facility construction to only that absolutely necessary so that more of the navy’s funds could be channeled to fleet production:

The increased demand for construction on shore by all departments, both military and civilian, as well as by the states, counties, municipalities, and private parties, has gone on apace. Recently, statistical data has been prepared which shows that the construction program desired for the calendar year of 1943 amounts to thirty-two billion dollars. The entire production capacity of this country for war implements is only estimated to be seventy-five billion dollars. Therefore it can readily be seen what a tremendous burden the construction program would impose on our war implement production. Drastic measures are in order to reduce the construction so that production of our war implements may proceed unimpaired.³⁷

By the end of 1942, when the navy moved to drastically cut back on facility projects, Portsmouth Navy Yard had already received the infusion of facility improvement appropriations it needed to transform itself into a modern shipyard.

³⁶ Secretary of the Navy Frank Knox letter of 4 Nov 1942 to All Naval Activities. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 36, Folder N23-5, “Acetylene and Oxyacetylene.”

³⁷ Commandant First Naval District letter of 4 Nov 1942 to All Activities, First Naval District. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 13, Folder A3-2 “General Management 1932-1940.”

As noted earlier, the facility boom at Portsmouth Navy Yard in 1942 was not unlike what was happening at many shipyards across the country. According to maritime historian Frederick C. Lane, “Before 1942, in spite of some temporary steel shortages, shipbuilding was limited mainly by shipyard facilities. But by June or July of 1942, facilities got ahead of steel.”³⁸ Facilities had also gotten ahead of steel and other contractor supplied material and components at Portsmouth Navy Yard by late 1942. Facilities were being completed, employment was increasing, and, most importantly, quality submarines were being delivered to the United States Navy. On Christmas eve, 1942, Commandant Rear Admiral Withers announced with considerable pride to his management team that, “A Portsmouth boat has just reported operating 210 days out of 245 since completion. . . inflicting damage on the enemy just 492 days after the keel was laid.”³⁹ Portsmouth employees could indeed reflect with considerable pride on their accomplishments during the first year of the war.

Off-Yard Growth

Despite the massive ramp-up in facilities, the physically constrained island shipyard was left with an urgent need for more industrial space to fulfill its mission. The acquisition of 12 additional acres of industrial space, with the creation of the new fitting out pier, has already been described. Another 12 acres were claimed when the shipyard was joined to Jamaica Island to create an ordnance storage facility.⁴⁰ A discussion of the

³⁸ Frederick C. Lane, *The Navy and the Industrial Mobilization in World War II*, 343.

³⁹ Commandant T. Withers memo of 24 Dec 1942 to Heads of Division, Masters, Senior Office Supervisors. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 2, Folder A1-3, “Building Program, Pkg #4.”

⁴⁰ Portsmouth Navy Yard’s expansion during the war pales in comparison to Mare Island Navy Yard’s growth from 635 acres in 1940 to 1500 acres in 1945, primarily through wetlands reclamation.

Jamaica Island acquisition, the creation of an electrical shop in Somersworth, N.H. that at its peak employed as many people as the shipyard did in 1939, the use of a large gypsum plant in Portsmouth as an extension of the shipyard's machine shops, and various other off-yard endeavors will complete the discussion of the ramp-up of facilities at Portsmouth Navy Yard.

In early 1941, the Bureau of Ordnance directed Commandant Wainwright to investigate the possibility of purchasing Jamaica Island for the purpose of ammunition storage. The twelve acre island was a stone's throw from the northeast corner of the shipyard island, across a shallow inlet. The island is not even shown on Figure A-1, the 1939 map of the yard, but is shown with considerable development on the upper right corner of Figure A-2, the 1945 map.

Commandant Wainwright contacted the owner, Dr. W.B. Johnston, in January 1941 to inquire if he was interested in selling the island.⁴¹ Negotiations took place over most of that year. Things had progressed far enough by October 1941 for Wainwright to provide the Bureau of Ordnance an estimated price of \$327,000 for the ordnance storage facilities that included \$30,000 to purchase the island.⁴² Negotiations continued until the Judge Advocate General's message of 7 December 1941 announced "Johnston option [\$25,000] Jamaica Island accepted today."⁴³ The deal for the purchase of Jamaica Island

⁴¹ Commandant Portsmouth Navy Yard letter of 14 Jan 1941 to Dr. W.B. Johnston. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 10, Folder N1-13, "Lands."

⁴² Commandant Portsmouth Navy Yard letter of 10 Oct 1941 to Chief Bureau of Yards and Docks. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 10, Folder N1-13, "Lands."

⁴³ US. Naval Message from the Judge Advocate General Washington D.C. of 7 Dec 1941 at 0013 to Navy Yard Portsmouth N.H. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 10, Folder N1-13, "Lands."

had been completed just a few hours before the Japanese dropped bombs on Pearl Harbor.

Post-purchase developments associated with Jamaica Island will be covered later in this study. The landfills and shoal water reclamation projects that tied the island to the shipyard, and extended the shoreline on the back channel, were major contributors to the contamination problems that plagued the yard in the 1980s and ultimately caused the yard to be declared a Superfund site.

The rapid, and extremely successful, relocation of the shipyard's Electrical Manufacturing Shop in early 1942 to a vacated plant in Somersworth, N.H. is one of the more impressive shipyard accomplishments during the war. The need for the facility was dictated by the expansion of naval orders for electrical fittings⁴⁴ from \$175,000 per month in 1940 to \$1,900,000 per month in 1943. Accordingly, shop employment expanded from a prewar average of 400 to a peak of 3,600 in the winter of 1943.⁴⁵

During the 1930s, Portsmouth Navy Yard had gradually been assigned most of the navy's workload for the manufacture of ship and submarine electrical hull fittings. As this workload grew, the shipyard was forced to farm out some portions of the work to local contractors. Immediately prior to the attack on Pearl Harbor, the Bureau of Ships proposed a 100% increase in Portsmouth's workload to keep up with the rapidly

⁴⁴ Electrical fittings are the mechanical connectors that accommodate the passage of electrical cables through watertight bulkheads and tanks. Needless to say, they find widespread application on submarines.

⁴⁵ *Administrative History: Portsmouth Naval Shipyard in World War II*, Portsmouth Naval Shipyard Museum Archives, Kittery, Me., 43.

expanding shipbuilding programs authorized by Congress.⁴⁶ Convinced that the shipyard would have to find accommodations off-yard to meet the greatly increased demands for electrical fittings, the Commandant wrote the management of Nashua Manufacturing Company in January 1942:

This Navy Yard is confronted with the necessity of obtaining additional shop space in which to carry on its program of manufacture for National Defense. . . An inspection has been made of the Great Falls Manufacturing Company's Mill Plant at Somersworth, NH, which it is understood is owned by your company. . . The reinforced concrete building of flat slab construction, known as No. 2 Cement Mill, . . . which forms part of the above property seems well adapted for our purpose. . . Will you lease or sell the building?⁴⁷

The shipyard quickly negotiated terms with the Nashua Manufacturing Company, and with the approval of the Assistant Secretary of the Navy received funding from the Bureau of Ships on 30 January to proceed with the purchase of the building.⁴⁸ Once again, there was no bureaucratic delay. The shipyard had advanced from initial problem definition to problem solution in less than two months.

Portsmouth Navy Yard records indicate that the move of the shipyard's Electrical Manufacturing Shop to the plant at Somersworth was accomplished so efficiently that "no machine was out of production for more than an 8-hour shift."⁴⁹ According to the

⁴⁶ Bureau of Ships letter of 29 Nov 1941 to The Division of Contract Distribution, Office of Production Management. NARA. Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 2, Folder A1-1, "Developments."

⁴⁷ Commandant Portsmouth Navy Yard letter to Nashua Manufacturing Company of 10 Jan 1942. NARA. Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 2, Folder A1-1, "Developments."

⁴⁸ Assistant Secretary of the Navy letter of 23 Jan 1942 to Commandant Portsmouth Navy Yard and Bureau of Ships U.S. Navy Dispatch of 30 Jan 1942. NARA. Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 2, Folder A1-1, "Developments."

⁴⁹ *Administrative History: Portsmouth Naval Shipyard in World War II*, Portsmouth Naval Shipyard Museum Archives, Kittery, Me., 20.

shipyard's self-history, operators cleaned their machines at the end of a shift and each machine was then transported the eighteen miles to Somersworth where it was located on a prearranged spot, complete with temporary electrical power, and made ready for use one shift after having been unplugged in the shipyard. By all accounts, the transfer occurred with minimum disruption to production.

The number of employees at the new plant quickly climbed to 3,750 men and women, more than double the original 1,546 men in the shipyard. The one hundred percent increase in workload forecast by the Bureau of Ships was more than realized.⁵⁰ The facility performed with impressive results during the war until 1945 when, having served its purpose, it was made available for disposal by 30 June 1946.⁵¹

In order to further relieve overcrowded conditions in the shipyard shops, the shipyard leased buildings owned by the Atlantic Gypsum Products Company in Portsmouth, in December 1943, for the manufacture of machined parts and assemblies. Without the gypsum plant, the yard would have been forced to do considerable assembly work in areas outside the shops, with minimal protection from the weather. The plant consisted of 60 acres, 13 buildings, and numerous docks for nine railroad spurs.⁵² Used as a shipyard during World War I, this complex also served the nation and Portsmouth Navy Yard well during World War II. The Navy released control of the plant in late 1945 so that the National Gypsum Company could receive its first shipload of gypsum rock from

⁵⁰ *Ibid.*

⁵¹ Commandant Portsmouth Navy Yard letter of 9 Apr 1946 to Bureau of Yards and Docks. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 15, Folder N1-13, "Lands Somersworth."

⁵² *Portsmouth Herald*, 3 Dec 1943, "Navy Takes Over Gypsum Plant to Make Sub Parts," 1.

Nova Scotia, in late October 1945, in preparation for reopening the plant a few months later.⁵³

By the summer of 1940, it was obvious that Kittery needed to greatly increase available housing for the thousands of new workers at the yard. In August 1940, Commandant Rear Admiral Wainwright wrote to the Board of Selectmen, Kittery, Maine, to inquire about the availability of land to accommodate the building of defense housing. Wainwright explained that “The Navy Department has authorized the construction of four hundred units to house married and enlisted men and civilian employees attached to this Navy Yard.”⁵⁴ Land was made available on the outskirts of Kittery just outside the new shipyard entrance, Gate #2. The project, known as Admiralty Village, was nearing completion when the war started. In fact, on 8 December 1941, the shipyard reported that, “The construction work at the Naval Housing Project now being done under lump sum contracts is nearing completion.”⁵⁵ Also, in December 1941, the Federal Works Agency authorized \$125,000 for a sewage disposal plant for Admiralty Village.⁵⁶ Other federal housing projects that followed later in the war, on the Portsmouth side of the river, will be discussed later when analyzing the transformation of Portsmouth.

⁵³ *Portsmouth Herald*, 18 Oct 1945, “First Shipload of Gypsum Rock in Over 2 Years Arrives at Local Plant,” 1.

⁵⁴ Commandant Portsmouth Navy Yard letter to Board of Selectmen, Kittery, Me of 16 August 1940. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 10, Folder N1-13, “Lands.”

⁵⁵ Commander Portsmouth Navy Yard letter of 8 Dec 1941 to Bureau of Yards and Docks. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 15, Folder L24, “Housing Development.”

⁵⁶ Commandant Portsmouth Navy Yard letter of 10 Dec 1941 to Bureau of Yards and Docks. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Folder L24, “Housing Development.”

Finally, at the same time that the shipyard officials were negotiating for the purchase of Jamaica Island, negotiations were also taking place for the purchase of the land necessary to provide another entry point, and bridge access, to the yard from Kittery.⁵⁷ In May 1941, Commandant Wainwright recommended that the land be purchased for \$15,000 and construction started shortly thereafter on the second access gate for the shipyard.⁵⁸

Employment Ramp-up

At the same time that the shipyard was being transformed geographically and structurally, thousands of new employees were being hired. It began slowly in October 1939 when navy yard ceilings were eliminated.⁵⁹ Prior to that time, the shipyard was obligated to obtain the authorization of the Assistant Secretary of the Navy to exceed 3600 employees. On 2 August 1940, as the funding flood gates were being opened, the shipyard reported that employment levels had increased to 5,843, with plans to further increase to the 6,440 employees required to complete the assigned workload of eight submarines. Always looking for ways to do better, the yard volunteered that a building rate of six submarines a year could be sustained, without additional facility upgrades, with a further increase to 8,400 employees and by taking advantage of local commercial

⁵⁷ Commandant Portsmouth Navy Yard letter of 30 Dec 1940 to Chief Bureau of Yards and Docks. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 10, Folder N1-13, "Lands."

⁵⁸ Commandant Portsmouth Navy Yard letter to Chief Bureau of Yards and Docks of 17 May 1941. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 10, Folder N1-13, "Lands."

⁵⁹ Commandant Portsmouth Navy Yard letter of 2 Oct 1939 to Assistant Secretary of the Navy (Shore Establishment Division). NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 2, Folder A1-2/NY, "Government Policies."

firms for selective farm-out work. Figure 3 shows the employment ramp-up that peaked at 20,465 in November 1943.

The rapid growth in employment was not without problems. In February 1941, Hull Superintendent F.A. Tusler made the following observation regarding the recent rapid increase in employment:

During the past year or more the Yard has taken on a large number of new men, the training of whom differs widely. It is believed that these men can be adequately trained if placed with older men who are familiar with the work. . . It is recognized that old men with a large amount of submarine experience are more valuable than green men, even though competent mechanics. . . Helpers and helper-trainees who have been rated up to mechanic must necessarily be placed on tasks with which they are familiar.⁶⁰

Tusler's comments, about the value of older men with submarine experience, illustrate well the importance of having been able to maintain a satisfactory workload and a core workforce during the late 1930s.

The increasing numbers of employees, and pace of work, left some wondering where events were leading the shipyard. Hull Superintendent Tusler, suspicious that the boom in employment might be short lived, expressed concern that employment levels and work hours would quickly return to previous levels after the existing emergency had passed:

There seems to be little question that until the present program is completed, there will be little difficulty in maintaining steady employment in the Yard. However, when this emergency is over, there is no question that the Yard will be unable to maintain its present degree of employment and very drastic reductions in force will be necessary.⁶¹

⁶⁰ Hull Superintendent F.A. Tusler memo to Production Officer of 3 Feb 1941. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 26, Folder A19, "Conferences, Congresses, and Conventions." Tusler's memo was in response to the Industrial Manager's request for items in preparation for his appearance before the Naval Subcommittee of the House Appropriations Committees concerning navy yard work.

⁶¹ *Ibid.*

Hull Superintendent Tusler's prediction concerning drastic reductions in employment, after the crisis had subsided, was indeed accurate. However, he need not have concerned himself about post-crisis unemployment in February 1941. Employment would more than double in a few years and the crisis would last for the next four and one half years. In February 1941, Tusler and his fellow shipyard workers had little appreciation of what the next several years held in store for them.

Ramp-up of Submarine Orders

Starting in the summer of 1940, orders for new submarines also started to increase rapidly. On 26 August 1940, the shipyard was told by superiors to, "Increase new construction activity until a maximum output of six submarines a year is attained."⁶² One year prior to Pearl Harbor, the shipyard was increasing its building rate from two to six submarines a year, still very modest indeed when compared to the building rates that would be achieved a few years later.

In the spring of 1941, Congressman Carl Vinson, Chairman of the Naval Affairs Committee, queried the yard about the possibility of accelerating the completion dates for the submarines, then under contract, by twenty percent. Industrial Manager Captain H.F.D. Davis responded with a schedule of accelerated delivery dates for 14 submarines; 9 to complete in 1942 and 5 to complete through 1 August 1943.⁶³ The yard would ultimately complete 21 submarines in the same time frame. The accelerated ramp-up in production, planned in the spring of 1941, bore little resemblance to what actually

⁶² War Plans Officer memo of 26 August 1940. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 24, Folder A16-11, "National Defense."

⁶³ Industrial Manager H.F.D. Davis letter of 15 Mar 1941 to Congressman Carl Vinson, Chairman of Committee on Naval Affairs. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 2, Folder A1-3, "General Building Program, Pkg # 3."

happened in the first year and a half of the war. It is a credit to management and employees of the navy yard that they could adjust so rapidly to changing conditions.

In January 1942, the shipyard's ramp-up was in full gear. While the yard was moving rapidly towards acquiring the infrastructure needed to increase production, much was left to be completed before dramatic increases in production could be realized. In addition, the yard was heavily burdened with miscellaneous work, including overhauls of British submarines which detracted from the increased building of submarines. On 2 January 1942, Commandant Wainwright reported to his superiors that one British submarine had been completed on 1 January 1942 and another was scheduled to be completed on 22 January 1942. In addition, newly constructed submarines USS *Drum* (SS228) had been completed on 24 December 1941, USS *Grayback* (SS 208) was on sea trials, and USS *Flying Fish* (SS229) was on dock trials.⁶⁴ The three submarines under construction were progressing toward completion on comfortable schedules that minimized mutual interference, and competition, for shipyard resources.

Maximum building rates would require the assumption of more schedule risk and the multiple processing of submarines on other than a single file basis. A reduction of repair work, both foreign and domestic, and sufficient new construction facilities to permit simultaneous, and parallel, construction processes would also be necessary if Portsmouth Navy Yard was to achieve greatly accelerated production rates. And this is exactly what happened as the year unfolded.

⁶⁴ Commandant Portsmouth Navy Yard letter of 2 Jan 1942 to Chief of Naval Operations. NARA College Park, Formerly Security Classified General Correspondence of the CNO / Secretary of the Navy 1940-1947, RG 80, Box 442, File L9-3/NY---L9-3/NY1.

Portsmouth Navy Yard's "can-do" attitude, and demonstrated performance, during the early stages of the war quickly led to increased Navy Department orders for submarines that continued through June 1943. Table 3 shows submarine orders between June 1940 and June 1943. The fourteen submarines ordered in 1940 were the direct result of the 11 % Naval Expansion Act passed in June 1940 and the 70% Naval Expansion Act passed in late July 1940.

Table 3: Portsmouth Navy Yard Submarine Orders (1940-1943)⁶⁵

<u>Submarines</u>	<u>Order Quantity</u>	<u>Date of Order</u>
SS228-235	8	June 1940
SS275-280	6	Sept 1940
SS285-291	7	Dec 1941
SS308-312	5	Apr 1942
SS381-410	30	June 1942
SS417-424	8	Feb 1943
SS298-299	2	Started at Cramp Shipbldg, completed at PNY
SS475-515	<u>40</u>	June 1943
	106	

The next forty-two submarines ordered were part of the flood of contracts issued during the first six months of the war, in a frantic effort to further accelerate war production.

During the three months prior to Pearl Harbor, the Navy awarded 1,625 contracts for purchases that exceeded \$50,000 each that totaled \$1.47 billion dollars. During the three months after Pearl Harbor, 2,917 similar contracts were issued that totaled \$5.327 billion.⁶⁶ Portsmouth Navy Yard shared in this ordering frenzy. The large number of advance orders for submarines permitted the bulk ordering of material, and the

⁶⁵ *Administrative History: Portsmouth Naval Shipyard in World War II*, Portsmouth Naval Shipyard Museum Archives, Kittery, Me., 1.

⁶⁶ Robert Connery, *The Navy and the Industrial Mobilization in World War II*, 269.

development of disciplined repetitive work procedures, that would be critical to the mass production of submarines.

Between the summers of 1940 and 1942, Portsmouth Navy Yard ramped-up for war. Portsmouth's situation was not unlike that at the other navy yards and private shipyards. The increased naval construction bills during the late 1930s had revitalized the yards with work and increased employment, but it was not until the summer of 1940 that the naval expansion legislation provided the funding needed for the urgently needed shipyard infrastructure upgrades. The navy yard infrastructure building bonanza occurred simultaneously with massive increases to employment and previously unimagined orders for large numbers of new ships and submarines. At Portsmouth Navy Yard, the successful integration of these new facilities and personnel resources into the day-to-day shipyard operations, with minimal interference to production schedules, was an extreme challenge to the mettle of management and employees.

CHAPTER IV

MANAGEMENT & EMPLOYEES

“Admiral Withers was a man whom everybody liked because he let everyone do their job.”¹

**Fred White
Portsmouth Navy Yard Master Rigger and
Laborer during World War II
3 April 2006**

“The workforce at Portsmouth is especially high grade. Top civilian supervisors are alert, intelligent, and obviously proud of their Yard.”²

**Booz-Allen Industrial Survey
6 November 1944**

The performance of Portsmouth Navy Yard during the war will be analyzed under the four categories shown in the titles of the next two chapters, Management, Employees, Methods, and Measurables. At this point, it is well to revisit a question posed earlier. What part of the shipyard’s success was due purely to the stimulation of war, and what part was due to other factors? That unanswerable question recognizes the special environment that existed at the yard during the war, an environment that inspired and focused all towards the common goal of increased production. While that environment

¹ Oral interview with Fred White, 3 Apr 2006, at his home in New Castle, N.H.

² Assistant Secretary of the Navy Ralph A. Bard letter of 6 Nov 1944, Subject: Survey of Industrial Department, Navy Yard, Portsmouth, N.H. – Report No. 2 of Industrial Survey Division, 8. NARA College Park, RG 19, Bureau of Ships General Correspondence (1940-45), Box 785, Folder NY1/A3. Emphasis added.

may have contributed to heightened performances and an increased willingness to embrace organizational change and innovative production methods, favorable environments alone do not increase production. However, innovative management working with a skilled workforce in an environment ripe for change and cooperation can lead to impressive results. And that is what happened at Portsmouth Navy Yard during World War II.

Shipyard management, of course, includes military and civilian management. However, this management study is skewed towards the naval officers' management of the yard as the senior positions were all held by naval officers and as they were the decision makers. However, as those who have served in navy yards know so well, the military leadership turns over every few years and it is the civilian management that provides the long-term leadership continuity, as well as the industrial and technical expertise that defines the yard. Civilian management is given much credit in this study, but the fact remains that the preponderance of archival information available about shipyard management during the war reflects the decisions, actions, and personalities of the senior naval officers.

That said, it should also be noted that the study includes the personal recollections of Fred White, a 96 year old shipyard retiree, who held a senior civilian management position during the war. White was the Master Rigger and Laborer, and, in that capacity, he supervised hundreds of employees and was heavily involved in important waterfront industrial events such as keel layings, launchings, dockings, undockings, and submarine movements. His testimony is an invaluable contribution to this study. In addition, the family papers of a shipyard naval architect, Harold Sweetser, who worked at the yard

from 1917 until 1958, and articles from the shipyard's newspaper, the *Portsmouth Periscope*, provide some insight into civilian management at the yard during the war. However, there is no escaping the fact that this dissertation deals primarily with the naval officer management of the shipyard during the war.

The next two chapters draw heavily from four World War II industrial studies. Two of the studies were conducted by independent management consulting firms, under the sponsorship of the office of the Secretary of the Navy, and the other two were self-assessments by a Portsmouth Navy Yard industrial survey team. Because of their importance to this dissertation, a discussion follows providing background and context for the studies.³

The first independent survey was a September 1942 survey of four navy yards (New York, Philadelphia, Bremerton, and Mare Island) by the firm Industrial Relations Counselors Inc. as directed by Assistant Secretary of the Navy Ralph A. Bard.⁴ The study evaluated each yard's production efficiency and needs. While Portsmouth was not included in the survey, the results permit comparisons of Portsmouth to the yards surveyed. The second independent study, also directed by the Secretary of the Navy, was an assessment of Portsmouth Navy Yard's Industrial Department completed in late 1944

³ For purposes of clarification, the four industrial studies will be referred to throughout the rest of this study in abbreviated terms as Portsmouth Industrial Survey I (December 1941), Portsmouth Industrial Survey II (June 1942), Industrial Relations Counselors Survey (1942), and the Booz-Allen Survey (1944).

⁴ Industrial Relations Counselors, Inc. letter of 8 September 1942 to Assistant Secretary of the Navy Ralph A. Bard. NARA College Park, RG 19, Bureau of Ships General Correspondence, 1940-1945, Box 151, Folder NY1, 1 Jul 1942-30 Jun 1943. Hereafter Industrial Relations Counselors Survey (1942).

by the firm Booz-Allen Inc.⁵ The results of the Booz-Allen study provide an independent assessment of the industrial operations of Portsmouth Navy Yard during the war that provides balance to the wealth of archival shipyard self-appraisals cited throughout this study.

The two above surveys had different purposes. The Industrial Relations Counselors Survey of September 1942 was a cursory survey of four navy yards to provide feedback to Secretary of the Navy Knox regarding the effectiveness of the millions of dollars that had been spent on facility upgrades over the previous two years. The nation was in the early stage of a war whose outcome was still in doubt and the pressure was on to maximize the capabilities of the navy yards. While the auditors were careful not to overly criticize or condemn the efforts of the mobilizing yards, they were also quick to point out areas needing improvement to maximize production at each yard. On the other hand, the Booz-Allen Survey of 1944 was pointed more towards postwar operations than maximizing production to win the war. This survey took the opportunity to congratulate Portsmouth Navy Yard for its war record while emphasizing changes needed to adjust to the fast approaching reduction in workload and workforce. Of paramount concern was a desire to end the crisis management modus operandi that had characterized wartime operations and return to more structured and disciplined management with emphasis on cost monitoring and control.

The third and fourth studies are Portsmouth Navy Yard Industrial Department self-assessments that were issued on 8 December 1941 and 6 June 1942. The 8 December

⁵ Assistant Secretary of the Navy Ralph A. Bard ltr of 6 Nov 1944, Subject: Survey of Industrial Department, Navy Yard, Portsmouth, N.H. – Report No. 2 of Industrial Survey Division. NARA College Park, RG 19, Bureau of Ships General Correspondence, 1940-1945, Box 785, Folder NY1/A3. Hereafter Booz-Allen Survey (1944).

1941 report provides an extensive analysis of the yard's production status and needs to achieve increased building rates.⁶ The 6 June 1942 report provides extensive analysis of the yard's first six months of operations after Pearl Harbor.⁷ It is a much more refined assessment of the yard's capabilities with a confident prognosis for future success. These Portsmouth Navy Yard self-assessments are important keys to understanding much of management's thinking and actions during the war. For this reason, a detailed explanation of these two studies follows.

In conjunction with an accelerated shipbuilding program, the Secretary of the Navy announced, in September 1941, the inauguration of a shipbuilding competition to commence 1 October to evaluate the efficiency of the nation's commercial and government shipyards. Five categories were to be evaluated; work progress, work quality, yard improvement, yard spirit, and the overall opinion of the evaluating board of officers.⁸ The first three categories relied on the typical indicators of shipyard performance as measured by schedule adherence, inspection records, and test results. The last two, yard spirit and overall opinion of the board, addressed the intangibles that were needed to build mobilization momentum.

⁶ Board of Shipbuilding Construction Report of 8 Dec 1941 to Commandant Portsmouth Navy Yard, Subject: New Construction – Progress and Administration to Expedite Work. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 2, Folder A1/3, "Building Program, PKG4." Hereafter Portsmouth Industrial Survey I (December 1941).

⁷ Board of Shipbuilding Construction Report of 6 Jun 1942 to Commandant Portsmouth Navy Yard, Subject: New Construction – Progress and Administration to Expedite Work. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 1, Folder A1, "Construction June 1940 to Dec 1943." Hereafter Portsmouth Industrial Survey II (June 1942).

⁸ Secretary of the Navy letter of 24 Sep 1941. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 2, Folder A1-3, "General Building Program, PKG # 4."

The board, with Rear Admiral H. E. Yarnell as the senior member, visited Portsmouth Navy Yard on 5 November to kick off the competition.⁹ Each yard was to be evaluated quarterly with awards given quarterly, semi-annually, and annually. The annual award for the best shipyard of each group was to be known as the "Victory" award. Private shipyards were assigned to one of four regions and all navy yards were grouped together for evaluation purposes. The competition, obviously designed to motivate all shipyards to review internal capabilities and processes to eliminate waste and improve efficiency of operations, had exactly the desired effect at Portsmouth Navy Yard. Commandant John D. Wainwright established a well qualified local review board to recommend improvements to new construction processes and practices. The board was in the final steps of its review on the day Pearl Harbor was attacked and published its initial findings the next day, 8 December 1942.¹⁰

The board continued to function after the war started and issued an updated report in June 1942. The board consisted of six officers under the leadership of the shipyard's Planning Officer, Captain A.I. McKee. The board showed a clear understanding of shipyard industrial management and the needs of Portsmouth Navy Yard in particular. The 8 December 1941 and 6 June 1942 reports are comprehensive reports of fifteen pages each that provide a convenient firsthand summary of activity at Portsmouth Navy Yard at the start, and during the first six months, of the war. In addition to valuable facts and figures, the studies are rich in analysis of the shipyard's needs and opportunities. The two

⁹ *Portsmouth Herald*, 5 Nov 1941, "Adm. H.E. Yarnell Here to Inspect Local Navy Yard," 1.

¹⁰ Commandant Portsmouth Navy Yard Rear Admiral John D. Wainwright memo of 7 Nov 1941. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 2, Folder A1-3, "General Building Program, PKG # 4."

reports served the intended purpose of kick-starting greatly increased wartime production at the yard. While no follow-on reports are extant in the archives, it is obvious that the shipyard continued to aggressively pursue and improve upon the recommendations contained in these two reports.

A comparison of the tone of the two studies, six months apart, suggests an attitude change on the part of the board and shipyard management. The first study (December 1941) reflects confidence in the yard's abilities to make the necessary changes to ramp-up production to meet expectations, but expresses concerns about the details of that transition. The second report (June 1942) takes considerable pride in the yard's demonstrated performance during the first six months of the war and aggressively proposes opportunities to not just meet, but exceed, expectations. The first report focused on potential production limitations due to local restraints. The second report reflects great self-confidence that the shipyard's performance can be limited only by external factors, especially contractors' abilities to provide timely delivery of components to support the yard's accelerated schedules. However, the board refused to accept schedule delays for any reason and recommended ways to work around delinquent contractor support.

These two internal shipyard self-assessments of December 1941 and June 1942 are not self-congratulatory or self-serving. The immediate threat of war, in the first case, and the early stages of war, in the second case, had cut through any ulterior motives or conclusions. The teams consisted of representatives from various shipyard departments who had the same objective, to define those actions needed to enable their shipyard to do its part to win the war. While they were advertised as industrial surveys, the teams were

headed by the Planning Officer, Captain A.I. McKee, who had held that position since March 1938. Consequently, he was very knowledgeable of the yard's practices and capabilities. If anything, the reports are more critical of the support departments than the Industrial Department, calling for better planning, provisioning of material, and closer liaison of the support departments with the industrial scheduling department. In effect, the team called for maximum streamlining of all shipyard functions towards submarine construction. And that is exactly what happened in the months that followed.

Finally, the next two chapters often refer to various Navy Department bureaus and commands to which Portsmouth Navy Yard was responsible, and deals considerably with a power struggle within the Navy Department for control of navy yards that can be confusing to the reader unfamiliar with naval matters and organization. Figure 9 is a

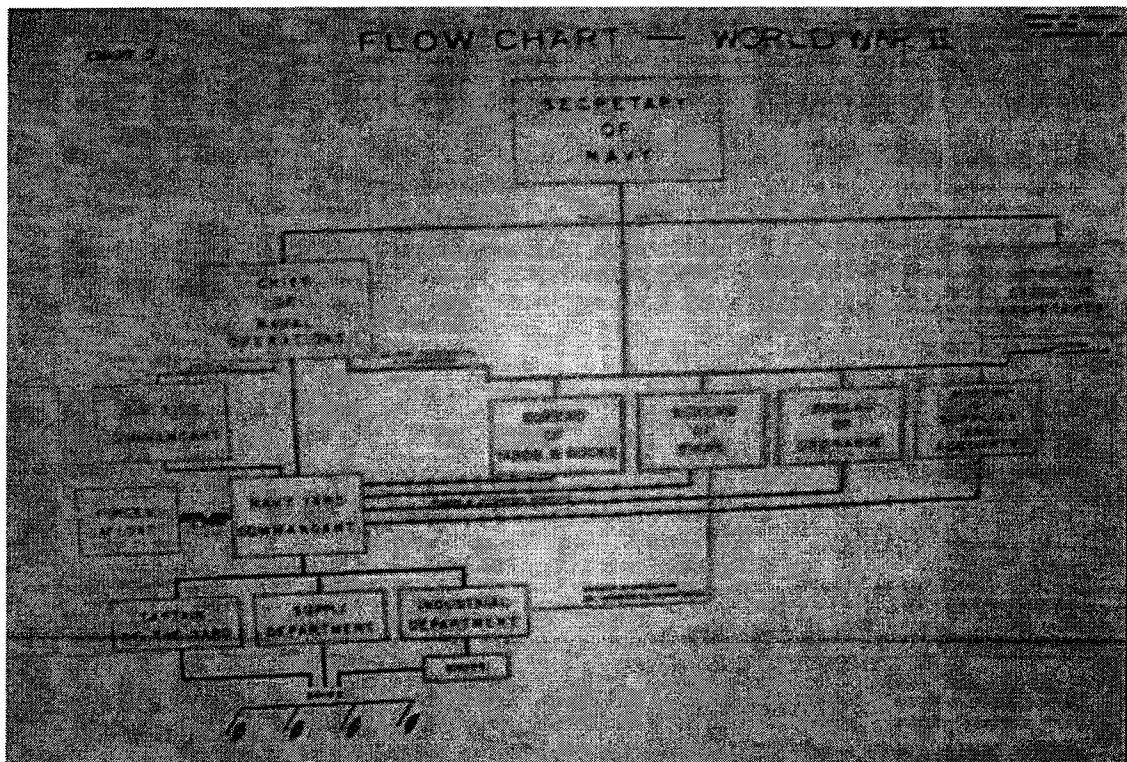


Figure 9: Navy Department WW II Organizational Chart. *United States Naval Administration in World War II, Bureau of Ships, 1946, Chart 5, "Flow Chart – World War II."*

chart showing the chain of command and organizational flow of responsibilities and authority from the Secretary of the Navy to the navy yard commandants and shipyard departments that existed during World War II. This chart will be referred to frequently to provide context and a clearer understanding of the complex and, sometimes, confusing organizational structure in which the navy yards were required to operate during the war. At this point, it is sufficient to note that the leadership of the Navy Department for most of the war was provided by Secretary of the Navy Frank Knox from 11 July 1940 until his sudden death on 28 April 1944. Knox was succeeded by his Under Secretary and assistant for procurement and production, James Forrestal (19 May 1944 to 17 September 1947). Two officers held the position of Chief of Naval Operations during the war, Admiral Harold R. Stark (1 August 1939 to 2 March 1942) and Fleet Admiral Ernest J. King (26 March 1942 to 15 December 1945).

Historian Robert H. Connery notes that, on the eve of World War II, Navy Department responsibilities for the planning the Navy's industrial mobilization were ambiguous and ill defined. According to Connery:

The Chief of Naval Operations, the material bureaus, and the Secretary's office all had some part in planning but their various roles were never clearly defined. The most serious consequence was lack of aggressive leadership in the industrial planning field. There were jurisdictional conflicts to be sure, but these were not nearly as serious as lack of interest arising from divided responsibility.¹¹

Things began to change for the better in August 1940 when James V. Forrestal took office as the first Under Secretary of the Navy with responsibilities for all material procurement. Forrestal, in time, did provide the industrial mobilization leadership, structure, and clarification that the Navy needed. Early in the war, however, the Under

¹¹ Robert H. Connery, *The Navy and the Industrial Mobilization in World War II*, 31.

Secretary was still organizing his new office at the same time that the newly formed Bureau of Ships was struggling to get its act together.

Figure 9 shows two primary flow paths of authority to the navy yard commandants. In the case of Portsmouth Navy Yard, the first path, through the Chief of Naval Operations, primarily concerned the maintenance of the existing submarine fleet and the care and administration of the sailors and officers who manned those submarines. The Chief of Naval Operations set priorities and schedules. The second path, through the Under Secretary of the Navy for Procurement and Production, primarily concerned matters pertaining to the construction of new submarines, including the oversight of the management of the navy yards through the Bureau of Ships. The tension between policies for the construction of new submarines and policies for the maintenance and overhaul of existing submarines was an essential element of operations at Portsmouth Navy Yard during the war. This tension frequently left the yard managers trying to please two masters. Management's ability to walk this political tightrope to the satisfaction of both is critical to understanding the yard's performance during the war.

Management

By the summer of 1942, the success that United States submarines were having in the Pacific sinking Japanese shipping received considerable press coverage, much of it advocating increased and accelerated production of submarines. Journalist David Lawrence urged that emphasis be placed on the building of submarines to close the gap that the Germans enjoyed in numbers. Lawrence wrote:

Why has the submarine been neglected in public discussions? . . .
Authoritative figures show that on Oct. 10, 1941, Japan had 71 submarines and seven building for a total of 78. Germany had 120 in service and 180 building for a total of 300. The United States had 113 in service and 73

building for a total of 186. . . It takes about 11 months to build a large submarine nowadays. Can this time be cut by the various speedup formulas that have helped us to turn out planes and cargo ships at record production? Very little is known by the public of submarine construction. There has been a great deal of secrecy about it but, with the splendid work being done by American submarines in the Pacific, the opportunity for stimulating the whole submarine program would seem to be increased by disclosing more and more about our offensive operations with the submarine.¹²

Portsmouth Navy Yard management was in the process of doing much as David Lawrence was suggesting, speeding up the traditional production rate of submarines by employing new and innovative techniques. However, it was one thing to casually suggest the speedup of submarine production and quite another thing to do it.

The transformation of the Portsmouth Navy Yard, from the custom shop operation that built two submarines a year in the 1930s to a mass producer of dozens of submarines a year by 1944, required a unique industrial environment. This section argues that the yard's success was the result of innovative management directing the efforts of a dedicated and empowered workforce in a relatively small shipyard with a sharply focused and well defined mission. All of these factors enabled the yard to operate very efficiently and thrive in an industrial environment that was characterized by loose corporate oversight of navy yards by the Bureau of Ships, leaving the yards free to manage their own affairs. In that environment, Portsmouth management developed production methods, tailored to the yard's strengths, that included employee empowerment, special teams, risk management, and submarine construction procedures that employed mass production techniques to the extent that it was possible to do so at the time. Prior to a detailed analysis of industrial methods and practices, it is important to understand the

¹² David Lawrence article with Washington date line, undated. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 1, Folder A1, "New Construction June 1940-December 1943."

context of the times, beginning with the situation at the Bureau of Ships and working down through the shipyard leadership and management to the waterfront industrial operations.

Loose Corporate Oversight of Navy Yards

In comparison to the detailed supervision and guidance imposed by the Naval Sea Systems Command on the naval shipyards today, Portsmouth Navy Yard received relatively little direction from higher authority during the war. The navy yard's immediate supervisor during World War II was the Bureau of Ships, newly created in June 1940. The Bureau of Ships (BuShips) spent a good part of the war in a crisis management mode that left little opportunity for the new organization to oversee shipyard operations. To a large extent, each navy yard was an entrepreneurial operation whose success, or failure, depended on local management decisions and initiative.

According to the Bureau of Ships self-history of operations during the war, "The role of the Bureau of Ships in management and supervision of the work in the naval industrial establishments had been restricted, in spite of its predominant interest, and had been subject to qualifications and limitations."¹³ The result was "decentralized, independent organizational growth"¹⁴ with each navy yard having different responsibilities and a variety of procedures to fulfill those responsibilities. The Industrial Relations Counselors Survey (1942) commented on the lack of coordination, communication, cross-training, and sharing of experiences between navy yards.¹⁵ The

¹³ *United States Naval Administration in World War II, Bureau of Ships*, 1946, Navy Department Library, Naval Historical Center, Washington, D.C., 135.

¹⁴ *Ibid.*

¹⁵ Industrial Relations Counselors Survey (1942), 1.

Bureau of Ships should have coordinated activities between navy yards and, apparently, did not. In essence, each navy yard was left to independently develop and tailor processes and procedures to their own individual needs. Portsmouth Navy Yard's ability to develop processes and procedures that took advantage of existing facility and workforce attributes proved to be quite exceptional.

The organizational change that left the navy yards lacking in organizational oversight during World War II had its roots in a long and tortured history of indecision about how best to manage and administer the navy yards. A 1945 survey of current navy yard operations, conducted by the Navy's Organization Planning and Procedures Unit, traced that volatile history to over a century of debate about the proper relationship between the Secretary of the Navy and the yards, the most efficient relationship between the Navy Department Bureaus and the yards, and the optimum internal organization of navy yards.¹⁶ According to the Bureau of Ships self-history, the genesis of the problem can be traced to the post-Civil War alignment of internal navy yard departments to Navy Department Bureaus that left a lack of cooperation and a division of loyalties in the navy yards:

The origin of many of the difficulties in defining the Bureau of Ships' role in Naval Yards goes back to 1 July 1868 when Secretary Welles extended the Bureau system [established in 1842] to the individual yards. In this action each bureau [Bureau of Construction and Repair, Bureau of Steam Engineering, Bureau of Ordnance, Bureau of Supplies and Accounts, and Bureau of Navigation] was assigned its own department in each yard and was permitted to handle its own supplies and materials. Each bureau dealt directly with its own department, with the result that cooperation often proved to be

¹⁶ Organization Planning and Procedures letter of 13 July 1945 to Assistant Secretary of the Navy Ralph A. Bard forwarding "Review of the Organization and Administration of Navy Yards and U.S. Naval Drydocks." This survey provides a summary of the history of navy yard organization and administration with recommendations for improvements. NARA College Park, RG 19, Bureau of Ships General Correspondence 1940-45, Box 785, Folder NY1/A3.

completely lacking. Although a Commandant commanded each yard, primary allegiance of department heads gravitated towards their bureau.¹⁷

Each navy bureau received annual Congressional appropriations and, thus, commanded great allegiance from its corresponding navy yard department upon which it was dependent for funds. The consequence was navy yard internal departments that were more loyal to their parent navy bureaus in Washington D.C. than to their commandant at the navy yard.

The inefficient bureau system continued to be a major problem until a 1938 audit report by the firm Booz, Fry, Allen, and Hamilton noted that, "In the gradual evolution of the two bureaus [Bureau of Construction and Repair and the Bureau of Engineering] the distinction between 'hull' and 'machinery' became increasingly obscure. . . This resulted in overlapping and duplication of work, inefficiency, and confusion."¹⁸ The inefficiencies became so bad that President Franklin Delano Roosevelt intervened and, in a letter of 16 March 1938 to Assistant Secretary of the Navy Charles Edison, complained of excessive delays in the cases of three cruisers under construction at the Philadelphia and New York Navy Yards. FDR did note that "The record on submarines is not so bad." However, FDR wrote, "In the case of the cruisers, the Philadelphia Navy Yard and, to a less degree, the New York Navy Yard need to be told that the Commander-in-Chief is much dissatisfied."¹⁹ Congress became involved and, on 20 June 1940, the 76th Congress passed Public Law 644 abolishing the Bureau of Construction and Repair and the Bureau

¹⁷ *United States Naval Administration in World War II, Bureau of Ships*, 1946, Navy Department Library, Naval Historical Center, Washington, D.C., 135.

¹⁸ *Ibid*, 25.

¹⁹ Quoted in *Ibid.*, 29-30.

of Engineering and establishing the Bureau of Ships to consolidate navy yard operations under one bureau.²⁰

Figure 9 shows the Navy Department organizational structure after the establishment of the Bureau of Ships. While the technical and management responsibility for all naval ships and navy yards resided in the Bureau of Ships instead of being split between the two feuding bureaus, it should be noted that the Bureau of Yards and Docks, Bureau of Ordnance, and Bureau of Supplies and Accounts continued to provide direction to the navy yards during the war. However, unlike the earlier, and faulty, “bureau system” that undermined the commandant’s authority, there were fewer bureaus and they were required to function through the navy yard commandant. The establishment of the Bureau of Ships solved some, but certainly not all, of the navy yard problems. As late as December 1944, Secretary of the Navy James Forrestal, who continued to be frustrated with the inefficient administration of the navy yards, wrote, “What I want is some man whose sole job is to examine the functions, to compare operations and handle difficulties [at navy yards]. We should have one man to go to.”²¹ Organizational revisions immediately after the war further consolidated these other bureau functions under the Bureau of Ships.

The consolidation of navy yard shipbuilding operations under one bureau in 1940 was a step in the right direction. However, the timing was bad as the new bureau rapidly grew from 1,000 to 6,000 employees during the war and never had a chance to organize

²⁰ *Ibid.*, 42.

²¹ Quoted in Organization Planning and Procedures letter of 13 July 1945 to Assistant Secretary of the Navy Ralph A. Bard, Enclosure A, 3c. NARA College Park, RG 19, Bureau of Ships General Correspondence 1940-45, Box 785, Folder NY1/A3.

itself, let alone the navy yards, before it was inundated with overwhelming wartime responsibilities.²² The Congressional Hearings on further naval expansion, held during the spring of 1940, almost simultaneously with the birth of the Bureau of Ships, continued the mobilization of shipbuilding that had begun with the outbreak of the war in Europe in 1939. The fall of France stirred up demands for further increase in the strength of the U.S. Navy and, by July 1940, with the Bureau of Ships celebrating its one month anniversary, the 70% Naval Expansion Act was passed, greatly expanding the workload of the new bureau:

This rapid increase in the size of the shipbuilding program created a host of problems in the administration of the new Bureau's work. The Shipbuilding Program on the books on September 1, 1939 was 360,000,000 man-hours; it had risen to about 2,250,000,000 man-hours on January 1, 1942 and 3,000,000,000 man-hours by 1 September 1942. Daily emergencies being the rule, little time could be devoted to the sort of work that would pay dividends only in the long-run.²³

As noted, the Bureau of Ships did little or no long range planning. Rather, it fought day-to-day emergencies and settled into a crisis management mode that left the navy yards to fend for themselves. Concerning the Bureau of Ships inability to function effectively during this period, industrial mobilization historian Robert Connery wrote, "The Bureau of Ships was going through a period of indigestion caused by the amalgamation of the Bureau of Steam Engineering and the Bureau of Construction and Repair and its administrative processes were confused."²⁴ The bad case of indigestion at the Bureau of Ships had been the result of an unprecedented glut of shipbuilding contracts.

²² *United States Naval Administration in World War II, Bureau of Ships*, 1946, Navy Department Library, Naval Historical Center, Washington, D.C., Table 5, "Personnel On-board by Months, 1933-45."

²³ *Ibid.*, 201-202.

²⁴ Robert H. Connery, *The Navy and Industrial Mobilization in World War II*, 74.

Table 4, which places the establishment of the Bureau of Ships chronologically with annual naval appropriations for ship engineering, gives one a sense of the overwhelming workload that the newly created Bureau faced.

**Table 4 - Bureau of Ships Naval Appropriations (1935-1944)²⁵
(Bureau of Construction & Repair before 1940)**

1935	\$29,204,200
1936	\$39,490,233
1937	\$40,550,000
1938	\$41,559,300
1939	\$59,681,590
1940	\$84,072,000
BUREAU OF SHIPS ESTABLISHED 20 JUNE 1940	
1941	\$228,898,180
1942	\$1,497,470,000
1943	\$1,708,979,935
1944	\$1,733,880,000

The Bureau of Ships quickly found that it was responsible for managing budgets that were twenty to thirty times larger than the Bureau of Construction and Repair managed just a few years earlier.

Recognizing that the Bureau of Ships was overwhelmed with the nation's revitalized shipbuilding program, Secretary of the Navy Frank Knox, in January 1941, directed the navy yard commandants to operate independently of the Bureau of Ships to the maximum extent possible:

During the present emergency, it is directed that Commandants of all Navy Yards act with the full authority of the Bureau of Ships taking final local action to the greatest extent possible.²⁶

²⁵ *United States Naval Administration in World War II, Bureau of Ships, 1946*, Navy Department Library, Naval Historical Center, Washington, D.C., Table 2, "Decline and Renaissance of the Navy."

²⁶ Secretary of the Navy Frank Knox letter of 15 Jan 1941 to Chief Bureau of Ships and Commandants All Navy Yards, Subject: National Defense Shipbuilding Program – Expedition and Prosecution of Work. NARA College Park, RG 24, Bureau of Naval Personnel General Correspondence, 1941-45, NY1 (66-176) to NY2 (551-661), Box 1601, Folder NY 166-176.

Knox further directed that the only technical issues to be forwarded to the Bureau of Ships for concurrence, prior to shipyard action, were those deemed necessary by the shipyard commandant. This policy, which Knox promulgated to enable the navy yards to accelerate production to achieve the ambitious naval shipbuilding programs passed in the summer of 1940, became the modus operandi for the duration of the war.

Not only were the orders for new ships growing at an unprecedented rate, but changes to those orders were frequently necessary to accommodate changing war plans. On one hand, America's success during World War II was the direct result of an industrial flexibility that was able to shift production quickly from one goal to another. On the other hand, the shifting of workload priorities amongst shipbuilding orders created an unmanageable situation for the fledgling Bureau of Ships. According to a Bureau of Ships report, "Not one month of the twenty-four under consideration [Jan 1942-Jan 1944] passed without the Bureau of Ships receiving at least one directive either ordering a ship to be built or canceling others previously ordered."²⁷ Chief of the Office of Procurement and Material Rear Admiral S.M. Robinson told the Under Secretary of the Navy in July 1942, "Since the beginning of 1942, the Navy Shipbuilding Program has been in almost continuous turmoil."²⁸ There can be little doubt that, in the summer of 1942, when Portsmouth Navy Yard was ramping-up facilities and employment to meet accelerated production schedules, it could expect little help from the Bureau of Ships.

²⁷ *Ibid.*,327.

²⁸ Chief of the Office of Procurement and Material Admiral S.M. Robinson's memo of 31 July 1942 to the Under Secretary of the Navy. Quoted in full in *United States Naval Administration in World War II, Bureau of Ships*, 1946, 201-202. Navy Department Library, Naval Historical Center, Washington, D.C.

In July 1942, “at a time when the production and scheduling of the Bureau of Ships was, for the first time, beginning to assume some semblance of order, following the initial wartime adjustment period,”²⁹ the Combined Chiefs of Staff decided to launch the North Africa offensive as soon as possible and shipbuilding priorities had to be restructured to insure the landing craft and support ships would be available to support the operation.³⁰ The Chief of Naval Operations shifted ship construction priorities frequently, depending upon the progress of the war, leaving the Bureau of Ships struggling to restructure and reassign shipyard workloads.³¹

War, by its very nature, requires constant reassessments and revisions to plans. The Bureau of Ships self-history of World War II, however, attributed the chaotic conditions in which it was required to operate to a lack of coordinated advance planning between the Secretary of the Navy and the Chief of Naval Operations. The Bureau also believed that President Roosevelt’s personal involvement in naval matters further added to the confusion, “The personal handling of many matters by President Roosevelt was

²⁹ *Ibid*, 331.

³⁰ *Ibid*, 333.

³¹ World War II shipbuilding priorities were assigned on a basis of A, B, C for the highest priority projects and then numerically for the others of lower priority. For example, landing craft enjoyed an “A” priority in the summer of 1942 in preparation for the North Africa campaign discussed above. Submarines, despite their obvious important contributions to the war effort, never enjoyed a high industrial priority during the war. On a priority system ranking of 1 to 10, submarines were most often ranked 7th with the priorities 8 to 10 not used or assigned to “all other vessels.” According to the Bureau of Ships self-history, “Submarines in view of our comparative strength in the class, received seventh priority and all other vessels following.” Perhaps the low assignment of priorities to submarine construction was also done with the belief that the submarine community would produce satisfactory results no matter what priorities were assigned, as was certainly the case. One can argue that the national shipbuilding priority system contributed to Portsmouth Navy Yard’s independence and stability during the war in that constantly changing priorities kept the Bureau of Ships fully occupied with little time to devote to navy yard operations. At the same time, the ever changing priorities kept the non-submarine shipyards in constant turmoil while Portsmouth, in comparison, was little affected by changes to priority or workload. See *United States Naval Administration in World War II, Bureau of Ships*, 1946, Navy Department Library, Naval Historical Center, Washington, D.C. 593, Table 40, 599.

well known and tended to give advantage to the individual who could get to him with his case.”³² The end result was a failure to plan in advance that “led to haphazard development of requirements” that “made the job of the Bureau much more difficult than it would have been if greater stability had prevailed.”³³

The need for the newly created Bureau of Ships to come to grips with a vast array of material procurement issues also distracted the bureau’s attention from the management of navy yards. The logistics problems associated with the mobilization of private industry, to provide basic components and equipment for shipbuilding, were especially taxing to the Bureau of Ships:

Although the most obvious interest of the Bureau of Ships was in the expansion of shipyards. . . its greatest headache centered on the problem of upland facilities capable of manufacturing the components and materials necessary to keep the shipyards supplied. It is not unreasonable to state that the Bureau devoted as much effort to the increase of production capacity in supporting industries as to the increase in shipbuilding facilities.³⁴

Again, the Bureau of Ships had pressing needs in several areas of responsibility that kept it from devoting sufficient attention to the navy yards.

Ineffective leadership also plagued the Bureau of Ships during the hectic summer of 1942. The first chief of the new bureau, Rear Admiral Samuel Robinson, was widely respected and especially enjoyed the confidence of Assistant Secretary of the Navy James Forrestal. Historian Robert Albion described Robinson as “wise, shrewd, and technically

³² *United States Naval Administration in World War II, Bureau of Ships*, 1946, Navy Department Library, Naval Historical Center, Washington, D.C., 324.

³³ *Ibid.*, 326.

³⁴ *Ibid.*, 162.

competent.”³⁵ Forrestal promoted Robinson to head procurement operations for the entire Navy in February 1942. According to Albion, “His [Robinson’s] successor [Rear Admiral Alexander H. VanKeuren] proved unable to hold in check the disruptive forces and ambitions within the Bureau of Ships and it was drifting into ineffectiveness.”³⁶ Forrestal replaced VanKeuren after only eight months in the job, in November 1942, with Rear Admiral Edward L. Cochrane. Cochrane proved much more capable and remained in the job throughout the war until November 1946.

Looking up the corporate ladder from the vantage point of Portsmouth Navy Yard in December 1942, one year after Pearl Harbor, it must have been obvious to shipyard management that they were pretty much on their own. The overwhelmed bureau to which they reported, and from which they should have received support and guidance, had only been in existence for eighteen months and the admiral in charge had just been removed for ineffective performance. It would be a while longer before the Bureau of Ships could assume any semblance of control over navy yard operations. In the meantime, Portsmouth Navy Yard had dozens of orders for new submarines and had to get on with the measures necessary to meet those production goals.

Throughout 1943 and 1944, Portsmouth Navy Yard not only met, but greatly exceeded, production goals. This was not the case for many shipyards, as evidenced by a September 1943 Bureau of Ships letter that noted, “110 of the 342 [ships] actually

³⁵ Robert Greenhalgh Albion and Robert Howe Connery, *Forrestal and the Navy* (New York: Columbia University Press, 1962), 61.

³⁶ *Ibid.*

scheduled for delivery in August did not meet their date.”³⁷ The letter highlighted the need for the bureau to receive more accurate progress reports from the shipyards. Not only was the Bureau of Ships unable to actively manage the shipyards, it was also having difficulty keeping up to date on the progress of ships under construction at the yards. In late 1943, the Bureau of Ships continued in a crisis management mode with many shipyards adding to that crisis by failing to meet scheduled completion dates. What little attention the bureau could give to shipyards was better directed at the deficient yards and not at the better performing yards like Portsmouth Navy Yard.

An exponentially growing and constantly changing shipbuilding program, massive material procurement issues, ineffective leadership, and the internal administrative burdens of organizing and managing the newly created and rapidly growing Bureau of Ships left little time or opportunity for the bureau to effectively oversee navy yard operations. For the most part, navy yards were left to their own devices to manage their own affairs. Fortunately, in Portsmouth’s case, those devices were considerable and well managed.

A Relatively Small Navy Yard

The Industrial Relations Counselors Survey (1942) noted that, “The expanse of the waterfront at all Yards [New York, Boston, Puget Sound, and Mare Island] tends to retard the transfer of gangs between ships and makes for a more rigid operating situation than is normally found in commercial yards.”³⁸ In comparison, Portsmouth Navy Yard had a rather limited and compact waterfront area that lent itself to the efficient transfer of

³⁷ Chief Bureau of Ships Confidential letter of 18 Sep 1943. NARA Waltham, RG 181, Shipyard Formerly Confidential Correspondence 1930-50, Box 3, Folder L6-3, “Progress Reports.”

³⁸ Industrial Relations Counselors Survey (1942), 2.

teams from submarine to submarine, and a high degree of flexibility not found in the other navy yards. Left to its own devices to manage its own workload, the smaller yard with the more homogeneous workload would have a much better chance of developing successful practices and processes than a larger shipyard with a complex workload. At peak wartime employments, Portsmouth was the smallest navy yard and the only one able to specialize in the construction of a single type of ship.

The Industrial Relations Counselors Survey (1942) also noted that the industrial departments in all navy yards had increased three to four fold in less than two years. The three to four fold employment increases would pale in comparison to the peak employments reached at each yard later in the war. Table 5 compares civilian employment levels at each navy yard on 1 July 1938 with the peak employment reached during the war.³⁹

Table 5: Navy Yards Employment (1938 – WWII Peak)

<u>Navy Yard</u>	<u>7/1/1938</u>	<u>Peak During WWII</u>	<u>Multiple Increase</u>
Portsmouth	3273	20461	6.25
Boston	2860	50128	17.52
New York	6876	69128	10.05
Philadelphia	5636	46454	8.24
Norfolk	5739	42372	7.88
Mare Island	4756	39736	8.35
Puget Sound	3469	32643	9.41
Pearl Harbor	1974	24916	10.69
Terminal Island	-----	15971 (temporary)	
San Francisco	-----	17174 (temporary)	
Total	35655	384997	10.80

³⁹ *United States Naval Administration in World War II, Bureau of Ships*, 1946, Navy Department Library, Naval Historical Center, Washington, D.C., 145.

The table shows that Portsmouth, one of the smaller navy yards in 1938, experienced considerably less growth during the war than the other navy yards. Portsmouth increased by a factor of 6.25 while all navy yards increased by an average factor of 10.8. Relative to the other yards, Portsmouth's smaller, specialized, and concentrated workforce had better opportunities to optimize production than the other yards.⁴⁰

Well Defined Mission

Earlier it was argued that Portsmouth Navy Yard enjoyed a distinct workload advantage over the other navy yards, at the start of World War II, because the U.S. Navy had decided to develop the submarine design and new construction capabilities at the yard during the 1920s and 1930s. The shipyard exploited that opportunity to the fullest through continued outstanding performance. The success of Portsmouth Navy Yard during World War II was the direct result of an even more focused and specialized workload during the war.

The Industrial Relations Counselors Survey (1942) noted great disorganization and confusion in other navy yards and highlighted the production control and scheduling advantages that private shipyards, engaged only in the new construction of ships, enjoyed over the navy yards surveyed. Those navy yards serviced the fleet with ship repairs and overhauls, often of an emergency nature.⁴¹ The study reported that the private shipyards could build a more orderly and disciplined work environment, whereas the navy yards surveyed might have "thousands of employees thrown aboard a single ship to expedite

⁴⁰ Electric Boat, a relatively small private shipyard, enjoyed advantages similar to those of Portsmouth Navy Yard during the war. It grew from 2900 employees in August 1940 to a peak of 12,466 employees during the war, a multiple of only 4.3. Electric Boat also specialized in submarine construction like Portsmouth Navy Yard. See Horn, *Submarines and the Electric Boat Company*, Page V-3 – V-5.

⁴¹ Industrial Relations Counselors Survey (1942), 1-2.

the work by having men available when and where they are needed, [and] gangs are constantly forced to stand by waiting for other crafts to finish up or for servicemen to bring up necessary material or equipment.”⁴² In this regard, Portsmouth Navy Yard enjoyed the same advantages as the private shipyards and, for the most part, did not have to deal with the chaotic repair and overhaul work environment that characterized the inefficient operations at other navy yards.

The Booz-Allen Survey (1944) heaped credit on the yard for its ability to focus resources and streamline work practices towards a single objective, the construction of submarines. According to the survey, “Any present judgment of the organization, administration, and control procedures of the Navy Yard, Portsmouth, N.H. must give great weight to the development of the Yard, subordinating all other considerations to the demands of the war effort, into a specialized construction activity for submarines only. All operating units have been streamlined for this sole purpose.”⁴³ The U.S. Navy’s goal to develop the submarine design and production capabilities of the yard between the wars, and the yard’s local strategy of the mid and late-1930s to shed all other work, except submarine new construction, had been a resounding success. This strategy, which served the shipyard’s interests so well, served the war effort even more. The U.S. Navy would have had far fewer submarines than were ultimately needed to win the war in the Pacific had Portsmouth Navy Yard not been able to perform as it did early in the war.

⁴² *Ibid.*

⁴³ Booz-Allen Survey (1944), 3.

Table 6 shows the yard's transition from a preponderance of overhaul work in the early 1930s to specialized submarine construction during World War II.⁴⁴

Table 6: Portsmouth Navy Yard Workload Mix (1931-1945)

	1931	1932	1933	1941	1942	1943	1944	Aug1945
Subs Building	1	2	2		4	12	19	32	12
Yard Craft Built	2					1	2	7	
Overhauled Subs	7	8	7		2	5	4	10	19
Ships Overhauled		2				2	1	6	16
Yard Craft Repaired							3	1	
Subs Ovhd/ Built	7	4	3.5		.5	.42	.21	.31	1.58
Yard Employment	1552	1477	1595		11,142	18,326	20,466	17,102	10,133

During the early 1930s, the shipyard overhauled many more submarines than it built and built surface ships and yard craft as well. Although not shown on this table, the shipyard built its last surface ship, U.S. Coast Guard Cutter *Hudson*, in 1934.⁴⁵ During the boom submarine construction years 1942-44, when employment levels were ten times higher than the early 1930s, the shipyard overhauled far fewer submarines annually than it did in the early 1930s. The ratio of Subs Overhauled / Built clearly shows the streamlining for new construction during the war years to which the Booz-Allen Industrial Survey (1944) referred. With most of the United States submarine fleet deployed to the Pacific theater, the West Coast shipyards assumed a disproportionate share of the submarine repair and overhaul workload, leaving Portsmouth Navy Yard relatively free to concentrate on the construction of new submarines.

⁴⁴1930's data is from the Industrial Manager's Annual Reports. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 22, Folder A9-1/Y1 "Annual Reports Commandant First Naval District 1925-34." The 1930s data is a fiscal year summary ending on 30 June. 1940's data is from "Portsmouth Naval Shipyard During World War II," Official Administrative History, Portsmouth Navy Yard, Kittery, Maine, 3.

⁴⁵ *Cradle of American Shipbuilding*. The USS *Hudson* is listed near the back of the booklet as the last surface ship built at Portsmouth Navy Yard.

Figure A-3 in the appendix, Portsmouth Navy Yard Manpower Curves by Work Category (1940-1945),⁴⁶ shows even more conclusively the streamlining for new construction. The Manpower Curves show the phasing out of the repair workload (shaded on Figure A-3) between early 1940 and early 1942. In the second quarter of 1940 the 1,500 men per day expended on repairs approximated that on new construction. By January 1942, only a few hundred men per day were assigned to repair/overhaul work and over 6,000 men a day were working on new construction. As can be seen in Figure A-3, the shipyard's workload continued to reflect negligible repair work in comparison to new construction work until the end of 1944. There is no doubt that the shipyard's workload was streamlined towards new construction during the shipyard's glory years from early 1942 through the end of 1944.

Not only could the shipyard concentrate on one type of work, it was protected from external changes in priorities for the scheduling of that work. Those shipyards that handled a mix of ship types and work packages, including repairs and overhauls, were subject to ever shifting priorities that resulted in the need for frequent short-notice internal shipyard scheduling revisions. For example, Jeffery M. Dorwart, discussing the shifting wartime priorities at the Philadelphia Navy Yard, described how that yard's workload shifted from the construction of battleships, to destroyer escorts, to amphibious ships, to heavy cruisers, to aircraft carriers:

In 1942, the Navy Department changed building priorities from battleships to destroyer escorts for an anti-submarine war in the Atlantic. . . FDR announced an emergency program in April 1942 to build landing craft for North African, European, and later Pacific amphibious operations. . . With victory in Europe becoming more certain by 1944, League Island [Philadelphia Navy Yard] turned

⁴⁶ *Administrative History: Portsmouth Naval Shipyard in World War II*, Portsmouth Naval Shipyard Museum Archives, Kittery, Me., Chapter Ic, Production Graphs.

to construction of heavy cruisers and aircraft carriers to fight the Pacific War against Japan.⁴⁷

Philadelphia Navy Yard found it difficult to plan for a moving target while Portsmouth Navy Yard could continuously improve upon its planning for a stationary target, submarines, for the duration of the war.

The Chief of Naval Operations priority system for navy yard work, in order of precedence, was overriding priority, first priority, second priority, and new construction priority.⁴⁸ The first three priorities were all related to war damage and urgent repairs with each priority subcategorized according to urgency by ship type. Under the new construction priority, submarines were generally low on the ship-type list, with landing craft, transport ships, and other surface ships often high on the list to support the next invasion or coordinated assault. As a result, submarine new construction enjoyed a low priority – on paper. However, the ability of Portsmouth Navy Yard to bulk order material more than neutralized any disadvantages of a low priority. While other shipyards were whipsawed back and forth with waves of changing priorities, according to the fortunes of war, the priorities of Portsmouth Navy Yard never wavered. The shipyard's charge for the entire war remained constant; to build as many submarines as possible as fast as possible. The ability to specialize in one line of work was, unquestionably, one of the keys to the shipyard's success during the war.

⁴⁷ Jeffrey M. Dorwart, *The Philadelphia Navy Yard: From the Birth of the U.S. Navy to the Nuclear Age* (Philadelphia: University of Pennsylvania Press, 2001), 186.

⁴⁸ Vice Chief of Naval Operations F.J. Horne letter of 12 Jul 1943, NARA College Park, RG 80, Records of the Navy Department 1798-1947. Formerly Security Classified General Correspondence of the CNO / Secretary of the Navy 1940-1947, Box 897, File L9-3/NY-NY1.

Once Portsmouth Navy Yard started to deliver new submarines at record rates, there was never any serious attempt by the Navy Department to direct other types of work to Portsmouth until the end of the war. The U.S. Navy had many material procurement problems but getting submarines out of Portsmouth Navy Yard was certainly not one of those problems. Rather than attempt to fix what was not broken, the Navy left Portsmouth free to continue to do its thing. The Navy did, however, tap the shipyard's expertise and resources to assist Mare Island Navy Yard and Cramp Shipbuilding in Philadelphia in their efforts to build submarines. Portsmouth Navy Yard was a CEO's dream. The facility consistently achieved great production and quality with little or no investment of time or effort on the part of corporate management.

Effective Leadership

Outstanding leadership is critical to the successful management of any industrial operation and Portsmouth Navy Yard was blessed with one of the most respected leaders of the submarine community during the war. Rear Admiral Thomas Withers relieved Rear Admiral J.D. Wainwright as Commandant Portsmouth Navy Yard on 10 June 1942. Withers remained in charge of the shipyard until late 1945. His immediate assignment, prior to coming to Portsmouth, was as Commander Submarine Force Pacific Fleet, where he had witnessed the attack on Pearl Harbor and directed the first deployment of United States submarines in response to the attack.

As an eye witness to the very first minutes of the war, Withers reportedly witnessed the first Japanese "sinking" by a US submarine when, on the morning of 7 December 1941, during the attack on Battleship Row, a machine gunner on USS *Tautog*

downed a Japanese plane.⁴⁹ As Commander Submarine Force Pacific Fleet, Rear Admiral Withers rallied the twenty-one fleet submarines under his command and sent them to sea to “commence unrestricted submarine warfare against all Japanese merchant and military units.”⁵⁰ In an inspirational message to the men of his command shortly after the attack, Withers wished them, “Good luck and good hunting, hit ’em hard.”⁵¹

Prior to his assignment at Pearl Harbor, Withers had enjoyed a long and illustrious career in submarines. After his graduation from the U.S. Naval Academy in 1906, Withers assumed his first submarine command, the USS E-1, in 1914. During World War I, he was awarded the Navy Cross for meritorious service and the Cuban and Santo Domingo campaign medals for his participation in those operations. After the war, he progressed through operational commands of ever greater responsibility including Commandant of the New London Submarine Base and Commander Submarine Force Pacific Fleet in January 1941.⁵²

In 1928, as Commander Division 4, Withers had advanced the concept that U.S. submarines should be used as independent commerce raiders, much as the Germans had done in World War I, rather than scouting units in conjunction with fleet or coastal defense. As a consequence, he is credited with helping to change the direction of the submarine policy of the United States. His concept of independent submarine operations required submarine designs with longer ranges, better sea-keeping ability, and improved

⁴⁹ Theodore Roscoe, *United States Submarine Operations in World War II*, 10.

⁵⁰ COMSUBPAC message dated December 1941, Subject: Mission Orders, www.subsowespac.org/ptc4/cycle1.htm.

⁵¹ *Ibid.*

⁵² Withers was assigned as Commander Submarine Scouting Force from January 1941 to May 1942. This command became Commander Submarine Force Pacific Fleet at the outbreak of World War II.

habitability.⁵³ United States submarines, designed and operated as Commander Withers envisioned in the late 1920's, would go on to sink massive amounts of Japanese tonnage and play a key role in winning World War II. It was only logical that the Navy would assign one of its most innovative thinkers, and an expert in submarine design, to head up the expanding submarine design organization at Portsmouth Navy Yard. It was an added benefit that Withers' trusting, low-key management style was just what the shipyard needed to fully develop its production potential.

In the summer of 1939, Captain Withers had been a member of the Court of Inquiry that convened at Portsmouth Navy Yard to investigate the sinking of the USS *Squalus*.⁵⁴ This investigation carried on for several months and gave him ample opportunity to become familiar with the shipyard. By the time he assumed command of the yard in June 1942, Withers had a good understanding of the shipyard and its operations. In its coverage of Withers' change of command ceremony, the *Portsmouth Herald* reported:

A man who has been associated with submarines during the better part of his career in the navy, it is expected that the new commandant will create new and powerful factors in production at the Portsmouth Navy Yard.⁵⁵

Indeed, under Withers, the yard would create new and powerful production factors. Rarely had a newspaper more accurately predicted the future.

⁵³ Commander Submarine Force Pacific Fleet website, www.csp.navy.mil/admirals/withers.htm.

⁵⁴ *Portsmouth Herald*, 19 Jun 1939, front page has a picture of the Board of Inquiry that includes Captain Withers.

⁵⁵ *Portsmouth Herald*, 11 Jun 1942, "Withers Takes Command of Portsmouth Navy Yard," 1.

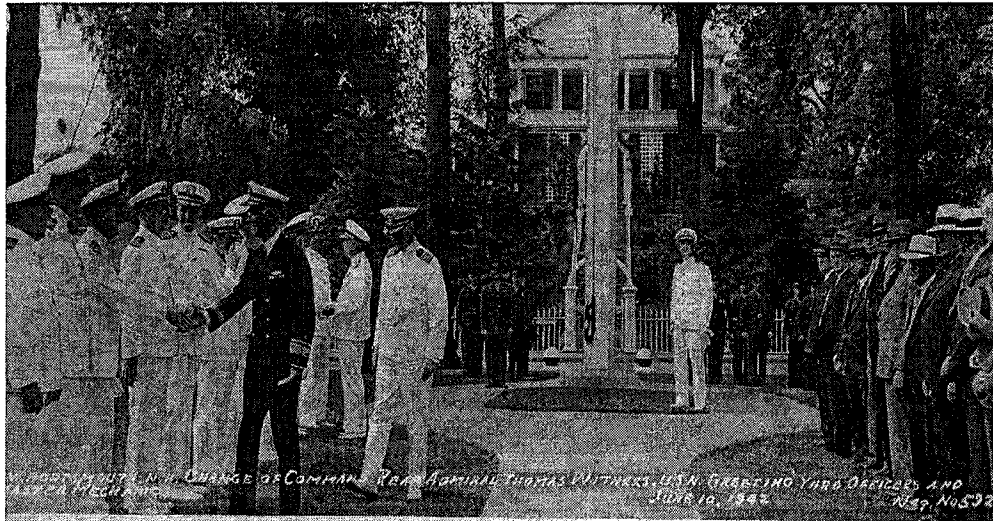


Figure 10: Rear Admiral Thomas Withers Greeting Managers, Change of Command (10 June 1942). Courtesy of Milne Special Collections University of New Hampshire, Durham, N.H.

According to a U.S. Navy press release, Withers apparently possessed what later management schools described as good people skills:

A kindly, soft-spoken officer, Radm Withers gained unlimited support and praise from his sailors after leasing the Honolulu Royal Hawaiian Hotel for permanent use as a rest Camp deluxe for submarine sailors in port.⁵⁶

Gary Weir described Withers as “always quiet, and amiable – but perceptive and precise.”⁵⁷ Fred White fondly remembered Withers and confirmed his popularity with shipyard workers. White said that “Admiral Withers was a much respected man whom everybody liked because he let everyone do their job.”⁵⁸

Withers fits the description of a transformational leader as conceived by James MacGregor Burns in his seminal work, *Leadership*, and developed extensively in follow-on works by Burns, Bernard M. Bass, and others. According to Burns, a transformational

⁵⁶ Commander Submarine Force Pacific Fleet website, www.csp.navy.mil/admirals/withers.htm.

⁵⁷ Gary Weir, *Building American Submarines 1914-1940*, 40.

⁵⁸ Oral interview with Fred White, 3 Apr 2006, at his home in New Castle, N.H.

leader satisfies higher needs, and the needs of the follower, by engaging the full person of the follower to create “a relationship of mutual stimulation and elevation that converts followers into leaders.”⁵⁹ Bass adds that transformational leadership is more likely to emerge in time of stress and disorganization, and in organizations more open to growth and change” during which transformational leaders “delegate as much as they can to their subordinates” while providing subordinates “a vision of what they might be able to accomplish with extra effort.”⁶⁰ Indeed, Withers was a visionary leader who satisfied the higher need of dramatically increased wartime production, and his subordinates need to maximize their individual contributions to the war effort, by creating an environment of mutual trust and respect, characterized by extensive delegation of responsibility.

It is not a stretch to assume that Withers exhibited the same trust and confidence in his shipyard managers and workers that he had in the submarine officers and crews that he sent to war after the attack on Pearl Harbor. With little fanfare, he encouraged both to do their jobs independently and aggressively. Rear Admiral Withers’ inspirational, low-key leadership and confidence in his managers and employees was important to the yard’s success. Under his leadership, managers and employees were empowered and encouraged to work more independently than they would have been under a more authoritative shipyard commander.

Complimentary Leadership Styles

There is a school of thought that teaches that effective organizations often have executives with different, but complimentary leadership styles. One crude example is the

⁵⁹ James MacGregor Burns, *Leadership* (New York: Harper & Row, 1978), 4.

⁶⁰ Bernard M. Bass, *Leadership and Performance Beyond Expectations* (New York: The Free Press, 1985), xiv.

“good cop – bad cop” police interrogator team that might question criminal suspects. Onboard naval ships, some think that the Commanding Officer and the second in command, the Executive Officer, team best when one is a disciplinarian and the other a humanitarian. The top two executives at Portsmouth Navy Yard during the war, Commandant Rear Admiral Thomas Withers and Industrial Manager Captain H.F.D. Davis, had contrasting and complimentary leadership styles.

Prior to discussing leadership attributes, it is important to note that the Commandant and the Industrial Manager were members of two different naval officer communities. Rear Admiral Withers was an unrestricted line officer and, as such, had spent a naval career operating and commanding submarines and submariners. Captain Davis, on the other hand, was a restricted naval officer, meaning that he was a specialist in a selected field. Davis’s specialty was ship construction. In this capacity, he had spent most of his naval career in the shipbuilding industry in charge of industrial shops and large numbers of civilian employees. Under the rules at the time, Captain Davis, as a restricted officer, could never be promoted to command a ship, submarine, or navy yard. Prior to reporting to Portsmouth in June 1940, Davis had been the Planning Officer at Philadelphia Navy Yard and, when detached from Portsmouth in June 1944, Davis became the Supervisor of Shipbuilding at the Bethlehem Steel Corporation at Quincy, MA. While Withers was responsible for all facets of operations at the Portsmouth Navy Yard, Davis was responsible for the Industrial Department and to him goes much of the credit for the yard’s successful expansion and outstanding productive performance. At the

same time, Commandant Withers deserves much credit for giving Davis the freedom to, as Fred White put it, "Do his job."⁶¹

Figure 9 shows the three major department heads, all naval captains, which reported to the commandant during the war; the Captain of the Yard, the Supply Officer, and the Industrial Manager.⁶² The Captain of the Yard was primarily responsible for the naval personnel attached to the yard and various administrative matters. The Supply Officer was primarily responsible for purchasing and managing material. The Industrial Officer was responsible for all the shops and industrial operations on the yard. In that capacity, he had two other senior naval captains reporting to him; Captain Andrew I. McKee, the Planning Officer, and Captain Sidney E. Dudley, the Production Officer.⁶³ While the Industrial Manager appears to share equal billing with the other two major department heads shown on Figure 9, such was not the case in the day to day business of the shipyard. On 15 November 1943, when the shipyard employment peaked at 20,445 employees, roughly 18,000 of those employees worked for the Industrial Manager and the remainder were split among the other shipyard departments. The shipyard's mission during the war, to build as many submarines as possible as fast as possible, rested squarely on the shoulders of Captain H.F.D. Davis.

Withers was a widely respected, self-assured, unassuming man of few words who inspired trust and confidence in his followers. Withers managed with a soft hand, always

⁶¹ Oral interview with Fred White, 3 Apr 2006, at his home in New Castle, N.H.

⁶² Other officers reporting to the commandant included the Medical Officer, the Officer-in-charge of the Prison, the Officer-in-Charge of the Marines, and the Communications Officer.

⁶³ At the start of the war, the Public Works Officer and the Disbursing Officer also reported to the Industrial Manager. "Industrial Department Organizational Chart - 1940." NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 10, Folder A3/NY1, "Organizational Charts for Officer Personnel Under Manager, 1934-43."

quick to offer praise for a job well done. Employee morale was always close to the top of his priority list. For example, in an August 1943 memo to all shipyard supervisors that emphasized the need for efficient use of resources, Withers concluded, “Finally, that the ‘human relations – the morale factors’ be made and kept as good as possible.”⁶⁴ Davis, on the other hand, was more of a problem solver than a morale booster. On one occasion, when Commander Spiller suggested that employee morale was the Industrial Department’s most important problem, Davis suggested that they first confine their attention to “concrete management problems” for which they were primarily responsible.⁶⁵ Concrete management problems included the improvement of working conditions and the clarification of assignments and priorities. Clearly, Davis was not a “touchy, feely” manager. Withers, however, was always sensitive to employee concerns and quick to address and resolve any personnel issues. Their management styles were a study in contrasts.

Withers’ directives were typically brief, clear, and to the point. He was a big picture type of manager, in the style of Ronald Reagan, who set the tone and objectives for the organization but left the management of details to subordinates. Industrial Manager Captain Davis, on the other hand, was a hands-on manager who reveled in the details of his responsibilities. His directives were typically long, if not verbose, with considerable explanation and detail to back up his position. Davis kept the waterfront

⁶⁴ Commandant Rear Admiral Thomas Withers memo of 28 Aug 1943, Subject: Economy in Naval Expenditures. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 14, Folder A3-2/LC PKG 8.

⁶⁵ Report of Manager’s Conference of 21 Jun 1943, Subject: General Programs, Purpose, and Specific Problems for Next Meeting. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 13, Folder A3-2 “Genera Management.”

supervisors on edge with his incessant suggestions and demands for improved performance.

Captain Davis' effort in July, 1943 to stress welding as the critical path to successful completion of the scheduled twenty-eight submarine program is an excellent example of the attention to detail that he typically applied to his work. In a memo to the shipyard managers, Davis led the readers through an analysis that started with the fact that 71,148 pounds of welding rod had been used on the recently completed SS285 and concluded that 2,000,000 pounds of welding rod would have to be laid to complete 28 submarines in the next year. Following an analysis of sixteen months of personnel gains and losses in the Welding Shop, Davis determined that the welders then available would have to reduce non-work days and weld at an average rate of 7,126 pounds per day to meet the schedule. Noting that this rate was only possible with the full cooperation of all the other shops, Davis solicited that support. Such was Captain Davis' delight in details.⁶⁶

Another example of Captain Davis' attention to detail and thoroughness of planning involved his efforts to bring order to the personnel disruptions caused by the Selective Service process. Those efforts resulted in a precedent setting arrangement with the Selective Service, that set a long term release schedule for employees with special skills, so that Captain Davis and his managers could anticipate manpower needs and train replacements accordingly.⁶⁷ Davis thrived on such detailed and orderly planning.

Fred White's assessment of the two leaders, as the result of personal experiences with both during the war, highlights their contrasting management styles. While Withers

⁶⁶ Manager memo of 13 Jun 1943. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 36, Folder N5 14, "Welding Shop."

⁶⁷ See the Selective Service section under Employees in this chapter for further details on the Selective Service agreement.

was respected and well liked, White remembers Captain Davis as “a meddler and a man of many ideas that seldom worked.” When pushed for an example of one such idea, White told the story of a scheme Davis concocted to minimize inefficient use of riggers. In fairness to Captain Davis, time lost when needing a rigger and not having one, or having riggers stand-by waiting to accomplish a job that ran late, resulted in great inefficiency in a shipyard. According to White, Davis sought to minimize that inefficiency by having all the riggers assigned to the fitting-out pier assembled in a shack, at a central location, to wait for a call for their services that would be made by the hoisting of a flag on specially constructed poles alongside each of a half dozen submarine berths. While Davis’ idea sounds quite reasonable, White and others were convinced that the daily informal communications on the waterfront were more than adequate to anticipate the need for riggers. As White recalled, the shack was built, but [lacking the enthusiastic support of the riggers] the idea was abandoned before the flagpoles were erected.⁶⁸

While Captain Davis may have been somewhat of an irritant to Fred White and the other Shop Masters, there is little doubt that he was a presence and a force on the waterfront that kept the industrial pot stirring. If he was a man of ideas that did not always work, he was also a man constantly looking for another approach, a novel way to get the job done. Imagination and innovation thrive in an organization where the leader practices and encourages such thinking. As this study shows throughout, Portsmouth Navy Yard had an abundance of both during the war.

⁶⁸ Oral interview with Fred White, 3 Apr 2006, at his home in New Castle, N.H.

Senior Management Continuity

Both Commandant Rear Admiral Thomas A. Withers and the Industrial Manager, Captain H.F.D. Davis, held their shipyard leadership positions for most of the war years. Withers held command from 10 June 1942 until November 1945 and Davis served in his position from 28 June 1940 until 25 May 1944. As Table 7 shows, the other senior managers in critical industrial positions enjoyed similar longevity in their jobs.⁶⁹

Table 7: WW II Leadership Continuity at Portsmouth Navy Yard

<u>Position</u>	<u>Person</u>	<u>Reported</u>	<u>Detached</u>	<u>Duration (mos.)</u>
Commandant	Radm T. Withers	10 Jun 1942	Nov 1945	41
Industrial Mgr	Capt. Davis	28 Jun 1940	25 May 1944	47
Production Officer	Capt. Dudley	Aug 1941	25 May 1944	34
Planning Officer	Capt. McKee	Mar 1938	20 Jan 1945	82
Hull Supt	Capt. Spiller	3 Sep 1941	Jul 1945+	46+
Machinery Supt	Capt. Ambrose	7 Dec 1939	25 May 1944	53

The average tour length for the senior officers who served in the six critical industrial management positions in the shipyard was over fifty months. And the officer who held his position for the shortest time, Captain Dudley, was promoted within the yard from Production Officer to Industrial Manager, replacing Captain Davis on 25 May 1944. Likewise, Captain Ambrose was promoted from Machinery Superintendent to Production Officer, replacing Captain Dudley on the same date. Such in-house promotions suggest that both officers had performed well in their previous assignments and proven themselves competent and capable of handling additional responsibilities.

Captain Andrew I. McKee headed up the local team that produced Portsmouth Industrial Surveys I (December 1941) and II (June 1942), that set in motion many of the concepts that later contributed to the shipyard's outstanding performance. McKee had

⁶⁹ U.S. Navy, "Portsmouth Naval Shipyard during World War II," Official Administrative History, Portsmouth Navy Yard, Kittery, Maine, 66-68. Portsmouth Naval Shipyard Museum Archives, Kittery, Me.

already served as Planning Officer for 44 months prior to leading that team. With that extensive background and experience, he obviously knew the shipyard well and was fully qualified to assess its needs and capabilities. Moreover, Captain McKee continued in his assignment at the shipyard for another 48 months, during which he was able to monitor and implement the changes his team had recommended.

Hardly overshadowed by Rear Admiral Withers and Captain Davis, Captain A.I. McKee enjoyed a well deserved reputation as an expert in submarine design. In 1945, when the Society of Naval Architects and Marine Engineers published a special 50th anniversary edition entitled *Historical Transactions*, McKee was selected to author an article on the history of submarine design.⁷⁰ Furthermore, in recognition of his career accomplishments, the A.I. McKee award for academic excellence is presented to the most deserving officer in each graduating class of the Navy's Nuclear Power Training Course. Rear Admiral Withers was surrounded with a core of competent and experienced managers.

As can be seen from Table 7, during the first two years of Rear Admiral Withers' tour as commandant, not a single one of the critical management positions turned over. The rock solid stability of a competent management team during the early stages of the war, when the shipyard was being transformed from a custom shop to a mass producer of submarines, was a significant reason for the shipyard's ultimate success.

Another critical factor in the yard's success was the contribution of a dedicated and talented cadre of civilian designers and managers. Having highlighted the lengthy

⁷⁰ A.I. McKee, Captain, U.S.N., "Development of Submarines in the United States," *Historical Transactions 1893-1943* (New York: The Society of Naval Architects and Marine Engineers, 1945).



Figure 11: Shipyard Civilian Shop Managers during World War II. Fred White, the Master Rigger and Laborer interviewed for this dissertation is shown in the upper left corner. Courtesy of Milne Special Collections, University of New Hampshire, Durham, N.H.

tours of duty of the senior naval officers in the yard during the war, it is appropriate to note that the naval officer continuity paled in comparison to the civilian management continuity. While forty *months* was a long tour of duty for a naval officer, it was not unusual for senior civilian managers to complete forty *years* of service at the yard before retiring. Indeed, pictures of shipyard employees being presented forty year pins during the war and postwar periods were common occurrences in the shipyard newspaper, the *Portsmouth Periscope*. For example, on 16 February 1945, no less than twenty shipyard employees were presented forty year pins by Rear Admiral Withers.⁷¹

⁷¹ Robert Whittaker, *Portsmouth-Kittery Naval Shipyard in Old Photographs*, (Stroud, Gloucestershire: Alan Sutton, 1993), 108.

Harold Sweetser hired on at the yard in May 1917, progressed through various draftsman jobs, and retired after forty years of service in 1958 as the Supervisory Naval Architect. Likewise, Sweetser's compatriot, Chief Draftsman Robert Boyd, retired in October 1945 after 49 years of service. Another of Sweetser's friends, Carl Galle, promoted to the position of Head Engineer of the yard in October 1951, began his navy yard career as a draftsman in 1918 and was promoted to Senior Naval Architect during World War II. The shipyard was blessed with many experienced and competent civilian employees during the war.⁷²

The shipyard would have not had the benefit of the extensive submarine design experience of employees like Sweetser, Boyd, and Galle had the Navy not decided to develop the submarine design capabilities of Portsmouth Navy Yard after World War I. Likewise, had the construction of new submarines at the yard been discontinued for any period of time between the wars, these naval architects would probably have been forced to seek employment elsewhere. As was noted earlier, all navy yards except Portsmouth experienced a hiatus in new ship construction at one time or another after World War I and before the rebirth of naval shipbuilding in the early 1930s.

It was no accident that Portsmouth Navy Yard acquired a reputation for high quality submarines. Also, it was no accident that the yard was able to incorporate wartime feedback into the designs of their new submarines in a timely manner. Navy Department industrial strategy created the opportunity to develop submarine design capabilities at Portsmouth and naval officer leadership set the objectives during the war. However, most of the credit for the yard's outstanding production accomplishments must go to the yard's

⁷² Papers of Harold Caswell Sweetser, Portsmouth Navy Yard Supervisory Naval Architect, 1917-1958, Sweetser Family Papers, Milne Special Collections, University of New Hampshire Library, Durham, N.H. including *Portsmouth Periscopes* of 13 Oct 1945, 8 and 20 Oct 1951, 4.

experienced core of talented civilian designers and skilled shop employees. It was they who put drafting pen to paper, welding rods to steel plates, and wrenches to valves.

During the war, Commandant Rear Admiral Thomas Withers and the Industrial Manager, Captain H.F.D.Davis, provided strong leadership for an experienced group of naval and civilian managers who enjoyed long and successful tours of duty at the shipyard. This stable and well qualified management team led an exceptionally motivated team of experienced designers and shop tradesmen to tremendous production achievements. Portsmouth had the additional advantages of being a relatively small shipyard with a sharply focused and well defined mission. This vital, but very specific, mission protected the yard from external forces and shifting priorities. As a result, the yard's industrial operations could proceed without interruption, and with no need to deviate from the streamlined new construction processes that had been in development since the mid-1930s. All of these factors combined to enable the yard to flourish in a corporate environment that was characterized by lax oversight when the newly created Bureau of Ships was overwhelmed with other responsibilities. Portsmouth Navy Yard could not have written a more successful script for success.

Employees

The shipyard's workforce grew to over 20,000 employees, including over 3,800 women, during the war. The assimilation of thousands of new employees into the shops and offices, and the training of those employees, was an extreme challenge that was further complicated by the loss of younger and often more talented employees to the Selective Service. Prior to any discussion of innovative management methods that led to

the yard's success, it is appropriate to highlight the high quality of the shipyard's workforce, the women's contribution to the yard's success, worker training programs, and the impact of the Selective Service program. Innovative production methods would have been for naught had the shipyard employees not been up to the task.

It was obvious, from the earliest days of the war, that Portsmouth Navy Yard had an unusually patriotic and dedicated workforce. In mid-December 1941, all the

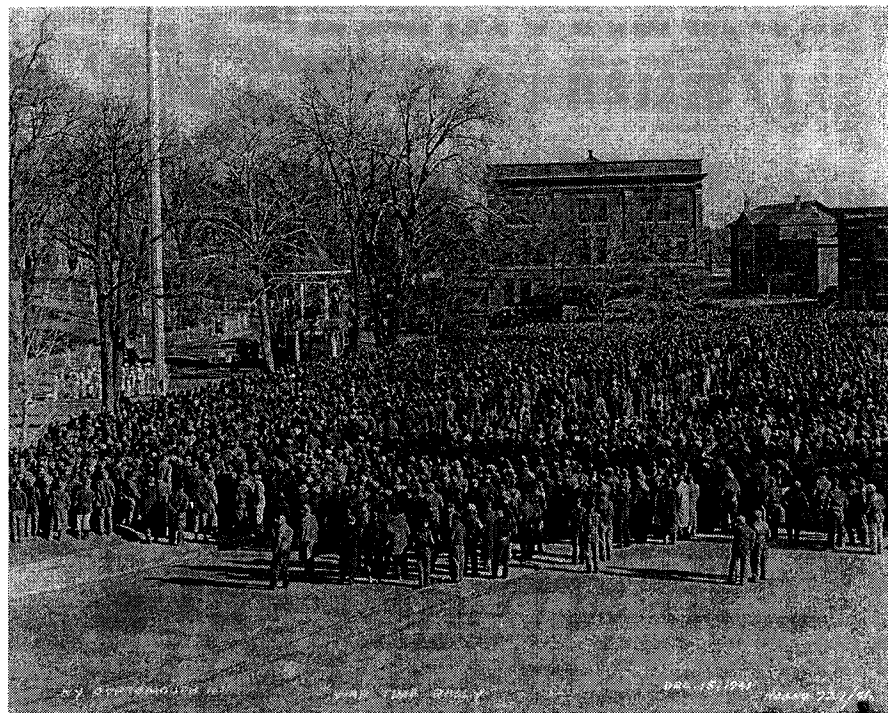


Figure 12: Shipyard Rally at Start of the War (15 December 1941). Courtesy of Milne Special Collections, University of New Hampshire, Durham, N.H.

employees at the yard signified their intention to work Sunday, 21 December without pay. The idea for a payless workday had originated with a few workers after a war rally at the shipyard on Monday, 15 December and, within a few days, every employee had

signed up for the “Gift Day.”⁷³ Later that week, much to the chagrin of the employees, Secretary of the Navy Frank Knox vetoed the idea because it would violate existing work statutes.⁷⁴ Even though Navy officials would not go along with the idea, the gesture spoke volumes about the dedication and unity of Portsmouth Navy Yard employees.

An incident involving a change in shift work hours in April 1942 further illustrates the cooperative nature of the yard’s employees while, at the same time, showing that those same employees were willing to exercise the power of labor to affect management decisions, given management’s need for increased productivity. Shift work hours had been changed in the spring of 1942 to have the first shift start at 4:00 am instead of 6:00 am and the other eight hour shifts were staggered accordingly. Management believed that the new shifts were more productive. However, members of Ranger Lodge 836, International Association of Machinists, believed that there was no production improvement, but great inconvenience to workers and families. The machinists’ aggressive effort to have management reverse the decision was balanced with a reaffirmation of their support for yard management that appeared on the front page of the *Portsmouth Herald*:

We have the utmost confidence in the officers who have been designated by the Navy department to administer the policies at this yard and we pledge our utmost cooperation with their efforts to build our submarine navy quickly and efficiently, but we reserve our inalienable rights to protest any local orders that to us seem unnecessary to our country’s war program.⁷⁵

⁷³ *The Portsmouth Herald*, 16 Dec 1941, “Navy Yard Workers Give a Day to Aid National Defense,” 1.

⁷⁴ *Ibid.*

⁷⁵ *Portsmouth Herald*, 21 Apr 1942, “Ranger Lodge Machinists Hit Navy Yard Hours,” 1.

Shortly after the machinists had voiced their displeasure with the new shifts, a shipyard wide poll confirmed that a decisive majority of the rest of the employees felt the same way. To management's credit, the old shift hours were restored and the controversy was settled.⁷⁶ Mutual respect and open communications were a hallmark of management-employee relations at Portsmouth Navy Yard at that time.

Another example of unusual patriotism and employee-management cooperation was the record setting war bond participation of the yard. In November 1942, the yard established a national record for war bond participation when 100% of the yard's more than 17,000 employees pledged an average of 13.1% of their gross pay. The previous record had been held by Philadelphia Navy Yard at 98% participation and 12.1% of gross pay.⁷⁷ Management had solicited maximum employee support for the war bond campaign and the employees responded beyond all expectations. Once the employees realized that 100% participation was possible, peer pressure and pride drove the final record setting results.

Portsmouth Herald coverage of a union banquet in January 1946 offers further evidence that labor-management cooperation at the shipyard continued at a high level throughout the war. According to the paper:

Accenting the fine cooperation between labor and management at the Portsmouth naval base, more than 300 members of the Ranger Lodge No. 836, International Order of Machinists, and high ranking officials attended an installation banquet and program held Saturday at the American Legion hall.⁷⁸

⁷⁶ *Ibid*, "Navy Yard Shift Goes into Effect," 6.

⁷⁷ *Ibid*, 9 Nov 1942, "Portsmouth Navy Yard Bond-Buying Record Set as Goal for Hub Drive," 1.

⁷⁸ *Portsmouth Herald*, 14 Jan 1946, "Admiral Lauds Cooperation of Labor, Management Here, 1.

Rear Admiral John H. Brown, who had relieved Rear Admiral Withers as commandant a few months before, told the gathering that “He could plainly see that the cooperation in the yard during the war years was the reason for the success in production and other records.”⁷⁹

There is also much evidence that speaks to the quality of the workforce. For example, the Booz-Allen Industrial Survey (1944) emphasized the high quality of the Portsmouth Navy Yard’s workforce and supervision:

The working force at Portsmouth is especially high grade. Top civilian supervisors are alert, intelligent and obviously proud of their Yard. Intermediate supervision of high quality is in general evidence. . . Most of the mechanical employees have been recruited from nearby areas, normally non-industrial. The result is an average of unusually high type of personnel among this group.⁸⁰

Percy Whitney, hired in June 1940 to be a trainee in the shipyard’s apprentice program, is a good example of the high quality worker to which the industrial survey refers. Percy applied for the apprentice program after attending Bates College for two and one half years. Even with two and one half years of college education, Percy recalled that the apprentice program entrance exams and classroom training were quite challenging.⁸¹ Eileen Dondero Foley, a painter’s helper at the yard during the war, had graduated from Syracuse University with honors prior to seeking employment at the yard.⁸² With intelligent, motivated young men and women like Percy Whitney and Eileen Dondero Foley working their way through the shops and training programs at the yard, there is

⁷⁹ *Ibid.*

⁸⁰ Booz-Allen Industrial Survey (1944), 8.

⁸¹ Oral interview with Percy Whitney, 23 Mar 2006, at his home in New Castle, N.H.

⁸² Oral interview with Eileen Dondero Foley, 30 August 2006, at her home in Portsmouth, N.H.

little wonder that the Booz-Allen industrial survey team would be highly impressed with the workforce.

The Booz-Allen Industrial Survey (1944) also noted that, “The supervisory ratio is below the prewar standard of one to twelve, which is the exception rather than the rule in shipyards.”⁸³ Portsmouth, unlike the other navy yards, did not increase the ratio of supervisors to workers to compensate for the addition of large numbers of inexperienced employees during the war. Several factors contributed to the low supervisory ratios at Portsmouth Navy Yard. The intelligent and self-motivated workforce required less direct supervision, specialized training created a pool of independent workers and teams, and managers trusted and empowered employees to do their jobs. An intelligent, capable, and trusted workforce has less need for supervision.

Minimal supervision is one indicator of worker independence and empowerment, but there were others. According to the Booz-Allen Industrial Survey (1944), “There has been a notable simplification of paperwork and of routine reports. A minimum of management and shop conferences are held for coordination of work and dissemination of information.”⁸⁴ The trained, trusted, and empowered workforce had little need for paperwork and meetings.

The reduction of paperwork and administrative burdens were standard shipyard goals from the earliest stages of the war. Portsmouth Industrial Survey I (December 1941) noted that:

⁸³Booz-Allen Industrial Survey (1944), 8. Furthermore, it was noted that Portsmouth had the lowest percentage of Group IV (b) [salaried] employees of all navy yards. In April 1945, Portsmouth’s complement of salaried employees was still the lowest of all navy yards at 8.8%, while the average for all Yards was 11.8%.

⁸⁴ Ibid, 4.

The practice of holding a shop accountable for over expenditures of estimates on a job order practically requires each shop to set up a small accounting system and requires a leadingman either to keep cost records or to furnish information to a shop clerk for such records. The effort now devoted to cost keeping could be better devoted to the supervision of men. It is recommended that this practice be discontinued and that all shops be informed that they will not in the future be held accountable for the expenditures on any job.⁸⁵

In effect, shipyard management was saying that the actual accomplishment of work was far more important than accounting for the cost of doing that work. The decision to free the supervisors of administrative burdens that distracted from the direct accomplishment of work can be found throughout all of the local board's recommendations for production improvements at the start of the war. A few years later, the Booz-Allen Survey (1944) critically confirmed the yard's success in this regard by observing that, "Practically no regular records are kept of production, whether of individual workers, of shops, or by jobs."⁸⁶ Paperwork reduction and worker independence, both increasingly emphasized as keys to successful industrial management in the latter half of the twentieth century, were facts-of-life at the Portsmouth Navy Yard during World War II.

Teamwork, another attribute coveted by today's industrial managers, was also much in evidence at the shipyard during the war. Noting that "A spirit of teamwork and of harmonious cooperation was evident at all levels," the Booz-Allen Survey (1944) also observed that the Portsmouth Navy Yard was "unusually free from labor or other personnel difficulties."⁸⁷ The inspectors noted a very positive and healthy relationship between Portsmouth Navy Yard management and employees.

⁸⁵ Portsmouth Industrial Survey I (1941), 11.

⁸⁶ Booz-Allen Survey (1944), 11-12.

⁸⁷ *Ibid*, 10.

Orderly and harmonious management-employee relationships were not the case at many shipyards. The Industrial Counselors Survey (1942) noted extensive confusion and disorganization at other navy yards:

This rapid expansion has given rise to problems of recruitment, development of new sources of labor supply, and training, and these difficulties have been intensified by the fact that supervision has been thinly spread, inexperienced, and perhaps not sufficiently informed as to policies and procedures. Under these circumstances, the ordinary management controls in matters of discipline have been increasingly difficult to maintain.⁸⁸

Portsmouth faced these same challenges of recruitment, training, and supervision. In all three instances, the challenges were not only successfully resolved, but turned into strengths.

Labor-management relations were more contentious at private shipyards than the navy yards. According to Maritime Historian Frederick C. Lane, the percentage of time lost due to strikes during the war years in the U.S. merchant shipbuilding industry versus all U.S. industries was as shown in Table 8:⁸⁹

Table 8: Time Lost Due to Strikes during World War II

	<u>U.S. Merchant Shipbuilding</u>	<u>All Industry</u>
1941	1.26 %	.32 %
1942	.07 %	.05 %
1943	.07 %	.15 %
1944	.09 %	.09 %
1945	.15 %	.47 %

After an initial onslaught of serious shipyard strikes in 1941, during which nearly 250,000 man-days of production were lost, time lost due to strikes in the merchant shipbuilding industry was approximately the same or less than all of U.S. industry during

⁸⁸ Industrial Relations Counselors Industrial Survey (1942), 1.

⁸⁹ Frederick C. Lane, *The Navy and the Industrial Mobilization in World War II*, 305.

the remainder of the war years. Not to be minimized is the fact that, during the war years, merchant shipyards experienced a total 148 strikes that cost the nation 735,000 man-days of production.⁹⁰ In comparison, the “no-strike pledge” that had to be signed as a condition of employment at navy yards helped to keep those yards strike free.⁹¹

Ninety percent of the more than 11,000 production workers at Electric Boat Company, Portsmouth’s prime competitor in submarine construction, went on strike on 15 August 1944 for several days for higher wages.⁹² The union presented a list of 34 grievances that it claimed had been originally presented to company officials the previous December. The company’s president, L.Y. Spear, insisted that “the strike was brought about by a small group of union officers in an attempt to hide the real issue – the two-day suspension of the union president for being away from his job without permission.”⁹³

Portsmouth was essentially free of the haggling and contentiousness between management and employees that existed at Electric Boat Company and other shipyards. Why was that the case? When interviewed, Eileen Foley repeatedly emphasized the exceptional patriotism and respect for authority that she and her fellow workers had during the war.⁹⁴ William Tebo expressed similar thoughts about the shipyard managers.⁹⁵ One might be quick to dismiss such idealism in today’s skeptical world but

⁹⁰ *Ibid.*

⁹¹ Oral interview with William Tebo, 3 Nov 2006, at the Portsmouth Navy Yard Museum. Shortly after the attack on Pearl Harbor major union leaders announced “no-strike” pledges. However, the pledge meant little as “some two million workers staged more than four thousand strikes in 1941, many of them over organizational issues.” David M. Kennedy, *Freedom from Fear*, 638.

⁹² *Portsmouth Herald*, 15 Aug 1944, “Groton Strikers Deadlocked with Company,” 1.

⁹³ *Portsmouth Herald*, 16 Aug 1944, “7,500 Strike at Sub Yard in Groton,” 1.

⁹⁴ Oral interview with Eileen Dondero Foley, 30 Aug 2006, at her home in Portsmouth, N.H.

⁹⁵ Oral interview with William Tebo, 3 Nov 2006, at the Portsmouth Navy Yard Museum.

there is no doubt in Foley's mind that respect for authority and patriotism were powerful forces at the yard during the war.

Also to be considered is that the increase in yard employees included few minorities and other workers relocating from distant parts of the country with different values and attitudes that might have caused tensions among locals with biases. Chapter VI of this dissertation will discuss the migration of great numbers of workers, including many African-Americans, who moved to the West Coast and Puget Sound area looking for shipyard employment. According to Lorraine McConaghy, who studied shipyard boomtown Kirkland, Washington, residents often complained of "the ignorance of Tarheels, Arkies, and Oakies" and "traded stories about the arrogance of Texans and the streetwise savy of Chicago city slickers."⁹⁶ Portsmouth residents and shipyard workers were not exposed to such a variety of strangers and, consequently, never developed similar feelings, attitudes, and prejudices towards the newcomers.

This is not to say that Portsmouth was not without ethnic diversity. Indeed, the city and the mill towns of New Hampshire experienced much immigration during the late nineteenth and early twentieth century that populated the state with many nationalities, including Italians, Irish, Greeks, Poles, and French-Canadian Catholics. However, by the late 1930s, the immigration wave had subsided and many of the immigrants had become American citizens, if not Americanized.⁹⁷ Consider the following table of births showing

⁹⁶ Lorraine McConaghy, "Wartime Boomtown: Kirkland, Washington, a Small Town during World War II," 45.

⁹⁷ According to David M. Kennedy, in 1924, "Congress choked the immigrant stream to a trickle, closing the era of virtually unlimited entry to the United States. The ethnic neighborhoods that had mushroomed in the preceding generations would grow no more through further inflows from abroad." Kennedy notes that "of the 123 million Americans recorded in the census of 1930, one in ten was foreign

American or foreign parentage and marriages showing American or foreign nationality in the city of Portsmouth between 1938 and 1945.

**Table 9: Portsmouth Births and Marriages⁹⁸
(American vs Foreign) 1938-1945**

	<u>Births</u>			<u>Marriages</u>		
	Parents American	Parents Foreign	Parents Mixed	Both American	Both Foreign	Mixed
1938	261	4	36	549	14	87
1939	246	8	37	252	6	30
1940	298	7	38	267	6	47
1941	385	10	43	350	8	45
1942	620	6	47	369	3	53
1943	663	5	52	312	8	37
1944	Not Provided			304	6	36
1945	Not Provided			407	6	32
1946	Not Provided			Not Provided		

As can be seen, the preponderance of newborns had American parents, few had foreign parents, and about 9 % had mixed parents. Similarly, for marriages, a preponderance of both partners were American citizens, few were both foreign, and about 11% were mixed. While there were pockets of ethnic enclaves in the city and ethnic diversity was strong, it is also true that considerable mixing and intermarriage of immigrants had occurred prior to the start of the war. This relative stability was not challenged by the “outsiders,” predominantly other New Englanders, who moved to the area during the war.

At Electric Boat, in the early days of the expansion, new workers came from local communities, but as production increased the company recruited from as far away as

born and, an additional 20 percent had at least one parent born abroad.” David M. Kennedy, *Freedom from Fear*, 15-16.

⁹⁸ New Hampshire Department of Vital Statistics Reports for the Years 1938-1946. Concord, N.H. University of New Hampshire Milne Collection, Durham, N.H. The Vital Statistics Reports provide annual data on births, marriages, divorces, and deaths. No minority statistics are given for the years shown and the American versus foreign breakdowns for births and marriages ceased in 1944 for births and 1946 for marriages.

Pennsylvania, West Virginia, and Minnesota.⁹⁹ Portsmouth, on the other hand, attracted other New Englanders. It will be shown that many of the new residents of the Portsmouth area merely relocated from other nearby towns and states. In fact, many relocated from the more distant parts of the same county, Rockingham County. When asked about new shipyard employees who had not grown up in the local area, William Tebo responded, "There were a lot from towns in Down East Maine." Folks from Millinocket and Damariscotta share many of the same values and agendas as folks from Kittery and Portsmouth.

Loafing was also observed to be much too prevalent in the shipbuilding industry. Admiral Emory Land, the Chairman of the Maritime Commission, was outspoken in his criticism of loafing in the shipbuilding industry during the initial months of the war.¹⁰⁰ A March 1942 Maritime Commission investigation found eight yards rated satisfactory, seven rated fair, and eleven to be "unsatisfactory" or "downright disgraceful."¹⁰¹ The Industrial Relations Counselors Survey (1942) noted a high prevalence of inefficient standby time in some navy yards caused by the nature of short lead time and unplanned ship repair work. Much less tolerable were the unethical work practices that included sleeping during working hours, leaving work places before quitting time, and loafing. The survey recommended firm supervisory control of work sites and timely discipline of offenders. According to the survey, shipyard workers that were short on work ethics could find ample opportunity to stand by, waiting for other support trades or supervision

⁹⁹ "History of Electric Boat, 1899-1949," Navy Department Library, author unknown, Naval Historical Center, Washington, D.C., V-9.

¹⁰⁰ Frederick C. Lane, *The Navy and the Industrial Mobilization in World War II*, 301.

¹⁰¹ *Ibid.*

to provide direction. Worse yet, slackers could escape detection in ship compartments and tanks and other out of the way work sites. As late in the war as January 1945, a Senate War Investigating committee reported an alarming condition of wasted labor at Norfolk Navy Yard with the conclusion that the yard's supervisory system required improvements.¹⁰²

Portsmouth's World War II history is remarkably free of any need to discipline workers for unethical work practices. In fact, Portsmouth Industrial Survey I (December 1941) reported that, "The Board does not believe that loafing exists at this Yard to such a degree as to constitute a serious problem."¹⁰³ However, the board did recommend a number of changes to reduce the temptation for workers to loaf, including reduced hours for the shipyard restaurant and mobile lunch carts, and improved staffing for both to avoid lines and time lost from the job. The same task force considered the established practice of monitoring shipboard job sites by checklist, to insure assigned workers are on the job, to be inefficient and not commensurate with the administrative burden it entailed. It was recommended that the practice be discontinued. All evidence points towards an uncommon level of mutual trust and confidence between managers and employees that started at the top with the commandant and extended down through the independent and specialized workers that roamed the waterfront routinely doing their jobs as needed to deliver submarines at record setting rates.

Eileen Dondero Foley, a painter's helper during the war, who later served as the mayor of Portsmouth for a total of 16 years, was most emphatic, when interviewed, about the mutual respect that existed between management and employees during the war. She

¹⁰² *Portsmouth Herald*, 23 Jan 1945, "May Inspect More Yards." 1.

¹⁰³ Portsmouth Industrial Survey I (1941), 5.

remembered the civilian managers as being ever-present in the industrial areas, monitoring the progress of work sites, but seldom criticizing or interfering with the workers. Attired in coat, tie, and felt hat, their dress was a symbol of their authority, which Foley remembered as being exercised in a firm, but fair, manner. During an interview with the Master of the Paint Shop, on her first day of work in 1942, she and another girl were told, "This is dirty work. You are here to paint the boats and not your faces."¹⁰⁴ Such was the no-nonsense approach of shipyard management to the increased hiring of women on the yard. Foley reported to work at the Paint Shop the next morning but she never saw the other girl again.

While Eileen Dondero Foley may have been directed by her shop master to deemphasize her personal appearance for the sake of the job and production, Alice Kessler-Harris claims the opposite was often the case during the war. She argues that women often "found themselves facing male pressure to be feminine" and personnel managers preferred "the girls to be neat and trim and well put together," claiming that it helped the women's morale and brought prestige to the workplace. Another less welcomed consequence of the maintenance of a feminine appearance in the workplace was that "catcalls, whistles, and hisses faced women who walked onto production floors for the first time."¹⁰⁵ Neither Foley nor any of the other retired shipyard employees interviewed for this study alluded to the type of male behavior in the workplace described by Kessler-Harris. Rather, Foley's example with the Master of the Paint Shop suggests the other extreme. One cannot draw conclusions from such a limited sampling; however,

¹⁰⁴ Oral interview with Eileen Dondero Foley, 2 Sep 2006, at her home in Portsmouth, N.H.

¹⁰⁵ Alice Kessler-Harris, *Out to Work*, 268..

it can be noted that the interviews for this study did find evidence to support the observations presented by Kessler-Harris.

Shipyard employees apparently were not as dedicated to safety regulations as they were to the quality of their work and the timely completion of their job responsibilities. The Booz-Allen Survey (1944) found that, “The Yard has a creditable safety record although its ratio of lost time to all accidents has been high.”¹⁰⁶ The survey added that, “Safety hats were noticeable by their absence,” and “There was a noticeable neglect of using goggles on grinding operations.”¹⁰⁷ William Tebo, who worked at the yard about the time of the survey, was issued a pair of safety glasses. However, he never wore a hard hat and does not recall any being made available. Tebo also recalled that ear plugs were not available until late 1944 when, he suspects, authorities began to make an association between growing hearing losses and the intolerable noise that resulted from banging and chipping on a submarine pressure hull. Tebo also had a friend lose a few toes in a shop accident for lack of safety shoes.¹⁰⁸ The wartime environment at the shipyard, like most of society, was filled with hazards that were simply classified as the cost of doing business.

The Booz-Allen Survey (1944) also observed that, “There seemed to be a feeling in some shops that all action in accident prevention is the sole responsibility of the Safety Engineer and his staff.”¹⁰⁹ Without too much imagination, one can conjure up an image

¹⁰⁶ Booz-Allen Industrial Survey (1944), 10.

¹⁰⁷ *Ibid.*

¹⁰⁸ Oral interview with William Tebo, 3 Nov 2006, at the Portsmouth Navy Yard Museum.

¹⁰⁹ Booz-Allen Industrial Survey (1944), 10.

of an employee, confident in his ability to get the job done, free of rules and restrictions, wanting to extend that same independence of choice to the observance of safety rules.

In summary, Portsmouth Navy Yard employees were intelligent, cooperative, independent, trusted, well-trained, and able to accomplish their jobs with minimal supervision. Cooperative and self-motivated employees enabled managers to employ worker empowerment and other team oriented concepts. There were no strikes or slowdowns at Portsmouth Navy Yard, employee disciplinary actions were infrequent when compared to other navy yards, and loafing, prevalent at some shipyards, was not an issue at Portsmouth. The harmonious management-employee environment at Portsmouth Navy Yard during the war was the exception in the shipbuilding industry rather than the rule. There is little doubt that the cooperative environment at Portsmouth Navy Yard was a significant factor in the yard's success.

Women Employees

The mass industrial mobilization of women during the war to fill jobs vacated by men joining the armed services was slow to develop. According to Alice Kessler-Harris,

As government programs began early in 1942 to "warm up" the unemployed to heavy industry, twenty men were offered places to every woman. Some workers received training in industrial skills in the last half of 1941. Only 1 percent of those were female. Employers believed women were not suited to most jobs and declared themselves unwilling to hire women for 81 percent of available production jobs. . . Attitudes began to change after Pearl Harbor. . . For the first time employers sought out women for nontraditional jobs. By mid-1942, it was clear that this [the rate that women were entering the industrial workforce] was not enough. . . The government lowered the age limit for employment of women from eighteen to sixteen years. . . And in July 1943, the War Production Board declared itself in need of a million and a half more women.¹¹⁰

¹¹⁰ Alice Kessler-Harris, *Out to Work: A History of Wage-Earning Women in the United States* (New York: Oxford University Press, 1982), 275-276.

The discussion that follows will show that the progress made by women employees in filling industrial jobs at Portsmouth Navy Yard during the war, as Kessler-Harris described on a national level, was initially resisted by management and, consequently, was slow in developing. In addition, Portsmouth and the other east coast navy yards lagged their west coast counterparts in hiring women to fill shipyard employment needs.

Maritime historian Frederick C. Lane says that, “The female invasion began in the fall of 1942” and reached its maximum in 1944 and 1945 when “female workers formed 10 to 20 percent in most yards.”¹¹¹ According to Lane, female employment during the war was lowest in the Northeast and the Gulf and highest on the West Coast. For example, the percentage of females employed at the Richmond Shipyard outside San Francisco was 20 to 23 percent in 1944 and the Oregon Shipyard peaked at 33 percent in 1945.¹¹² These, of course, were both private shipyards.

West Coast government navy yards also had a higher percentage of female employees than other navy yards. The top two navy yards for female employment in March 1943 were Mare Island, California (19.6%) and Puget Sound, Washington (16.8%).¹¹³ At that time, Portsmouth Navy Yard had a workforce composed of only 8.5 % female employees, the second lowest of the navy yards. New York Navy Yard was lowest at 8.0%. In September 1942, the Industrial Manager, Captain Davis, urged his department to “more aggressively pursue training programs for women – as the West

¹¹¹ *Ibid.*

¹¹² *Ibid.*

¹¹³ Navy Department, (Industrial Manpower Section) letter of 1 May 1943 to Distribution including All Navy Yards, Subject: Employment of Women-Continental Navy Yards. NARA College Park, RG 38, Naval Operations General Correspondence, Box 151, Folder NY1, 1 July 1942 to 30 Jun 1943.

Coast shipyards have done so effectively.”¹¹⁴ At the high point for shipyard employment, 20,445 employees in November 1943, 3,832 women were employed, almost 18.7 percent of the workforce. Near the end of the war, in July 1945, women comprised about 18 percent of the total workforce of 15,078.¹¹⁵ Even though Portsmouth Navy Yard got off to a slow start, by the end of the war the yard employed women at about the same percentages as other navy yards.

In general, there was reluctance on the part of New England society to utilize women employees to the fullest extent of their capabilities early in the war. Perhaps, in the case of shipyards, it reflected a sincere desire on the part of the managers to keep females safe and protected from the rigors and unsavory aspects of shipyard industrial work. A directive issued by the Commandant of the Boston Navy Yard in January 1942 illustrating concern about the safety of female employees reads:

The Commandant considers that most clerical positions in the yard can be filled by female employees, except stockman in the storehouse, clerks assigned to night shifts in the shops or in shops where a single clerk is employed, and messengers required to go in the shops or on the ships.¹¹⁶

In short, women were not to be hired for jobs where they might have to interact with men in out-of-the-way job sites without other women present, especially at night. Without a doubt, shipyard managers were concerned about the introduction of sexuality and its potential repercussions to the workplace.

¹¹⁴ Manager memo of 30 Sep 1942. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 8, Folder A2-11/NY2, “Circular Letter Navy Yard.”

¹¹⁵ Administrative History: Portsmouth Naval Shipyard in World War II, Portsmouth Naval Shipyard Museum Archives, Kittery, Me., 33.

¹¹⁶ Boston Navy Yard Commandant’s Circular No. 398 of 13 Jan 1942. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 2, Folder A2-11/NY2, “Circular Letter Navy Yard – Boston.”

Captain Davis encouraged the recruitment of women employees, but he too expressed guarded optimism about their limitations and potential contributions. In September 1942, Davis wrote:

In view of the increasing demands on the available manpower of the country for defense work and military duty, it is apparent that the services of women must be utilized in every type of work *for which they can be trained and for which physically qualified.*¹¹⁷

Implicit in the memo is the understanding that women could not be expected to replace certain male employees because of their inherent inferior physical qualifications and training limitations. Specifically, Captain Davis emphasized that women were not to be employed onboard ships or as security guards.¹¹⁸

Eileen Dondero Foley, who worked as a painter's helper in 1942 and 1943, recalls that she was permitted to work topside on submarines, but, "Never, never, never, in the compartments or tanks."¹¹⁹ Foley added, "They [the shipyard managers] were very strict about that." The prohibiting of women workers onboard submarines did not last the entire war. William Tebo and Dan MacIssac both remembered women working alongside men in submarine compartments and tanks towards the end of the war.¹²⁰

Jeffery M. Dorwart found a similar initial reluctance to assign women to worksites onboard ships at Philadelphia Navy Yard that decreased as the war went on:

¹¹⁷ Manager memo of 15 Sep 1942 NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 8, Folder A2-11/NY2, "Circular Letter Navy Yard," (emphasis added).

¹¹⁸ Manager memo of 30 Sep 1942. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 14, Folder A3-2LC Pkg #7, "Orders to Shop Foremen."

¹¹⁹ Oral interview with Eileen Dondero Foley, 30 Aug 2006, at her home in Portsmouth, N.H.

¹²⁰ Oral interview with William Tebo, 3 Nov 2006, at the Portsmouth Naval Shipyard Museum. Oral interview with Dan MacIssac, 9 Nov 2006, at the Portsmouth Naval Shipyard Museum.

The Philadelphia Navy Yard never appeared entirely comfortable with female employees during World War II. . . supervisors would not allow women to work on board the battleship New Jersey for nearly a year. . . Approximately 70 percent of the Navy Yard's female employees held clerical, office, or inside shop work. . . The war drain on male employees [eventually] opened nearly every job except riggers to females.¹²¹

Female employees at Portsmouth Navy Yard also found improved employment opportunities as the war progressed.

Another Captain Davis memo of 30 September 1942 gives more insight into his sympathies regarding women employees. Reacting to a Secretary of the Navy directive of 1 September 1942 that alerted the navy yards to hire women because all eligible males would soon be called by the Selective Service, Davis wrote:

Seeing the trend of the movement [towards the hiring of women], it would behoove Portsmouth to take action to obtain the pick of women available as to avoid the serious dislocations which may occur if action is delayed and later forced [to hire women] upon the Yard in larger numbers and suddenly.¹²²

At the risk of paraphrasing Captain Davis, he appears to be suggesting that it would be best to follow the Secretary of the Navy's direction and expeditiously hire women for two reasons: by hiring women quickly the shipyard can get the pick of the limited female talent available, and if the yard can increase the number of female employees, it may avoid being forced to hire women en masse at a later date and inundating the yard with great numbers of unqualified and untrained employees.

¹²¹ Jeffery M. Dorwart, *The Philadelphia Navy Yard: From the Birth of the U.S. Navy to the Nuclear Age*. (Philadelphia: University of Pennsylvania Press, 2001), 178.

¹²² Manager memo of 30 Sep 1942. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Portsmouth Naval Shipyard General Correspondence (Central Files), Box 14, Folder A3-2LC Pkg #7, "Orders to Shop Foremen."

Captain Davis' worst fears came true, in May 1943, when Assistant Secretary of the Navy Ralph Bard directed Portsmouth and the other east coast navy yards to increase their employment of women, especially skilled women. According to Bard:

During the past ten months, continental Navy yards have shown a definite increase in the employment of women, particularly in the semi-skilled Group II. Greater efforts must be made immediately to increase this upward trend in Group II, and the employment of women in the skilled Group III by upgrading or direct employment must be materially increased in the very near future. . . The Navy yards at Portsmouth, N.H., Boston, Mass., New York, N.Y., Philadelphia, Pa., and Norfolk, Va., especially should increase their employment of women to at least the average for all yards. The acceptance of women in private industry indicates that the continental Navy yards are not utilizing women on a comparable scale, particularly in the skilled Group III.¹²³

Bard's observation about the shortage of skilled female workers in navy yards was especially true for Portsmouth Navy Yard.

Most women at the yard were employed as clerks or administrative assistants in offices, mechanics' helpers in the shops, shop cleaners, or operators of pieces of shop equipment on which they had been specially trained. Hazel Sinclair, an African-American woman, worked as a woodworker's helper for over two years during the war. Sinclair reported that "They didn't let women work on the machines"¹²⁴ and, consequently, she stacked wood during the period of her employment. Rosary Cooper, another African-American woman, first found wartime employment at the shipyard as a file clerk and eventually qualified as a crane operator.¹²⁵ Anna Jones, also African-

¹²³ Assistant Secretary of the Navy Ralph A. Bard letter of 25 May 1943 to Commandants All Continental Navy Yard. NARA College Park, RG 24, Bureau of Naval Personnel General Correspondence, 1941-45, Box 1601, Folder NY Jan 11, 1943.

¹²⁴ Valerie Cunningham and Mark J. Sammons, *Black Portsmouth: Three Centuries of African-American Heritage* (Durham: University of New Hampshire Press, 2004), 168.

¹²⁵ *Ibid.*, 170-171.

American, began at the yard as a messenger and was in training to be a draftsman when the war ended. Ambitious and opportunistic, these women took advantage of a window of employment opportunity that opened for African-American women during the war.

Unlike most of the new employees at the shipyard during the war, who came from nearby towns and states, Rosary Cooper “had come to the area from her native Florida as a children’s nurse” before taking a job at the shipyard. Likewise, Anna Jones had graduated from High School in Seneca Falls, in 1940, and served in the WAC in Washington D.C. before moving to the area to find employment at the yard, where her father had been hired earlier in the war as a refrigeration specialist. Based on these few examples, it appears that African-Americans may have traveled further to find employment at the yard during the war than most other employees.

Nationwide, many African-American women took advantage of a reduction in discrimination to enter well-paying jobs. According to Alice Kessler-Harris:

For black women, the change was dramatic. For generations they had been denied access to good, skilled jobs that now opened to them. . . . But black women took advantage of their previous work experience to move into more desirable jobs. About 20 percent of those who had been domestic servants found work in areas that had previously snubbed them. By war’s end the position of black women had improved substantially. They never got the best paying jobs But the numbers involved in low-paid and low-status domestic work dropped by 15 percent while the number of factory operatives more than doubled. . . . Their movement into better jobs reflects not changed attitudes but their ability to take timely advantage of enlarged opportunities.¹²⁶

Portsmouth Navy Yard’s Hazel Sinclair and Rosary Cooper were part of a national movement that saw African-American women seize unprecedented opportunities to improve their social status by moving into better paying jobs.

¹²⁶ Alice Kessler-Harris, *Out to Work*, 278-279.

Women hired into industrial shops most often found employment as helpers for welders,¹²⁷ sheet metal workers, or foundry molders.¹²⁸ According to Fred White, the women employees at Portsmouth Navy Yard were more likely to be assigned to secondary operations, such as punching holes for fasteners or grinding metal for welds, leaving the primary operation for the male mechanic.¹²⁹ In her capacity as a painter's helper, Eileen Foley remembers being allowed to apply the primer or first coat of paint topside on a submarine, but the finishing coats were always left to the more experienced male painters.¹³⁰

Rosie the Riveter did not work at Portsmouth Navy Yard during World War II. First and foremost, rivets were nearing extinction at the yard as submarines had moved towards all welded pressure hulls immediately prior to the war. Secondly, Portsmouth Rosie would not have actually driven the infrequently used rivets, but, rather, would have punched the holes for the rivets. The assignment of women to secondary jobs at Portsmouth Navy Yard was typical of all wartime industry where "women held just 4.4% of war jobs classified as skilled and a far smaller percentage of management

¹²⁷ The shop distribution of female workers at Portsmouth was very similar to that at a private yard in South Portland, Maine where half of the women employed were welders and the rest were assigned to trades that included shipfitting, pipefitting, burners, crane operators, etc. Lane, 257.

¹²⁸ While not a scientific approach, a review of the Public Works record of upgraded women's toilet facilities gives indications of where the women were working in the shipyard in September 1942. The Industrial Manager had authorized toilet facility upgrades in the following buildings to accommodate the number of female workers indicated; Building #96 for 25 female core and molding workers, Building #55 for 50 female welders, Building #2 for another 50 female welders, Building #74 for 50 female sheet metal workers, and Building #75 for 50 female sheet metal workers. See Manager memo to Public Works Officer of 2 Sep 1942, Subject: Toilet Facilities for Women in Shops and Shop Offices. NARA Waltham, RG 181, Box 36, Folder N4-14, "Latrines."

¹²⁹ Oral interview with Fred White, 3 Apr 2006 at his home in New Castle, H.H.

¹³⁰ Oral interview with Eileen Dondero Foley, 30 Aug 2006, at her home in Portsmouth, N.H.

positions.”¹³¹ Historian David M. Kennedy claims that the emblem of Rosie the Riveter as a “denim-clad, tool-wielding, can-do figure” actually typified very few wartime women employees. Kennedy suggests that Wendy the Welder, Sally the Secretary, or Molly the Mom might have been more appropriate labels for the typical wartime women employee.¹³²

Other industries in the city of Portsmouth were also slow to hire women. A Portsmouth Health and Welfare Survey (August 1943) reported that, in June 1942, of the three Portsmouth industrial plants engaged in defense work, only one, the Morley Company, employed any women. Morley Company employed 93 women, 3 of whom were married. At the time, the navy yard employed 430 women, 10 of whom were married.¹³³ Thus, during the early stages of the war, a limited number of women were employed in an industrial environment and almost all of them were unmarried. The Portsmouth Defense Area Health and Welfare Survey concluded from a survey completed in June 1942 that “There has been no significant increase in the number of mothers employed since the inception of defense work.” Also, “Because the Portsmouth Navy Yard is the major industry [in the area], and the only large one, it seems there will be no appreciable increase in numbers of employed women unless, and until, the Navy

¹³¹ David M. Kennedy, *Freedom from Fear*, 779.

¹³² David M. Kennedy, *Freedom from Fear*, 776-779.

¹³³ “Survey of Health and Welfare in the Portsmouth Defense Area, August 1943,” 35. Cumings Library, Strawberry Banke Museum, Portsmouth, N.H., Box 2, Folder 14, “S.C.D. Survey of Health and Welfare in Portsmouth.” Hereafter “Survey of Health and Welfare in the Portsmouth Defense Area.” A later survey, between June 1942 and August 1943, found 470 female clerical workers at the yard and 400 women employees at the Somersworth plant. “Survey of Health and Welfare in the Portsmouth Defense Area,” 67.

Yard employs women in large numbers.”¹³⁴ Women did find employment as taxi drivers early in the war in Portsmouth as the male drivers went to war and the demand for taxis increased with the overall shortage of automobiles, tires, and gasoline. In the summer of 1942, Rosie was driving a taxi, not rivets, in Portsmouth.

Despite the slow initial progress in hiring women to replace men at the yard, the *Portsmouth Herald* periodically featured front page articles and pictures that highlighted any progress that was made by women. For example, on 18 May 1942, the paper gleefully reported the advancement of women to positions of taxi cab and bus drivers:

No wonder people are beginning to wonder if it really is a man’s world. First Portsmouth had a woman cleaning company driver, then a taxi driver, and now the Hill Transportation company has hired from the government employment agency two women for duty behind its wheels.¹³⁵

Thus, six months after Pearl Harbor, the hiring of local women as replacements for men had progressed to the dubious distinction of finding employment as taxi cab and bus drivers. And this was front page news.

While not a particularly glamorous or lucrative beginning, taxi cab driving paid better than house cleaning and other jobs available to women at the time. Over the next year and a half, the *Portsmouth Herald* frequently carried pictures of women in training for, or assuming, traditional, and even better paying, men’s jobs at the shipyard. The *Herald’s* coverage provides a chronological summary of the incremental progress women made towards more meaningful industrial employment. On 18 June 1942, one finds a picture of several Exeter girls “amid gears and belts of steel lathes,” who were among the

¹³⁴ *Ibid*, 36.

¹³⁵ *Portsmouth Herald*, 18 May 1942, “Feminine Detail Takes Over Bus Service to Navy Yard,” 1.

first women to enroll in defense mechanical training classes with hopes of gaining employment at the shipyard. The 22 March 1943 paper has a picture of the first female navy yard machinist to apply for membership in the Ranger Lodge, International Association of Machinists. The article notes that she is currently a “checker of machines and other supplies,” but her number one ambition is to become a “full fledged machinist.” The 12 May 1943 edition contains an article entitled “School Aids Production of Navy Submarines” that heaps credit on the local Federal Vocational Training School and notes that 125 of the 322 students enrolled in the school are women. On 11 November 1943, four shipyard “welderettes” are pictured with their supervisor. According to the *Herald*, the four women had patriotically completed 150 hours of electric welding training and:

They have swapped the duties of housekeeping and the tapping typewriter for the glow of a blow torch and the clang of steel. They’re laboring, sweating, amid steel beams and plates to build fighting submarines for America’s safety.¹³⁶

Finally, in May 1944, a very important milestone was reached when the first women graduated from the yard’s supervisory training program. Four of the 195 graduates were women. Rear Admiral Thomas Withers’ graduation address praised not just the women, but also the class:

Your class is different from any other class in that it is coeducational. I am proud that this navy yard recognizes the fact that women are capable of becoming supervisors and I cannot understand why other navy yards do not take advantage of the capable women employees they must have.¹³⁷

¹³⁶ *Portsmouth Herald*, 11 Nov 1943, caption under the picture reads, “And More are Needed,” 1.

¹³⁷ Quoted in the *Portsmouth Herald*, 10 May 1944, “Yard Graduates Largest Group; Four Women,” 1.

Withers' remarks imply that the other navy yards had not yet trained any women for supervisory positions. Portsmouth Navy Yard, after a slow start, had made up a lot of ground on the other navy yards.

Women had progressed from housewives at the start of the war to bus and taxi cab drivers by May 1942, through machine operator training programs in the early part of 1943, to fully qualified sweaty welders by November 1943, and finally to trained shop supervisors by May 1944. Elsewhere on the yard, military women were also breaking new ground. In May 1943, the first class of fifty "WAVES" arrived at the Portsmouth Navy Yard Hospital for four weeks of basic training. The first female doctor at the shipyard reported for duty on 22 February 1945.¹³⁸

Mary C. Dondero, who had been a clerical helper in the Portsmouth Navy Yard Supply Department early in the war,¹³⁹ progressed further than any of the other women employed at the yard during the war when she was elected Mayor of Portsmouth in November 1944. Dondero was the first female mayor ever in the state of New Hampshire and one of the first in the nation.¹⁴⁰ Her story will be covered in more detail later when discussing the transformation of the city of Portsmouth during the war. Before one gets too carried away with the progress made by New Hampshire women during the war, it is well to note that, a little over a month after Mary Dondero became mayor of Portsmouth, the New Hampshire House of Representatives rejected a bill to allow women jurists by a

¹³⁸ *Administrative History: Portsmouth Naval Shipyard in World War II*, Portsmouth Naval Shipyard Museum Archives, Kittery, Me., 89.

¹³⁹ Oral interview with Eileen Dondero Foley, daughter of Mary C. Dondero, 30 Aug 2006, at her home in Portsmouth, N.H.

¹⁴⁰ *Portsmouth Herald*, 1 Jan 1945, 1.

vote of 181 to 174.¹⁴¹ Thus, in early 1945, women could hold responsible positions at the Portsmouth Navy Yard and govern the city of Portsmouth, but they could not sit on juries in the state of New Hampshire.

Late in 1945, Fred White was faced with the need to terminate about sixty women working in the sail loft of his shop making various torpedo straps, mattress covers, cushions, and other leather products for the submarines. All the women fell into the category of wartime employees without rights to continued employment after the war. After careful consideration, and with the women's encouragement, White decided to forego the normal practice of terminating employees individually, according to hiring date, and release all sixty of the women on the same day. The decision was met with universal approval by the women who did not want to experience individual firings and possible disputes about who should go next. According to White, the women celebrated together as they walked out of the shop after the last day of their employment.¹⁴²

Nationwide, women were quick to quit their jobs when war production ended. Alice Kessler-Harris wrote that "The rate at which women chose to leave jobs was at least double, and sometimes triple the rate at which they were discharged. And it was consistently higher than quit rates for men."¹⁴³ Many of the women who had found employment in the shipyard's industrial shops during the war, like millions of women in comparable positions across the United States, were more than willing to abandon their wartime jobs, in favor of returning veterans, and to return to their homes and other occupations.

¹⁴¹ *Ibid.*, 10 Feb 1945, "Women Juror Bill to Get New Action," 1.

¹⁴² Oral interview with Fred White, 3 Apr 2006, at his home in New Castle, N.H.

¹⁴³ Alice Kessler-Harris, *Out to Work*, 286.

Selective Service

One of the yard's most serious employment problems during the war was that the younger, more physically fit, and more trainable, employees were routinely drafted or volunteered for military service. The nation's first peacetime draft bill was passed on 16 September 1940. One month later, more than sixteen million men between the ages of twenty-one and thirty-five were registered on the draft rolls.¹⁴⁴ To further complicate matters, the Navy's well advertised "choose while you can" program enticed a large number of patriotic young men of the seacoast area to volunteer for the Navy and Marine Corps during the early years of the war.¹⁴⁵ Thus, fifteen months prior to the start of the war, at about the same time that the shipyard ramp-up was gathering momentum, the best and the brightest of the yard's employees began to be siphoned from the shipyard's rolls.

The shipyard's apprentice program was especially devastated by the loss of men to military service. The Booz-Allen Industrial Survey (1944) reported that, "Just before the war the Yard employed some 400 apprentices. The present number is about 80. Some 240 former apprentices are in the armed forces on military furlough."¹⁴⁶ At the end of the war, in the summer of 1945, the shipyard reported "approximately 450 on military furlough, leaving less than 50 apprentices now employed."¹⁴⁷ The loss of skilled and

¹⁴⁴ Amendments over the next two years extended the age limits from eighteen to sixty-five. However, the military wanted no men over forty-five and strongly preferred only those under the age of twenty-six. David M. Kennedy, *Freedom from Fear*, 459 and 632.

¹⁴⁵ David M. Kennedy, *Freedom from Fear*, 635. William Tebo, interviewed for this dissertation, was one of those who enlisted in the Navy rather than wait to be drafted.

¹⁴⁶ Booz-Allen Industrial Survey (1944), 10.

¹⁴⁷ *Administrative History, Portsmouth Navy Yard*, Portsmouth Naval Shipyard Museum Archives, Kittery, Me., 36.

experienced employees to military service was a never-ending problem throughout the war.

Percy Whitney was one of the skilled shipyard employees lost to the draft in 1943. Percy entered the apprentice program in June 1940 and graduated three years later. He attributes his good fortune of being employed for three years at the shipyard, prior to being drafted, to the critical nature of the work he was doing in the foundry, his married status, and a low lottery draft number.¹⁴⁸ Even then, he joined the long list of former apprentices and valuable shipyard employees on military furlough when he was drafted into the Marine Corps in 1943.

Selective Service attrition in the shipyard welding shop was particularly acute at the start of the war. First established in November 1939, the shop grew quickly in numbers and importance as submarine construction increasingly moved to welded pressure hulls to replace riveted hulls.¹⁴⁹ By April of 1942, the shop employed nearly one thousand people with a pressing need to hire many more welders.¹⁵⁰ In early 1942, the shop was scheduled to lose twenty five to thirty qualified welders per month. Welders were being lost faster than replacements could be trained and certified.¹⁵¹

Selective Service was a particularly difficult challenge for the shipyard because management's efforts to schedule the orderly release of employees with critical skills,

¹⁴⁸ Oral interview with Percy Whitney, 23 Mar 2006, at his home in New Castle, N.H.

¹⁴⁹ Commandant Portsmouth Navy Yard letter of 2 Nov 1939 to Assistant Secretary of the Navy (Shore Establishment Division). NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 36, Folder N5-14, "Welding Shop."

¹⁵⁰ Manager memo to Production Officer of 22 Apr 1942. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 36, Folder N5-14, "Welding Shop."

¹⁵¹ *Ibid.*

such as welders, had to be coordinated with numerous local boards in all three of the states from which the yard drew employees. In February 1943, the shipyard, under the leadership of Captain H.F.D. Davis, brought some order to this chaotic situation when it reached a precedent setting agreement with the Selective Service to release workers in accordance with a long range predetermined plan, with New Hampshire deferment rules applying to all yard employees subject to being drafted. According to the *Portsmouth Herald* of 5 February 1943, "This establishes the yard as the first employer in New Hampshire, and, it is believed to be the first navy yard in the United States to reach [such] an agreement with the Selective Service System."¹⁵² Explaining the advantages of the agreement, the *Herald* reported:

The naval authorities will no longer be required to deal with many local boards in several states in the cases of individual employees whose services they desire to retain for occupational reasons. The date of release in all such cases has been decided definitely as the result of studies and conferences which have been in progress for the past three months between General Bowen [Selective Service Director for the state of New Hampshire] and Captain Davis, the yard manager. A single deferment policy, that which prevails in the state of New Hampshire, will be applied to all employees at the yard who are vulnerable to the Selective Service and Training Act.¹⁵³

Captain Davis, always meticulous in his planning, had reduced the shipyard's Selective Service problem to manageable proportions.

In July 1945 the *Portsmouth Periscope* reported that "As of 30 June, 5,033 workmen had shifted from war work to the fighting front" and "85 men from this Yard have died in action."¹⁵⁴ During the peak war years, when the shipyard average

¹⁵² *Portsmouth Herald*, 5 Feb 1943, "They Agreed on Navy Yard Employee Induction Plan," 1.

¹⁵³ *Ibid.*

¹⁵⁴ *Portsmouth Periscope*, 10 July 1945, 1, 6. Papers of Harold Caswell Sweetser, Portsmouth Navy Yard Supervisory Naval Architect, 1917-1958, Sweetser Family Papers, Milne Special Collections, University of New Hampshire Library, Durham, N.H.

employment was about 18,000, the shipyard's average loss to the selective service was well over 1,000 employees a year. However, knowing well in advance what critical skills would be lost, and when, the shipyard could schedule training for replacements and work them into production schedules in an orderly manner.

In summary, Portsmouth Navy Yard was blessed with an intelligent and motivated workforce during the war that gave patriotism and teamwork very high priority. Employee-management relations were characterized by a cooperative spirit that was based on mutual respect and trust. The result was harmony in the workplace and few disciplinary actions. Women played an increasingly important role in the yard as they gradually gained access to training programs that qualified them for more responsible positions. Their progress was impressive and their contributions were significant. Because of the personnel disruptions caused by employees leaving the yard for military service, the yard arranged a precedent setting agreement with the Selective Service that allowed for orderly release of employees in accordance with a long range plan that permitted the yard to train replacements in a timely manner. The employees, in short, were the keystone upon which the shipyard built its remarkable success.

CHAPTER V

METHODS & MEASURABLES

“Any present judgment of the organization, administration, and control procedures of the Navy Yard, Portsmouth, N.H. must give great weight to the development of the Yard, subordinating all other considerations to the demands of the war effort, into a specialized construction activity for submarines only. All operating units have been *streamlined* for this sole purpose.”¹

**Booz-Allen Industrial Survey Report
6 November 1944**

By early 1942, several building blocks were in place upon which Portsmouth Navy Yard would build a remarkable production record over the next few years. An impressive team of naval and civilian managers had been assembled, massive facility upgrades were in progress, orders had been received for dozens of new submarines, employees were being hired at unprecedented rates and, organizationally, the yard had a free hand to manage its own growth and development. The final piece of the puzzle would be the implementation of well designed processes and practices that were tailored to take maximum advantage of the shipyard's strengths, growing workforce, and expanding facilities. Those production methods included well-designed training programs, special teams, assembly line, risk management, innovation, open communications, control systems, farm-out programs, and lean manufacturing.

¹ Secretary of the Navy Ralph A. Bard letter of 6 Nov 1944, Subject: Survey of Industrial Department, Navy Yard, Portsmouth, N.H. – Report No. 2 of Industrial Survey Division. NARA College Park, RG 19, Bureau of Ships General Correspondence (1940-45), Box 785, Folder NY1/A3, 3. Emphasis added.

The effectiveness of those methods will then be evaluated under the section entitled Measurables. The word “measurables” cannot be found in most dictionaries, but it is common manufacturing terminology. For manufacturing processes, quantifiable results, things that can be measured, are usually the most meaningful indicators of success or failure. Measurables might include total numbers produced, production rates achieved, or manhours expended per widget. It was the eye-catching production measurables, in terms of submarine delivery rates, that motivated this study. In the interest of consistency, the yard’s production numbers will be revisited and examined in more detail in this section. Two other indicators of success, cost savings and quality, will also be reviewed. In today’s world of industry and shipbuilding, both of these are true measurables in every sense of the word, able to be quantified and analyzed in great detail for performance trends. Such was not the case at the yard during the war. Records for cost and quality were often abbreviated or eliminated in the interest of production efficiency. However, other evidence is available to gain some indication as to how the yard performed in both of these areas. Remarkable production numbers lose much of their luster if costs are out of sight or quality is poor. As it turns out, cost and quality were as much a part of the Portsmouth success story as was production.

Methods

This section argues that the yard’s outstanding performance was the result of well designed processes and practices that were tailored to take maximum advantage of the shipyard’s resources. In the case of the most critically needed shipbuilding resource, building ways, Portsmouth Navy Yard was grossly under capacity immediately prior to the war and remained challenged for building sites throughout the war. Necessity was

very much the mother of invention as the yard made the most of what it had. The innovative management techniques and processes that were developed to maximize the shipyard resources available were, in some cases, years ahead of their time.

It was previously noted that shipyards were encouraged by higher authority to accept facilities constructed to less than optimum technical specifications during the ramp-up in order to expedite completion of urgently needed shipyard infrastructure. While quality of workmanship was a high priority at the Portsmouth Navy Yard during the war, it was time and production efficiency that drove the yard, not perfection of product. It was the sacrifice of absolute quality for time that led to the production miracle at Portsmouth Navy Yard and other American shipyards during the war.² This was in sharp contrast to the German approach to production which was more geared towards optimum designs and technical excellence than efficient production. Historian David Kennedy says that:

In the inescapable trade-off between quality and quantity, the Germans characteristically chose the former, the Americans the latter. . . Though the Americans also ultimately proved capable of some epochal scientific and technical breakthroughs, they innovated most characteristically in plant layout, production organization, economies of scale, and process engineering. If Germany aimed for the perfection of many things, America aspired to the commodification of virtually every thing. . . [The United States placed] a premium on organizing production around simple repetitive tasks that did not demand technical adeptness or extensive training.³

A common theme throughout this chapter will be the streamlining of work at Portsmouth Navy Yard to enable the repetitive accomplishment of the same jobs on numerous

² Liberty Ships were prime examples of the sacrifice of quality for the mass production of product during the war. "At least one Liberty Ship foundered at the pier before sailing, and seamen lived in dread that the welded hulls would split open in heavy seas, as some tragically did." There is little doubt that numbers were traded for performance as twenty-seven hundred Liberty Ships were built during the war. David M. Kennedy, *Freedom from Fear*, 652-653.

³ David M. Kennedy, *Freedom from Fear*, 648-649.

successive submarines. It will also be shown that the shipyard excelled in those attributes highlighted by David Kennedy that separated American industry from that of the enemy; plant layout, production organization, process engineering, and economies of scale. Not specifically cited by Kennedy, but also critical to Portsmouth's successful submarine construction programs, were well designed and implemented training programs.

Training

The increase in shipyard employment required a vast upgrade to the skilled labor base in the area. Prior to the war, the area had a shortage of skilled workers and, consequently, Portsmouth had not been able to attract much industry.⁴ It was absolutely essential that the shipyard have a large skilled labor pool from which to draw if it was to achieve expected production. This upgrade was achieved through three primary means of training. First, the Shipyard Apprentice Training Program was run by the Shop Masters for advancement to the next class or to journeyman. Second, free supplementary and pre-employment vocational training courses were given at off-yard locations with the cooperation of the Federal War Production Training Program through the State Department of Education. Finally, the Engineering Science Management War Training Program at the University of New Hampshire (UNH) conducted more advanced technical and engineering courses.

The Apprentice Program was a well-established shipyard tradition by the late 1930's. Immediately prior to World War II, the program was functioning near full capacity and successfully providing the skilled mechanics that the shops needed at the time. For example, the program had 346 students enrolled in August 1941, 342 students

⁴ The huge increase in skilled labor in the seacoast area as the result of the shipyard and defense training programs during the war is discussed in detail in Chapter VIII, "Community Consequences."

on 1 December 1941, 336 students on 5 January 1942, and 391 students on 2 March 1942.⁵ There was no need to create a new in-yard apprentice training program to meet the increased skilled tradesmen needs. One only had to continue the current program and expand it as necessary to meet the rapidly growing need for skilled employees.

The existing apprentice program consisted of approximately eighteen classes of about twenty students each that met for two hours a day, three days a week, taking advantage of shift turnovers and mid-day breaks for classes during the work day. A high school diploma was required for entry to the program. A minimum credit of 1,816 school hours or selective shop training was required before a candidate could take the promotional exam that was routinely given twice a year prior to the war. However, by October 1941, the exam was being given more often because of the increased numbers in the apprentice program.⁶ Percy Whitney, who had hired into the apprentice program after two and one half years at Bates College, remembered the apprentice program as being quite demanding academically. In particular, he recalled having to pass classroom metallurgy, trigonometry, and other challenging technical courses while working as an apprentice in the shipyard foundry.⁷

The War Department Training Program was run by the states, with machines and equipment provided by the federal government. It provided supplemental trade and technical instruction required to be employed at the shipyard, or to become better qualified in one's trade once employed. There were fourteen similar training programs

⁵ Shop Superintendent memos of 26 Aug, 27 Nov, 30 Dec 1941 & 25 Feb 1942. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 14, Folder A3-2/LC, PKG #6, "Orders to Shop Foremen."

⁶ *Ibid.*

⁷ Oral interview with Percy Whitney, 23 Mar 2006, at his home in New Castle, N.H.

run throughout the state of New Hampshire. The Portsmouth program, however, was “praised by the navy vocational officers as one of the finest in the country.”⁸

By early 1941, a coordinated federal, state, and local effort had established machine operator classes at Portsmouth High School. In March 1941, the high school program was expanded to include a three-shift defense school for welders.⁹ The machine shop classes underway at the time added an extra session from 10 pm to 7am. The training program was subsequently expanded to include gas and electric welding classes at a local industrial firm, the Morley Company, to meet an urgent need for welders at the navy yard. As noted earlier, the yard’s Industrial Manager, Captain Davis, had identified a shortage of welders to be the most critical obstacle to increased production in early 1942. Classes at Morley Company grew to include training 24 hours a day for welders, sheet metal workers, pipe fitters, ship fitters, machinists, electricians, machine operators, blueprint machine operators, and copyist draftsmen. In 1943, the program trained nearly 1,000 workers for positions at the navy yard.¹⁰ During the three years of operations, the school employed as many as eighty instructors who trained over 7,000 people.

William Tebo was a fifteen year old high school junior when he took 400 hours of machine operator defense training at Portsmouth High School to gain employment at the shipyard. Once hired, he was further trained as an electrician in order to perform limited, but important, shipboard wiring jobs. According to Tebo, there were hundreds of fifteen and sixteen year old high school students employed by the shipyard during the war. They

⁸ *Portsmouth Herald*, 12 Mar 1944, “Free Training Courses Offer Top Opportunities,” 1.

⁹ *Ibid*, 20 Mar 1941, “Start School for Welders Next Week,” 1.

¹⁰ *Ibid*.

would go to school during the day and then work the 3:00 pm – 11:00 pm shift at the shipyard. Like Tebo, most of them just passed through the shipyard for less than a year on their way to military service once they turned 17 years of age.¹¹ Tebo was at the yard for about six months, beginning in early 1944. By maintaining good grades, he and other teenagers could be excused from the last two periods of the day at the high school which gave them enough time to get to the yard in time for the shift start.¹²

Employment at the shipyard in 1942 was more than just a job to young people like William Tebo and Eileen Dondero. During interviews, both conveyed the fact that a sense of duty and patriotism had as much, or more, to do with their motivation for seeking employment at the yard as wages. Employment at the shipyard was seen as a way that they could contribute to the war effort until they could join friends and family members in the armed services. Tebo became a submariner¹³ and Dondero joined the Women's Army Corps.

Patriotism and personal sacrifice were strong forces in the seacoast area during the war. Barbara McLean Ward's *Produce & Conserve, Share & Play Square: The Grocer and the Consumer on the Home-Front Battlefield during World War II* is filled with stories of similar sacrifices made by Portsmouth residents:

Housewives, USO hostesses, Y.M.C.A. "girls," and "office girls," after their regular workday was completed, turned up in large numbers to work at Morley [Company] when a government contract was due . . . Portsmouth residents turned out in large numbers to staff the wartime committees . .

¹¹ Oral interview with William Tebo, 3 Nov 2006, at the Portsmouth Navy Yard Museum.

¹² *Ibid.*

¹³ Tebo knew of at least two other friends who worked at the yard and became submariners during the war. While prior employment at the yard did not help them get into the submarine force, the knowledge of submarines gained at the yard was of great benefit at Submarine School in New London, Ct. Oral interview with William Tebo, 3 Nov 2006, at the Portsmouth Navy Yard Museum.

Thousands of others did their part by participating in scrap drives, rubber drives, and numerous other salvage efforts.¹⁴

William Tebo volunteered for high school sponsored scrap drives, rag drives, and clothing drives for which he received no compensation.¹⁵ He and others on the Portsmouth home-front were quick to do whatever was required for the war effort. Employment at the shipyard, volunteering for scrap drives, and participation in the many training programs being offered were all seen as ways to help win the war.

The University of New Hampshire Engineering Science Management War Training Program provided the more technical and professional training required by shipyard technicians, engineers, and managers. This curriculum included courses in Mechanics, Strengths of Materials, Metallurgy, Welding Theory, and so forth. Over five thousand employees took advantage of the free training offered by the state and the university.¹⁶ The shipyard benefited greatly from the nearby availability of a state university, just ten miles distant.

Some industries had avoided the seacoast area prior to the war because of a lack of skilled workers. The programs discussed above produced thousands of skilled workers during the war and turned the shortage of skilled labor into an abundance of the same in a few years. In addition, the conversion of the federal defense training program to a state

¹⁴ G. Colati and Ryan H. Madden, "Victory Begins at Home: Portsmouth and Puddle Dock during World War II," in Barbara McLean Ward, ed., *Produce & Conserve, Share & Play Square: The Grocer and the Consumer on the Home-Front Battlefield during World War II* (Portsmouth: Strawberry Banke Museum, 1994), 59, 68.

¹⁵ Tebo also volunteered for a high school program that had students make model German airplanes for use by coastal lookouts as identification aids. In return for their work, the students received points towards honorary military titles that advanced in seniority and importance according to the number of models they built. Oral interview with William Tebo, 3 Nov 2006, at the Portsmouth Navy Yard Museum.

¹⁶ *Administrative History: Portsmouth Naval Yard in World War II*, Portsmouth Naval Shipyard Museum Archives, Kittery, Me., 47.

vocational training school, immediately after the war, went a long way towards insuring that the area had a long-term supply of skilled labor.

Special Teams

A well trained and self-motivated workforce with a homogeneous and repetitious workload, coupled with management concerns about the gradual loss of employees to the military services, was an environment rife for the use of special teams. A worker specially trained to accomplish the same job on submarine after submarine was highly productive, as well as an expert, in that task. In addition, if he were drafted into the military, his replacement could be quickly trained for the limited task with minimal disruption to the building process.¹⁷ For all of these reasons, Portsmouth Navy Yard made maximum use of special teams.

The Booz-Allen Industrial Survey (1944) noted the shipyard's widespread use of special teams and reported that, "Although the quality of the working force is at a high standard, there are many employees who have developed only specialized skills."¹⁸ Pointing towards the need for a more uniformly trained workforce during reduced post-war operations, the survey report recommended that the specialists who were to be retained as shipyard employees after the war should receive more formal and extensive training. It was no accident that Portsmouth Navy Yard had a large number of employees

¹⁷ It became routine shipyard practice to periodically schedule meetings for eligible employees to accommodate their registration for Selective Service. For example, on 7 February 1942, the Manager reminded all Shop Masters and Supervisors that, on 14 -16 February 1942, those men must register for Selective Service who reached age 20 prior to 1/1/42 and will not be older than 45 on 2/16/42. Manager memo of 7 Feb 1942 to All Shop Masters and Supervisors, Subject: Registration for Selective Service. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 14, Folder A3-2/LC, PKG #6, "Orders to Shop Foremen." The shipyard began to experience losses to the Selective Service as early as February 1942. The early loses included 12 welders in February, 11 in March, and 8 in April 1942. Manager memo of 22 Apr 1942 to the Production Officer. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 14, Folder A3-2/LC, PKG #6, "Orders to Shop Foremen."

¹⁸ Booz-Allen Industrial Survey (1944), 10.

with specialized skills. Shipyard management recognized early-on that specialized training and specialized teams should be an integral part of the shipyard's industrial operation.

The team that Commandant Wainwright had assembled in November 1941 to study work practices and make recommendations for improvements highlighted the need for specialization. Recognizing the difficulty that the shipyard faced in obtaining the numbers of skilled and trained mechanics that would be needed to quickly ramp up production, the team reported:

While it is not possible to train skilled mechanics in short enough time to make them available in the near future, it is possible to train unskilled men who have suitable adaptability in a few of the operations of the various trades in short time. By assignment of these men to operations which they have been trained to perform and by placing them under the supervision of skilled mechanics, it is possible to get work done which could not be accomplished if only skilled men were used.¹⁹

Similarly, the team recommended that the existing practice of some shops, to assign a group of men to custom build a single ship through completion, be discontinued in favor of using the same men to perform the same operations on different submarines.

According to the team report:

It is obvious that a man or a group of men is better able to perform a task after having done it on another similar ship than is a different man or group of men. Since the interval between keel layings, launchings, and completion of successive ships is approximately six weeks, it is recommended that each man or group of men be assigned to such jobs or parts of jobs on a ship as will require approximately six weeks to complete and that, after they have completed this work on one ship, they be moved to the next ship and assigned the same work. This recommendation applies not only to mechanics, but also to shop supervisors and to ship superintendents.²⁰

¹⁹ Portsmouth Industrial Survey #1 (December 1941), 3.

²⁰ *Ibid.*, 9.

From 8 December 1941, the shipyard was dedicated to specialized training and a high degree of repetitive tasking.

The Production Officer, Captain S.E. Dudley, reinforced and formalized the recommendations of Portsmouth Industrial Survey #1 (1941) when he advised the Shop Supervisors that the new work methods needed to achieve expected production increases should include a high degree of specialization:

We have 18 hulls to lay down. . . Our previous methods produced good ships, but each vessel was a custom built job. Such methods will not meet the problem that we are now facing. . . . You can't run Subs down an assembly line, but for "outside work" you can do the next best thing, that is, move men along from ship to ship to do the same work on each.²¹

Similarly, in mid-January 1942, the Industrial Manager reminded the shops to use "repeat work teams for assembly, installation, erection, and test jobs in shops."²² It was believed that completion dates on some ships might suffer from the effort to maximize specialization, but in the aggregate, the result would be an optimum performance overall.²³ Production results proved this belief to be true beyond a shadow of a doubt.

Job specialization was by no means unique to Portsmouth Navy Yard. The practice was widespread in the shipyards that mass produced Liberty ships for the same reasons that it appealed to Portsmouth. According to historian Frederick C. Lane, "When the work was planned so that the same crew had the same task every day, there was no

²¹ Production Officers memo of 23 December 1941 to Masters, all Shops. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 14, Folder A3-2/LC PKG #7, "Orders to Shop Foremen."

²² Manager memo of 16 Jan 1942 to Shop Masters, NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 14, Folder A3-2/LC PKG #6, "Orders to Shop Foremen."

²³ Production Officer memo of 23 Dec 1942 to Masters, all Shops. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 14, Folder A3-2/LC PKG #7, "Orders to Shop Foremen."

need of teaching the new workmen the 40 or 70 operations which had formed part of the craft learned by an apprentice at Newport News. Instead, a man who had only one skill could be kept busy doing that one thing.”²⁴ The one task, to be performed on a Liberty ship by a worker with limited skills, was much simpler than the specialized submarine tasks assigned workers at Portsmouth, but the same concept applied.

William Tebo, the high school teenager employed at the navy yard in 1944, recalled how he traveled from submarine to submarine on the building ways performing the few electrical jobs for which he was the “expert installer” with minimal supervision. According to Tebo, he was a member of a small team of electricians assigned to a specific submarine compartment. One of his jobs was to wire the electrical distribution panel for the newly installed, and highly secretive, shipboard radar. With the radar consoles and equipment concealed under wrappings and coverings, Tebo dutifully wired the radar electrical panels on submarine after submarine.²⁵ Thus, with limited electrical training, and minimal supervision, Tebo was able to provide a most useful and productive service to the yard during his six months of employment, prior to leaving for military service. Tebo was one of hundreds of specialists on small teams scattered throughout all the trades. It is clear that specialized training, and the formation of specialized work teams, were part of the shipyard’s mobilization agenda from the start of the war.

An Assembly Line of Sorts

Contrary to the opinion of the Production Officer in December 1941, Fred White remembers that the shipyard did manage to achieve an assembly line of sorts. Submarine sections, or modules, constructed in various buildings, were moved to the building sites

²⁴ Frederick C. Lane, *The Navy and the Industrial Mobilization in World War II*, 238.

²⁵ Oral interview with William Tebo, 3 Nov 2006, at the Portsmouth Navy Yard Museum.

to be welded together and, after launching, the submarines were moved from berth to berth for the completion of berth-specific tasks leading to machinery trials and completion. Granted, there was no assembly line as such, but the process did bear some resemblance to the automotive industry's conveyor belt that received subassemblies at various stations and moved on until a completed car was produced at the end of the line. At any rate, the submarine building process at the yard during the war was far removed from the custom building practices of the 1920s and early 1930s.

Portsmouth Navy Yard started modular construction of submarines in 1934 on the NIRA submarines, *Porpoise* and *Pike*. Prior to that, flat steel plates were rolled to the desired cylindrical shapes in the structural shop and moved to the building site where they were riveted together. Each submarine constructed was custom built at the building site. A Local Shore Station Development Board letter dated 30 July 1934 noted that, "A new method has been developed for the construction of submarines."²⁶ The letter explained that:

The submarines *Porpoise* and *Pike* are being constructed in sections. A section of the boat weighing approximately twenty tons is constructed at Building 96 and after it has been riveted and welded the section is moved by crane and railroad cars and placed on the building ways in Building 115. This method of constructing a large section and moving it as one piece to the ways has proven economical and more rapid than the method which was formerly used.²⁷

The shipyard wanted approval for the continued use of Building 96 as a submarine section erection site instead of converting it to a storehouse as previously planned. This

²⁶ Local Shore Station Development Board letter to Senior Member of the Departmental Shore Station Development Board of 30 Jul 1934. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 1, Folder A1/Y1, "Local Development Boards Package 1."

²⁷ *Ibid.*

request, and others that followed, sought to continuously improve the sectional construction concept.

The fact that sectional construction began on the NIRA submarines in 1934 illustrates the point made earlier that Portsmouth Navy Yard benefited greatly from a very limited, but nevertheless steady, stream of submarine construction orders during the 1920s and early 1930s. By directing new submarine orders to Portsmouth when Electric Boat and other yards were getting no submarine orders, the Navy allowed Portsmouth to maintain a relatively stable and trained workforce that could develop new submarine construction techniques. The shipyard would further develop and refine sectional construction during the latter half of the 1930s by creating other independent erection sites in various buildings as convenient to the building sites as possible. For example, the shipyard's 1937 plan for facilities development contained numerous features to accommodate sectional construction, including a large addition and alteration to the ship fitters shop, additional building ways, and larger capacity cranes.²⁸ Thus, Portsmouth planned for facilities conducive to sectional construction, developed those facilities to the extent that limited funding was available, and acquired experience in this production technique. When orders skyrocketed and mass production became the order of the day, Portsmouth Navy Yard was poised to capitalize on the revitalized naval rebuilding program when other shipyards were thankful to go back to work.

²⁸ Commandant First Naval District letter of 10 Dec 1936 to Commandant Portsmouth Navy Yard. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 1, Folder A1-Y1, "Local Development Boards."

Portsmouth Industrial Survey #2 (June 1942) concluded that more work should be done on the structural hull assemblies before they were placed in position on the ways.²⁹ The board recommended the installation of more equipment foundations, bulkhead valves, stuffing tubes, small structural bulkheads, and other miscellaneous components. Increasing the completeness of the hull sections prior to delivery to the building ways accelerated the overall assembly schedule by reducing the time needed on the critically few building ways. Also, it reduced the number of workers needed in the confined spaces of submarine tanks and compartments after launch. Shipyard management recognized early on that the maximization of sectional content was critical to increased production.

The formula that Portsmouth Industrial Survey #2 (June 1942) outlined to increase submarine production was the same formula that other shipyards would use to deliver thousands of Liberty ships in record times a few years later. According to maritime historian Frederick C. Lane:

The phenomenal speed attained in [Liberty] shipbuilding during World War II consisted above all in reducing the length of time between keel layings and launchings. If the work of putting together the steel plates and shapes which formed the hull was all performed on the ways or building berths, then each building berth was occupied by one ship for a relatively long time. If, in contrast, the pieces were joined into large sections elsewhere than on the shipway, the time on the shipway could be reduced.³⁰

Working with much simpler systems and much roomier spaces, the builders of Liberty ships were able to accomplish more prefabrication and preassembly than was Portsmouth Navy Yard for the submarines it built. Nevertheless, throughout the war, Portsmouth sought to increase the number of components, primarily foundations, hull fittings,

²⁹ Portsmouth Industrial Survey #2 (June 1942), 14.

³⁰ Frederick C. Lane, *The Navy and the Industrial Mobilization in World War II*, 207.

bulkheads, and other structural components that were installed in submarine sections prior to delivery to the building ways.

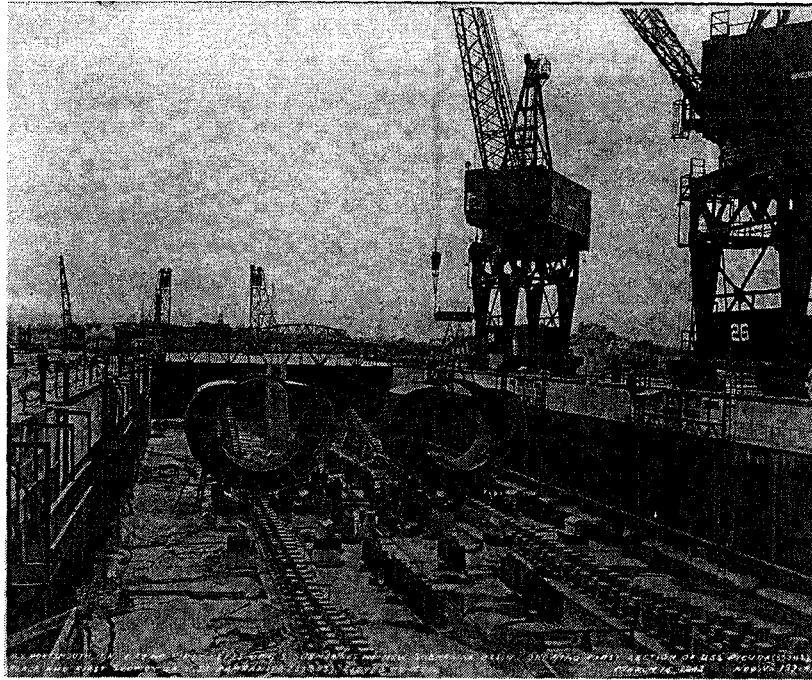
This is not to imply that Portsmouth Navy Yard was the only submarine yard employing the sectional construction of submarines. The other submarine building yards used some form of the sectional assembly process. In fact, Electric Boat's version of the process included an "upside down" feature that rotated the pressure hull sections so that welders could "work upright instead of standing on their heads inside a rigid hull."³¹ Portsmouth's advantage was that, having been first with the process in 1934, the yard had more experience in perfecting the process and adding content to the cylinders. Portsmouth, with fewer building sites than other yards, had great motivation to perfect the sectional construction process to accelerate the turnover of submarine hulls on the limited number of building sites. Without this concept, Portsmouth would have been an average shipyard. With it, the yard was something special.

According to Fred White, the thirteen steel cylinders that were welded together to form a pressure hull were manufactured at various sites in the shipyard, and staged at the building ways, ready to be lowered by crane into the dock or basin as soon as a launching occurred and the dock was free. Figure 13 shows two submarine pressure hull sections on the blocks in Dry Dock #1. On at least one occasion, White recalled, a launching occurred in the morning, the dock was pumped down during the day, and the thirteen pressure hull cylinders were lowered into place on the blocks on the dock floor by the end of the same day.³² Fred White and his crew of riggers were well aware of the shipyard's

³¹ Portsmouth Herald, 16 May 1942, "New Method Puts Subs Into Mass Production," 1.

³² Oral interview with Fred White, 3 April 2006, at his home in New Castle, N.H.

critical need to maximize the use of the building sites in order to achieve maximum production.



**Figure 13: Submarine Pressure Hull Sections in Dry Dock #1.
Courtesy of Milne Special Collections, University of New
Hampshire Library, Durham, N.H.**

If the sectional construction process was Part #1 of the pseudo-assembly line at the yard, Part #2 was the stepping of the submarines through various berths for the completion of berth-specific jobs, many of which were accomplished by special teams. Referring to Figure 14, White recalled that newly launched submarines were first berthed at Berth 11A, to have the sail and topside superstructure finished, after undocking from Dry Dock #1. White's men then moved the submarine to Berth 11B for the installation of periscopes and masts, then on to Berth 11C where the bow torpedo tubes were completed, including the firing of water slugs with the bow pointed out into the Piscataqua River.

Risk Management

The shipyard management team was aggressive and willing to assume reasonable risks to increase production. Portsmouth Navy Yard faced two major obstacles to increased production at the start of the war. The first, insufficient building ways, was satisfactorily resolved locally through aggressive and innovative management. The second, late deliveries of components supplied by contractors, was more difficult and frustrating for management to deal with because the solution required the support of external contractors and agencies. The yard could control its own fate on the first but much less so on the second. As the war progressed, it was found that many contractor-supplied components were not only late but unreliable. This section looks at how the shipyard, through risk management techniques, was able to resolve its dilemma with building ways and contractor's components.

By December 1942, the shipyard had created a number of opportunities for increased production. One possibility was the use of the new Dry Dock #1 for construction of two or three submarines at a time, instead of the repair of submarines as originally intended by the Chief of Naval Operations. At the start of the war, the Chief of Naval Operations placed the highest priority on the repair and maintenance of the existing fleet over new construction. Consequently, the Chief of Naval Operations considered it an urgent matter to insure shipyard facilities and dry docks were available for that purpose. The discussion that follows shows how Portsmouth Navy Yard successfully challenged the original intent for the dock in the interest of maximizing production at the yard. The tension that existed between the interests of the Chief of Naval Operations, in the maintenance of the existing fleet, and the interests of the

Assistant Secretary of the Navy, in the construction of new ships, met in Dry Dock #1 at Portsmouth Navy Yard.

By way of background, the Greenslade Report on the Adequacy and Future Development of Naval Shore Establishments, dated 6 January 1941, concluded that Portsmouth Navy Yard should “handle 6% of the repair load of the entire U.S. Fleet.”³⁴ The Greenslade Board recommended that “a Twin Destroyer Dock [able to accommodate two destroyers at the same time] be built to enable the shipyard to carry its portion of the work level.”³⁵ The Bureau of Ships authorized the shipyard to construct such a dock in March 1941.³⁶ The *Portsmouth Herald* of 20 March 1941 reported that the dock “will be big enough to handle destroyers as well as subs.” At no point in the article did it say that the dry dock, at this early stage, would be dedicated to the construction of two or three submarines simultaneously, which was its ultimate fate.

In January 1941, it was part of the U.S. Navy’s mobilization plan to assign Portsmouth Navy Yard a significant fleet repair workload that was not necessarily limited to submarine repair work. That intent was the Navy Department’s basis for authorizing the new dock. Portsmouth management, however, wanted to shed as much repair work as possible in order to streamline its operation for submarine new construction work. Shipyard management could kill two birds with one stone if it could get the Bureau of Ships and the Chief of Naval Operations to authorize the building of submarines in the new dry dock. The yard would gain two, possibly three, additional building ways for

³⁴ Chief Bureau of Ships letter of 30 Dec 1942 to Chief of Naval Operations. NARA College Park, RG 19, Bureau of Ships General Correspondence 1940-45, Box 18, Folder P2-4 (vol.3).

³⁵ *Ibid.*

³⁶ Bureau of Ships letter of 14 Mar 1941. NARA College Park, RG 19, Bureau of Ships General Correspondence 1940-45, Box 18, Folder P2-4 (vol.3).

increased submarine construction and, at the same time, discourage the assignment of excessive repair work to the yard.

Commandant Withers presented two options to Washington to obtain the additional building ways needed for increased production. Two side launching ways could be built at Berth 6 in four or five months for about \$90,000, or the new dry dock could be used for new construction.³⁷ The shipyard argued that the use of the new dry dock was far more efficient, more economical, and less risky than the side launching ways. The dock was the more efficient option, because it was more centrally located to the shops, and the more economical option, because the cost of preparation and launching would require less timber and other materials than side launching ways. Finally, launchings would be less risky because launching from the dry dock was merely an undocking evolution while “the side launching scheme required the second vessel to be skidded up into launching position.”³⁸

The management of Portsmouth Navy Yard had ulterior motives for the dry dock from the time construction started. Internal studies in December 1941 by Lieutenant Junior Grade Arnold and Hull Superintendent Captain Spiller proposed the use of the upper end of the new dry dock as a building basin for the construction of two submarines simultaneously with the completion of the caisson and dry dock machinery. It was thought that the dry dock would be far enough along to start construction of two submarines in May 1942.³⁹ The study concluded that, “By this method two vessels could

³⁷ *Ibid.*

³⁸ *Ibid.*

³⁹ Ltjg H.A. Arnold memo of 12 Dec 1941 to the Hull Superintendent. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box2, Folder A1-3, “Building Program, PKG #4.”

be sufficiently far advanced to permit floating them near the same time that the dock is ready to go into operation [December 1942].” In other words, in December 1941, some shipyard managers were considering the option of starting construction of two submarines in a hole in the ground with no means of getting them waterborne unless the remainder of the dry dock was completed as scheduled. This proposal was never advanced to higher authorities for approval, but it does illustrate the aggressive thinking, and the willingness to accept risk, that came to characterize the management of Portsmouth Navy Yard during the war. From the start of the war, there appeared to be little doubt in the minds of shipyard managers that they would eventually use the new dry dock for construction of submarines. They merely needed to pick the right time to tell their superiors of their plans. In the meantime, construction moved forward on the dock, still officially intended for repairs and overhauls, through the summer and fall of 1942.

With the dock nearing completion, the yard moved to realize its objective. On 27 November 1942, Commandant Rear Admiral Withers wrote a personal letter to Rear Admiral W.B. Farber, in the Office of the Chief of Naval Operations, to gain support for the yard’s plan to build submarines in the dock. Withers wrote, “The new twin dock is fitted for shipbuilding, and it is located just outside our Shipfitters’ Shop, which is ideal for shipbuilding.”⁴⁰ Withers noted further that approval would result in a \$100,000 savings over the other option of building two side-launch ways alongside one of the piers. Withers then asked his friend to assist in gaining quick approval for his official request that would soon follow.

⁴⁰ Commandant Portsmouth Navy Yard Radm Thomas Withers personal letter to Radm W.B. Farber of 27 Nov 1942. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 2, Folder A1-3, “Building Program, PKG #4.”

In December 1942, the yard pushed its proposal to a successful conclusion. Key to gaining the necessary approval was the shipyard's argument that the other dry dock (Dry Dock #2) would be sufficient capacity for emergency repairs and that it would be a waste of a valuable resource to not use the new dry dock for submarine construction.⁴¹ Utilizing the new dry dock with two building ways increased the number of building ways to nine, giving a potential minimum annual building rate of twenty-seven submarines. Higher building rates were possible if the time on the building ways could be shortened to less than four months or more submarines could be squeezed into the new dry dock.⁴² Both were eventually realized and the shipyard went on to achieve a building rate of over thirty submarines a year.

How valid was the shipyard's argument that Dry Dock #2 could handle all the anticipated submarine repair work? In retrospect, it was probably a stretch of an argument and somewhat of a risk to make such a case. An analysis of the 1943 weekly dry dock usage reports shows that the dock was rarely without a submarine and frequently there were two submarines in the dock.⁴³ As it turned out, when building dozens of submarines a year, a fair number of those required docking for repairs or inspections. That workload alone kept Dry Dock #1 busy. The new dry dock, despite the

⁴¹ Commandant Portsmouth Navy Yard Radm. Thomas Withers letter of 7 Dec 1942 to Vice Chief of Naval Operations. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 2, Folder A1-3, "Building Program, PKG #4."

⁴² Back-up memo for above letter, of 1 Dec 1942. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box2, Folder A1-3, Building Program, PKG #4.

⁴³ Commandant Portsmouth Navy Yard Rear Admiral Thomas Withers letter of 30 Mar 1943 to Chief of Naval Operations. NARA College Park, RG 80, Records of the Navy Department 1798-1947. Formerly Security Classified General Correspondence of the CNO / Secretary of the Navy 1940-1947, Box 897, File L9-3/NY-NY1.

approval to use it for new construction, was first used for repairs to the USS *Marlin* in March 1943. After that, the dock was dedicated to new construction for the remainder

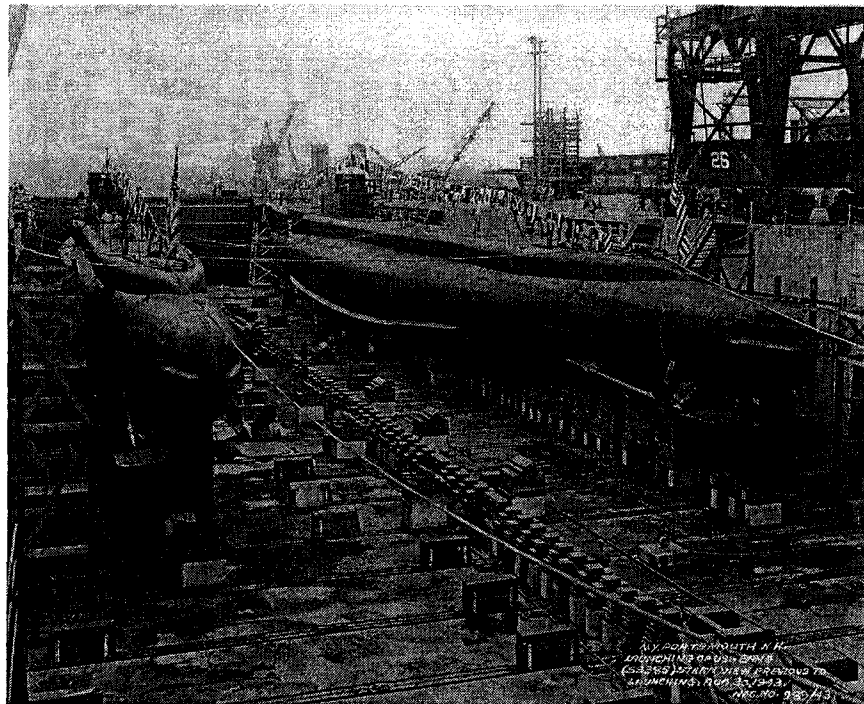


Figure 15: Two Submarines Nearing Launch in Dry Dock #1.
Courtesy of Milne Special Collections, University of New Hampshire Library, Durham, N.H.

of the war. The heavy use of Dry Dock #2 suggests that it may have been a marginal decision as to whether or not that dock could comfortably handle the repair workload. It appears that the Chief of Naval Operations and the Bureau of Ships were content to let Portsmouth Navy Yard run its own show as long as new submarines were being delivered at record rates.

The risk management of Dry Dock #1 did not stop with the authorization to use it for new construction of submarines. The first two submarine keels, for USS *Bang* (SS 385) and USS *Pilotfish* (SS 386), were laid in the dock on 30 April and 15 May 1943 respectively and those submarines were launched simultaneously on 20 August 1943.

Determined to maximize the use of the dock, a few weeks later, on 9 September 1943, the yard laid three keels in the dock for USS *Razorback* (SS394), USS *Redfish* (SS 395), and USS *Ronquil* (SS 396). The launching of these submarines together on 27 January 1944 was described in the vignette that opened this dissertation.

The experiences with Dry Dock #1 illustrate well the aggressiveness of the shipyard management team and a willingness to assume risks to achieve production increases. At the same time, the decision to limit submarine construction in Dry Dock #1 to two at a time, after building three at a time only once, shows that the shipyard was also quick to balance reason and risk. Recalling that the triple simultaneous launching occurred in January 1944, had the shipyard continued to successfully build three at a time in Dry Dock #1, the title of this dissertation might have been *36 in '44* instead of *32 in '44*.

The emphasis of Portsmouth Industrial Survey #1 (December 1941) was on facility and personnel upgrades. By the time of the team's second report in June 1942, the personnel issue was of secondary importance, facility improvements were well underway, and the emphasis had shifted to material procurement and scheduling. The board's June 1942 report opened with an enthusiastic endorsement of the yard's exceptional performance during the first six months of the war:

The increase in the rate of building submarines has far exceeded not only the schedule but even the most optimistic hopes of everyone connected with it. . . This [greatly reduced] length of time on the building ways seems phenomenal when compared to the best performances reached by other yards.⁴⁴

⁴⁴ Portsmouth Industrial Survey II (June 1942), 1.

The report then turned to the problem of material procurement:

The greatly accelerated rate of construction of submarines has brought to light certain additional factors which adversely affect the building program in various degrees. . . Procurement under present conditions [a lack of orders far into the future] is one of the most critical factors in submarine construction. . . A system has been formed and the method of scheduling has been changed radically. . . the system offers promise of more orderly construction and shorter building periods.⁴⁵

It was the team's opinion that "the acquiring of a long-range construction program is of prime and critical importance" because it would allow bulk ordering and "lessen the difficulties of procurement which in itself would eliminate or minimize many other problems of management."⁴⁶ In other words, if the shipyard could order material for five or six submarines at a time, the first submarine on the schedule might suffer late deliveries but the others would probably have a large percentage of ordered material sooner than needed.

Unfortunately, the shipyard's plans to bulk order material further aggravated a military procurement system that, according to historian David M. Kennedy, by the summer of 1942, had "abandoned any vestige of military discipline" as "Military purchase orders became hunting licenses, unleashing a jostling frenzy of competition for materials and labor in the jungle of the marketplace."⁴⁷ In time, more disciplined priority systems would better integrate and coordinate interservice and civilian needs. However, at the start of the war each service and industrial community was looking out for itself and Portsmouth Navy Yard was certainly no exception.

⁴⁵ *Ibid.*, 5.

⁴⁶ *Ibid.*

⁴⁷ David M. Kennedy, *Freedom from Fear*, 626-627.

In late 1942, the shipyard reported that the only scheduling delays being experienced at the yard were associated with late component and material deliveries. In a 12 December 1942 letter to the Bureau of Ships, Portsmouth reported with confidence that it could build submarines in 150 days, but necessarily continued scheduling construction for 210 days because of problems with material deliveries, especially steel and main engines. Industrial Manager Captain Davis wrote:

The steel situation calls for special comments. At the start, the [SS]285 Class submarines were handicapped due to late receipts of high tensile steel and heavy plates for bulkheads. This same situation exists now for the [SS]308 Class, and serious delays are being encountered.⁴⁸

Late steel deliveries were a widespread problem in the shipbuilding industry. In *Ships for Victory*, maritime historian Frederick C. Lane concluded that, by late 1942, "Facilities were adequate so that deliveries [of completed merchant ships] would have been higher in the last quarter of 1942 and throughout 1943 if more steel had been allocated to the yards."⁴⁹ The bulk ordering of steel for many submarines of the same class permitted Portsmouth Navy Yard to build 32 submarines in 1944, very close to the maximum capability of its facilities. Unfortunately, bulk ordering, such as employed by Portsmouth Navy Yard, further exaggerated steel shortages at other shipyards. Lane noted, "It should be made clear that the limit to merchant ship production was set not by the nation's steel capacity alone, but by it in conjunction with the allocation of steel to Army, Navy, and other users."⁵⁰ Implied by Lane is that the excessive ordering of steel throughout the

⁴⁸ Commandant Portsmouth Navy Yard letter of 12 Dec 1942 to Bureau of Ships. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 1, Folder A1, "New Construction 1941-1943."

⁴⁹ Frederick C. Lane, *The Navy and the Industrial Mobilization in World War II*, 343-344.

⁵⁰ *Ibid.*, 301.

armed services, which enjoyed much higher priorities than the U.S. Maritime Commission, contributed to the detriment of merchant shipbuilding. Portsmouth Navy Yard stands guilty as charged.

Late deliveries were not limited to steel. In April 1942, the yard reminded the Bureau of Ships that the delivery schedule for the submarine building program in progress depended on delivery of main propelling machinery for which the Bureau was responsible. Worse yet, the shipyard had received no information from the Bureau as to when the equipment would be available.⁵¹ In August 1943, the shipyard reported schedule delays due to late receipt of main power electrical control cubicles and motors for auxiliary equipments.⁵² The next month the yard reported that delivery dates for auxiliary and main engines and generators were 4 to 8 weeks late for orderly progress.⁵³ Delivery dates for radars, sound gear, and batteries were reported to be 2-3 weeks late. As noted earlier, the delivery dates for the first submarine of an order were often in jeopardy but the remainder of the submarines on that order usually had the needed equipment on hand well before the scheduled installation dates.

The problem with late contractor components was highlighted at a conference at the Bureau of Ships on 13 and 14 August 1943 that had been called in response to Under Secretary of the Navy James Forrestal's request to see what could be done to speed up

⁵¹ Commandant Portsmouth Navy Yard letter of 6 Apr 1942 to Bureau of Ships. NARA College Park, RG 24, Bureau of Naval Personnel General Correspondence 1941-45, Box 1601, Folder NY/P-16-1 January 1944.

⁵² Commandant Portsmouth Navy Yard letter of 11 Aug 1943 to Bureau of Ships, NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 1, Folder A1, "New Construction."

⁵³ Portsmouth Navy Yard Progress Report for Month of September 1943 NARA at College Park, RG 24, Bureau of Naval Personnel General Correspondence 1941-45, Box 1601, Folder NY1.

submarine construction. Portsmouth Navy Yard was represented at the conference by the Production Officer, Captain Dudley. Dudley's conference report shows that representatives from Portsmouth, Electric Boat, Manitowic, Cramp, and Boston were "unanimous in their comments that the present difficulty was largely due to late delivery of component parts and that the situation was getting no better."⁵⁴ Each yard identified other needs that might lead to improved production, but all else paled in comparison to late material deliveries. It was suggested by the Bureau of Ships that perhaps a central procurement agent, like Electric Boat, might better coordinate deliveries to each shipyard. The Electric Boat representative responded that E.B. did not want the job, but "they would do it if it was decided upon."⁵⁵ The yards agreed that it would be better to continue with the present system than try to initiate a new ordering system that might further compound their problems.

At the conference, the shipyards were asked to predict annual submarine production capacities assuming the completion of necessary plant improvements and the assumption of satisfactory material deliveries. The following responses were given by the representative of each yard:⁵⁶

	1944	1945
Portsmouth	30	35
Electric Boat	32	42
Manitowoc	13	15
Cramp	18	18
Boston		14

⁵⁴ Captain Dudley's conference report of 17 Aug 1943 on BuShips Conference of 13 & 14 Aug 1943. NARA Waltham, RG 181, Portsmouth Naval Yard General Correspondence (Central Files), Box 1, Folder A1, "New Construction Jan 1940 to Dec 1943."

⁵⁵ *Ibid.*

⁵⁶ *Ibid.*

Indicative of the comprehensive understanding that Portsmouth had of its capabilities and processes, the yard came close to achieving its predicted maximum production the next year when 32 submarines were actually delivered in 1944, two more than predicted. All the other yards fell short of their predictions. A major reason for Portsmouth's success was its ability to manage and work around late and unreliable contractor components.

In addition to late deliveries, Portsmouth Navy Yard and the other yards had to deal with the receipt of poor quality and unreliable components. The shipyard determined early on that certain pieces of critical equipment were too unreliable to install shipboard as received from the contractor. To do so was to jeopardize completion schedules, if the equipment failed later and had to be removed from the tight confines of the submarine for overhaul. Worse yet, premature failure after leaving the yard could jeopardize lives. Not having the time and resources to satisfactorily engage and resolve all contractor issues in a timely manner, the shipyard routinely reworked critical components, at its own expense, prior to installation. The Booz-Allen Industrial Survey (1944) highlighted this practice:

Certain items of submarine equipment such as electric driven pumps and air compressors are invariably broken down after delivery from the manufacturer, and given a complete overhaul. This is justified by the Yard as economical in the long run since, earlier in the building program, defects developed after installation so that units had to be removed for overhaul.⁵⁷

By assuming extra work up front in the schedule, the shipyard hoped to avoid late and disruptive work that might jeopardize completion. Risk management was well integrated into the routine shipyard planning, procurement, and production processes during the war.

⁵⁷ Booz-Allen Industrial Study (1944), 8.

The production scheduling system developed at Portsmouth Navy Yard early in the war became a valuable tool for managing and working around material procurement problems. Faced with a rapidly expanding workload, it soon became obvious that the work scheduling practices, which had produced one or two custom-built submarines a year in the past, were outdated. In addition, the expected increased production required much closer coordination between designers, material procurers, schedulers, and those executing the work.⁵⁸

Prior to any description of Portsmouth's scheduling system, it is important to appreciate the advantage that Portsmouth and Electric Boat enjoyed as the principal designers of the submarines they were building. During the war, each new order for a group, or class,⁵⁹ of submarines brought the requirement to incorporate the latest technical improvements, frequently determined by feedback from battle tested submarines. As a principal design agent, Portsmouth could incorporate the necessary changes, freeze the design, and promptly feed the changes to the yard's scheduling system for advance bulk ordering of material and job order preparation for the next group

⁵⁸ Industrial Manager Report of Manager's Conference of 22 Jun 1943. NARA Waltham, RG 181, Portsmouth Naval Yard General Correspondence (Central Files), Box 13, Folder A3-2, "General Management 1932-1940."

⁵⁹ Accounting for the classes of submarines built during World War II can be a confusing subject. Gary Weir, *Forged in War*, 16, note 30 explains that "Although the three principal classes of fleet submarines during World War II were *Gato*, *Balao*, and *Tench*, technical variations within each class often prompted submariners and BUSHIPS to refer to particular groups of submarines by more specific class names, like *Gunnel* or *Drum*." According to Cdr. John D. Alden, "Victorious Submarines of World War II," *United States Submarines*, 116, *Gato* was the basic World War II fleet submarine design. *Balao's* primary technical variation was an increased test depth and *Tench's* primary technical variation was increased torpedo stowage. Portsmouth Navy Yard's Administrative History of World War II, 1 notes that between June 1940 and June 1943 the yard received contracts for no less than 8 different classes totaling 106 submarines. Thus, Portsmouth Navy Yard considered each new order for a group of submarines to be a new class of submarine.

of submarines to be built. This was all part of the streamlining of the design and production processes for new construction.

The improved scheduling system, the Portsmouth Material Control System, revolved around the yard's continual efforts to maximize hull section content in the shops prior to delivery to the building sites. This more formal system of subassembly, work scheduling, and material control was implemented in July 1942 with the express purpose of "providing a better means of building more submarines in less time."⁶⁰ The basic building block of the system was a control unit, termed a "group," that was essentially the largest subassembly that could be efficiently put together, usually off-site, prior to shipboard installation. Based on the shipyard's experience, the completion of groups was scheduled no more precisely than the specific week that the assembly was needed after the laying of the keel. For example, a group that was required two weeks before the laying of the keel would be labeled 2B [for Before] and a tank required four weeks after keel laying would be identified as 4A [for After]. This was a major advance over previous scheduling attempts at the yard. The scheduling system, designed and implemented in 1942, reflected eight years of experience with submarine sectional construction that had started in 1934 with the NIRA submarines.

Under the new Portsmouth Material Control System, the start date for construction or assembly of each group then dictated need dates for all the other support activities that were required in advance of that event, including material deliveries, the issuance of drawings and plans, and shop manpower assignments. A key step in the process was the verification that all material and support documentation were on hand

⁶⁰ *Administrative History: Portsmouth Naval Shipyard in World War II*, Portsmouth Naval Shipyard Museum Archives, Kittery, Me., 23.

prior to the start of the job. The group schedule could be easily transferred from hull to hull for all submarines of the same class, permitting the bulk ordering of material for similar ships of the same class far in advance of actual need dates. Thus the Portsmouth Material Control System became the prime tool that enabled the yard to circumvent the inefficiencies of the procurement system.

Portsmouth's Material Control system was a first step towards critical path scheduling. Portsmouth's locally designed and implemented scheduling system was critical to the shipyard's ability to accelerate construction from mid-1942 through the end of the war. The Booz-Allen Industrial Survey (1944) acknowledged the value of the Portsmouth Material Control System and recommended further enhancements to the system for improved integration of material ordering with planned work schedules.⁶¹

Innovation

Much of what shipyard management did to increase production during the war, and much of what has been presented in this chapter thus far, can be grouped under the generic heading of innovative management. However, a few additional examples will make the argument for innovative management even more convincing. For a starter, innovation was obviously present in August 1941 when the shipyard convinced the Bureau of Ordnance to permit the use of twenty obsolete muzzle loading guns of the Civil War period, then in storage at the yard, as bollards on the new extension of Berth 6.⁶²

⁶¹ Booz-Allen Industrial Study (1944), 11.

⁶² The Chief of the Bureau of Ordnance letter of 2 Aug 1941 to Commandant Portsmouth Navy Yard. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files, Box 36, Folder N20-5, "Bollards Mooring."

Two other examples, much less pragmatic, were far more important to the shipyard's mission. The first involved the need to find transportation to and from the shipyard for thousands of new employees. The second involved delaying the arrival of submarine crews at the shipyard to minimize mutual interference between crews and shipyard workers during the final stages of construction. The latter was not as simple a matter as it may first appear as it required that the Chief of Naval Operations be convinced that the war effort would benefit by having the crews spend less time at the shipyard becoming familiar with their new submarines. As with the shipyard's plan to use Dry Dock #1 for new construction, Commandant Withers did not hesitate to challenge the decisions and policies of his superiors when needed to improve his shipyard's productivity. Similarly, Portsmouth Navy Yard's recommendations were usually well received in Washington because of the yard's recognized position of excellence in submarine technology and construction.

The rapid increase in employment required some means to get thousands of new employees to work at the shipyard at a time when automobiles were in short supply and gasoline was rationed. In March 1942, the yard contracted with Hill Transportation Company of Portland, Maine to provide bus service within a 60 mile radius of the yard. The service continued until November 1944 when the yard began to run its own fleet of buses. Hill's fleet of over 100 buses brought employees to work from as far away as Lowell, MA., Portland, ME., and Manchester, N.H.⁶³ The shipyard estimated in a 1946

⁶³ *Administrative History: Portsmouth Naval Shipyard in World War II*, Portsmouth Naval Shipyard Museum Archives, Kittery, Me., 38.

report that, during the peak employment period of the war, 10,000 employees arrived for work daily in 2,500 vehicles (averaging 4 occupants per vehicle), 8,000 by bus, and 2,500 walked to work. Vehicles and buses were filled to capacity to conserve gas and tires for the war effort.⁶⁴

Mass bus transport for shipyard workers contributed to a significant reduction in local traffic during the war years, despite a doubling of the local population and a quadrupling of shipyard employees. Undoubtedly, the rationing of automobiles, tires and gasoline also contributed significantly to traffic reduction. At any rate, traffic surveys of vehicles crossing the interstate bridge connecting Portsmouth and Kittery showed the following:⁶⁵

<u>Period</u>	<u>Total Vehicle Count</u>
12/1/41-8/1/42	785,870
12/1/42-8/1/43	520,925
12/1/43-8/1/44	316,327
12/1/44-8/1/45	498,429
12/1/45-8/1/46	830,860

It is interesting to note about the time that the Portsmouth Navy Yard employment peaked at 20,465, in late 1943, the traffic crossing the bridge was less than half what it was at the start of the war. Employees were walking to work from nearby housing projects, sharing a ride with several other employees, or taking the bus. The innovative and far-reaching bus system was critical to the local communities' conservation efforts, as well as the shipyard's success.

⁶⁴ *Ibid.*

⁶⁵ "Survey of Health and Welfare in the Portsmouth Defense Area" Cumings Library and Archives, Strawberry Bank Museum, Portsmouth, N.H.

Innovation was also evident when Commandant Withers approached the Chief of Naval Operations in January 1943 with a request to delay submarine commissioning dates and, thus, the arrival of submarine crews at the shipyard, so as to minimize the mutual interference between crews and shipyard workers as the submarine approached completion.⁶⁶ Prior to the spring of 1943, this period of mutual interference varied from submarine to submarine but was typically between six and eight weeks. For example, the USS *Balao* (SS 285) was commissioned at Portsmouth Navy Yard two months before completion on 4 April 1943.

The Chief of Naval Operations approved Withers's request and the next submarine completed at Portsmouth, the USS *Billfish* (SS 286), was commissioned just 15 days prior to completion. Thereafter, during the war, submarines at Portsmouth Navy Yard were routinely commissioned between two and three weeks prior to completion. Portsmouth Navy Yard's record of success and recognized expertise in submarine construction had paved the way for the fleet support that was needed to promote further success. Confident in the quality of Portsmouth-built submarines, and the leadership of Commandant Withers, the Chief of Naval Operations agreed to reduce the time that his submarine crews had to inspect and familiarize themselves with their submarines prior to departure from the shipyard. This action proved to be less controversial than one might think because, as the war progressed, the submarine commissioning crews included increased numbers of battle experienced submarine sailors who required less time to familiarize themselves with a new submarine.

⁶⁶ Commandant Portsmouth Navy Yard letter of 16 Jan 1943 to Vice Chief of Naval Operations. NARA Waltham, RG 181, Shipyard Formerly Confidential Correspondence 1930-50, Box 4, Folder SS/S8 Trials.

Communications and Control

Earlier it was established that Commandant Withers had great “people skills” as a leader. He was a personable leader with a bent towards congeniality and open communications with his subordinates and employees. Assistant Secretary of the Navy Ralph A. Bard held similar views about the importance of open communication. In June 1943, Bard urged navy yard commandants to promote open lines of communication between management and employees. Bard believed that:

Any team whether in sport, industry, or war, to be effective must have a common understanding of the game. To secure the highest degree of efficiency, each member of the team must at least understand the signals, the objective, the rules, and the part he is to play.⁶⁷

Bard saw the process of open communication to be a win-win situation for both management and employees, “The process of taking employees into the confidence of management creates far greater respect for management and usually saves much time and energy for both groups.”⁶⁸ Commandant Withers and his managers could not have agreed more.

There was no need to establish open lines of communication at Portsmouth Navy Yard, as the Secretary of the Navy was suggesting, because it already existed in spades. From Rear Admiral Withers’ open leadership style, to the civilian managers that Eileen Dondero observed roaming the industrial areas interacting with the employees, open communication was a way of life in the yard. As the Booz-Allen Industrial Survey (1944) had observed, despite a minimum amount of paperwork and written instructions

⁶⁷ Assistant Secretary of the Navy Ralph A. Bard letter of 5 Jun 1943 to Commandants and Commanding Officers Concerned. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 13, Folder A3-2, “General Management 1932-1940.”

⁶⁸ *Ibid.*

and few meetings, the work got done. William Tebo never saw a job order during the six months that he worked at the yard in 1944.⁶⁹ He was well trained for the jobs he was assigned and performed them well as did, apparently, most shipyard employees. Open and efficient communications were byproducts of the yards' "walk around" style of management. Furthermore, management tried to take advantage of the latest technology to facilitate communications and information transfer.

The state of communication and information transfer systems that existed in 1940, when mass production arrived at Portsmouth Navy Yard, was inadequate for the task. If, as this study suggests, the shipyard employed management techniques well ahead of their time, the yard did so with rudimentary communication tools, making the shipyard's success even more remarkable. Management's efforts to upgrade the yard's technical capabilities for efficient information transfer and communication can be taken as an indicator of the importance that was given these subjects. Unfortunately, shipyard management struggled throughout the war to gain the approvals needed from higher authority to upgrade internal communication and control systems to the extent that they believed necessary to effectively coordinate the greatly increased activity in the yard.

At the start of the war, Portsmouth Navy Yard lacked internal systems of communication and control that existed in other shipyards. These shortcomings included a grossly inadequate phone system, ineffective means to transmit messages and work instructions throughout the yard, no "clock system" for the accounting of employee hours, and no "check system" for employee payment. In fact, the shipyard did not begin

⁶⁹ Oral interview with William Tebo, 3 Nov 2006, at the Portsmouth Navy Yard Museum.

paying by check until 13 May 1942.⁷⁰ In essence, Portsmouth was still a manual yard whereas other yards had taken the first steps towards the automation of various administrative tasks. Portsmouth, favored with workload prior to the war, had not been favored with any degree of automation. The custom building of a submarine or two a year was primarily based on experience and acquired skills, not state of the art communication and automation.

The yard's telephone system was outdated and greatly under the required capacity at the start of the war. In 1936, it was reported that the shipyard manual phone system had a capacity of 200 lines, 150 of which were then in service, with some 13 pay stations. As the shipyard began to ramp up production in response to ever increasing orders in 1940 and 1941, shipyard management quickly realized that the shipyard's phone system was not equipped to handle the increasing workload. Telephone upgrades were installed on a piecemeal basis, but complaints of poor service persisted throughout the war.

The late 1930s saw the development of several technological developments in the telephone that greatly increased the capacity and efficiency of phone systems. Coaxial cable was introduced in 1937, as well as multiplexing techniques that allowed numerous calls to be carried over one cable simultaneously. Switching technology also advanced in the late 1930s, becoming more rugged and reliable. More mundane improvements included the combined handset and spiral cord, both introduced in 1938. Transistor circuitry and electronic switching, developed for military applications during the war, found widespread civilian application immediately after the war. At any rate,

⁷⁰ *Portsmouth Herald*, 14 Mar 1942, "Portsmouth Navy Yard Makes First Payment by Check", 1.

telecommunications technology had made great strides by 1940 but the shipyard had benefited little from those advances.⁷¹

Rear Admiral Withers issued a shipyard notice on 10 December 1942 that urged employees to make as few calls as possible, because “The large expansion in personnel and work of the Yard has increased the volume of telephone business to the point where the present capacity of the Yard Telephone Exchange is overtaxed during certain hours of the day.”⁷² The Industrial Manager also believed, as late as January 1943, that “The Yard’s steadily expanding building program, combined with the increasingly difficult problems of material procurement, has developed to a point where the existing telephonic communication between the material Planning Superintendent’s desk and the Supply Department . . . is totally inadequate.”⁷³ Davis wanted the shipyard to purchase one of the many inter-office communication systems that were appearing on the market about that time.⁷⁴

The state of communications technology in the early 1940s is a study unto itself. Systems that the shipyard considered buying at the time were quite rudimentary. Those systems included SELECT-O-PHONE (an automatic telephone service that eliminated the need for an operator and provided for “hands free” speaker communication), an exclusive Exec-U-Phone, a system for recording conversations on vinyl 78 RPM records,

⁷¹ Susan E. McMaster, *The Telecommunications Industry* (Westport, Ct.: Greenwood Press, 2002), 68-71.

⁷² Portsmouth Navy Yard Notice of 10 December 1942, NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 13, Folder A3-2, “General Management 1932-1940.”

⁷³ Manager memo of 14 Jan 1943 to Public Works Officer. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 13, Folder A3-2, “General Management 1932-1940.”

⁷⁴ *Ibid.*

a TelAutograph Telescriber (an inter-department communication system to eliminate phone calls between shipyard departments and provide for the efficient movement of material and supporting paper between departments), an RCA Paging and Public Address System, and an audible and visual call system for the shops. In the spring of 1943, the shipyard was attempting to get approval to install an announcing system that would enable the commandant to readily communicate in a broadcast manner to many important buildings and worksites, and also enable industrial managers to better communicate within their buildings.⁷⁵ The request was denied by the Bureau of Ships.

The manual methods of transfer of technical specifications and work instructions between the Supply and Industrial Departments that worked when the yard built one or two submarines a year could not work efficiently when it built one or two dozen submarines a year. In 1941, Portsmouth requested approval from the Bureau of Ships for the purchase of three teletype machines to improve the internal "handling of dispatches and other paper."⁷⁶ Again, the request was denied. According to the Bureau of Ships, teletype machines were not cost effective when compared to telephone rates and other means to transmit production instructions throughout the yard.⁷⁷ Clearly, the Bureau of Ships was out of touch with the needs of the navy yards.

⁷⁵ Industrial Manager Capt. H.F.D. Davis memo of 1 Apr 1943 and Portsmouth Navy Yard letter of 18 May 1943 to the Chief of Yards and Docks. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 13, Folder A3-2, "General Management 1932-1940."

⁷⁶ Navy Yard Portsmouth Dispatch 261600 of 26 Jun 1941 to Bureau of Ships. NARA College Park, RG 19, Bureau of Ships General Correspondence 1940-1945, Box 791, NY1/L11-3 vol.2 to C-NY1/N6, Folder NY1/N36.

⁷⁷ Chief Bureau of Ships letter to Commandant Portsmouth Navy Yard of 25 Aug 1941. NARA College Park, RG 19, Bureau of Ships General Correspondence 1940-1945, Box 791, NY1/L11-3 vol.2 to C-NY1/N6, Folder NY1/N36.

Portsmouth Navy Yard's outdated systems were not limited to communication and information transmittal systems. The Industrial Officer, Captain Davis was surprised to find, upon reporting to the shipyard in 1941, that "Unlike probably all Navy Yards, Supervisors of Shipbuilding [at private shipyards], Commercial Companies, and Government Offices, Portsmouth does not have a clock system."⁷⁸ Instead, employee time and attendance records were kept manually. Worse yet, the shipyard did not have a check payment system in place, as most other shipyards had, and employees lined up every Friday for a cash payday that was the height of inefficiency and disorder.⁷⁹

Hull Superintendent Tusler deplored the chaotic conditions that existed in the yard on Fridays when large numbers of employees lined up to be paid in cash for their weekly hours. He recommended that the shipyard "adopt a check method of paying Yard employees in order to eliminate the delays now encountered on Friday." Tusler also recommended that the yard "Adopt a time-clock system of checking employees in and out, and require employees to check in and out four times a day as is customary in other Yards." The Bureau of Supplies and Accounts authorized the shipyard to install an employee clock system in June 1941,⁸⁰ but it would be nearly a year later, 13 May 1942, before the shipyard would have the time-clock system completely installed and be able to

⁷⁸ H.F.D. Davis letter of 24 May 1941 to Capt. Claude A. Jones, Bureau of Ships. NARA College Park, RG 19, Bureau of Ships General Correspondence 1940-1945, Box 791, NY1/L11-3 vol.2 to C-NY1/N6, Folder NY1/N36.

⁷⁹ Hull Superintendent (F.A. Tusler) memo to Production Officer of 3 Feb 1941. NARA Waltham, RG 19, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 26, Folder A19, "Conferences, Congresses, and Conventions."

⁸⁰ Bureau Supplies and Accounts I letter of 19 Jun 1941. NARA College Park, RG 19, Bureau of Ships General Correspondence 1940-45, Box 791, NY1/L11 3 vol.2 to C NY1/N6, Folder NY1/P18-2.

begin to pay by check and alleviate the inefficiencies caused by cash paydays.⁸¹ Cash paydays may have made sense when the yard employment was a few thousand, but by May 1942 employment was about 15,000 and chaos reigned on Friday afternoons. It was estimated in May 1942 that the check payment system would save 7,000 man-hours per week.⁸²

The yard started the war with insufficient and inefficient systems that were inferior to many of the other yards. Worse yet, even though the yard recognized the need for significant upgrades to those systems that were commensurate with the production improvements expected of the yard, support for those upgrades was not forthcoming. As the yard management did with other obstacles, be it building ways, unreliable contractor components, or antiquated communications and control systems, it found a way to get the job done with what it had available.

Farm-Out Programs

The shipyard could not have achieved its production records without an extensive farm-out program. This program involved a network of local shops able to accomplish the machining, welding, and electrical work that exceeded the capacity of the shipyard's shops. Prior to September 1941, the machining of aluminum containers for electrical fixtures was the only work farmed-out by the shipyard. With increased orders for submarines, the capacity of the Inside Machine Shop was quickly exceeded and, in late 1941, the Industrial Development Company of Portland, Maine was contracted to manufacture air compressor and pump parts. In March 1942, additional Machine Shop

⁸¹ Portsmouth Naval Base Order No. 15-42 of 5 May 1942. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 8, Folder "Navy Yard Orders 1942."

⁸² *Portsmouth Herald*, 14 May 1942, "Portsmouth Navy Yard Makes First Payment by Check," 8.

work was farmed-out to Kidder Press Company of Dover, N.H. Kidder Press eventually accumulated \$4.7 million of Portsmouth Navy Yard contracts and performed so well against those contracts that, based on the shipyard's recommendations, received several government awards for excellence. Local welding companies were also used to relieve the overloaded shipyard welding shop.

Figure A-4 in the appendix, Portsmouth Navy Yard Man Hour Curve per Submarine (1940-1945)⁸³ shows how the shipyard greatly increased farm-out work (shaded on Figure A-4), beginning in late 1942 and continuing until mid-1945. Most noteworthy is the fact that when the yard achieved its maximum efficiency of 665,000 manhours per submarine in mid-1944, approximately 100,000 of those man-hours were attributed to farm-out work. Farm-out work was extensive through mid-1945, when shipyard orders declined and greatly reduced the need to export work. Shipyard records for 1943-44 indicate that, "The total value of contracts farmed out amounted to approximately \$13,190,409. This represents a value greater than the entire Yard output during the fiscal years of 1939 and 1940."⁸⁴ In other words, the annual farm-out program during the two peak war years, 1943 and 1944, approximated the annual shipyard production for the two years immediately prior to the war.

The magnitude of the farm-out programs highlights even more the importance of the Portsmouth Material Scheduling System. The shipyard needed to coordinate a farm-out program that approximated the workload of another entire shipyard, as well as late and unreliable contractor supplied material and components, with accelerating production

⁸³ *Administrative History: Portsmouth Naval Shipyard in World War II*, Portsmouth Naval Shipyard Museum Archives, Kittery, Me., 31.

⁸⁴ *Ibid.*

schedules. Fortunately, most of the farm-out program involved reliable local vendors that were essentially an extension of the shipyard.

Lean Manufacturing

Lean manufacturing, the elimination of frills and waste from manufacturing processes, was not a household phrase in the early 1940s. One might think that lean manufacturing would be a natural by-product of war time production. This is true to a large extent and, in fact, the submarines delivered by Portsmouth Navy Yard during the war had few frills and crew comfort features compared to today's standards. However, it is also true that, during the war, shipyards had to be reminded of the need to direct resources to essential work only. The following example illustrates the seriousness with which the senior German submarine officer, Admiral Karl Donitz, viewed the subject of lean manufacturing and how the Bureau of Ships used an intercepted Donitz communiqué to make the same point to navy yards.

In January 1942, the Bureau of Ships directed navy yard commandants to restrict the use of shipyard resources for crew amenities in order to support more critical shipboard work and timely deliveries of ships under construction. The Bureau noted that the enemy had taken extreme measures in that regard, as evidenced by a 16 April 1941 communication from Admiral Donitz to his subordinates that the Office of Naval Intelligence had intercepted with the capture of a U-570 Class submarine in August 1941. Donitz wrote:

I have noticed that too much time has of late been spent on finishing work and repairs. . . I absolutely forbid the issue of orders which merely contribute to the comfort of the boat's complement . . . The kind of finishing work that

is being carried out at present can no longer be tolerated, because it retards active service and puts too great a strain on the dockyards.⁸⁵

The Bureau of Ships suggested that, “The conditions which led to the issuance of this order in Germany in the spring of 1941 apply with even greater force in the United Nations in the spring of 1942.”⁸⁶

The Bureau of Ships had little need to caution Portsmouth Navy Yard about excessive finishing work and accommodating requests from the crews for comfort items. Portsmouth was delivering submarines rapidly in cookie cutter fashion, where all came from the same mold, with little opportunity for variation. In addition, the crews, after Commandant Withers’ move to shorten their time in the yard to a few weeks prior to completion had little time to solicit extra work from the shipyard.

In summary, the methods employed by Portsmouth Navy Yard during the war contained many of the same elements taught in management schools and seminars forty years later, especially employee empowerment and special teams. In addition, well-designed training programs, assembly lines, risk management, innovation, open communications, farm-out programs, and lean manufacturing were all in evidence at the yard during the war. Moreover, the methods were implemented by a competent management staff and an intelligent, self-motivated workforce. The combination proved to be a powerful force that produced submarines at unprecedented rates.

⁸⁵ Chief Bureau of Ships E.S. Confidential letter of 4 Mar 1942 to Commandant Navy Yards. NARA Waltham, RG 181, Shipyard Formerly Confidential Correspondence 1930-50 – Declassified by NARS per NCD Project #745085 and by the Navy Department, Box 3, Folder E.F. 30, “German, Portsmouth Naval Shipyard, May 1929-August 1945.”

⁸⁶ *Ibid.*

Measurables

No matter how competent the management, how dedicated the workforce and how well conceived the industrial tactics and strategy, it is results that count. This section analyzes the results of Portsmouth Navy Yard's performance during the war in terms of production, quality, and cost.

Production

As noted at the beginning of this study, the Portsmouth Navy Yard completed seventy-nine submarines between 1 July 1940 and 1 July 1945 after averaging the completion of less than two submarines a year in the 1930s.⁸⁷ Electric Boat completed seventy-eight submarines during the same period. Portsmouth built 81% of the 98 submarines built in navy yards and Electric Boat built 70% of the submarines built in private yards. At the risk of being slightly repetitious, the discussion that follows restates a few of the production records presented earlier in this study, along with additional noteworthy achievements.⁸⁸

⁸⁷ *Portsmouth Herald*, "Yard Tops in Sub Production," 1.

⁸⁸ With much of the discussion that follows focused on the large numbers of submarines built by Portsmouth Navy Yard during the war and the remarkably short building periods between the laying of the keels and completion for many of those submarines, it is appropriate to highlight a December 1941 change to the completion trials agenda that shortened subsequent building periods by several weeks to a month. On 18 December 1941, the Chief of Naval Operations eliminated builder's underway trials and substituted main propulsion and auxiliary machinery trials alongside the pier, subject to the acceptance of the Board of Inspection and Survey (Insurv Board). Underway trials were eliminated to accelerate completions and avoid any possibility of off shore enemy attacks. The process for acceptance trials of submarines was simplified even more in October 1942, when the President of the Board of Inspection and Survey requested shipyards to establish their own sub-boards to perform acceptance trials and inspections in those cases where workload prevented the participation of an Insurv Board team. As the result of this abbreviated wartime acceptance procedure, any comparisons between World War II submarine building durations and prior building durations must take this change into account. Comparisons of building durations between competing submarine building yards during the war are legitimate as they all complied with the same completion requirements.

The yard's remarkable string of "firsts" began with the first double launching of United States submarines when the *Scamp* and *Scorpion* slid down their building ways on 20 June 1942.⁸⁹ Another first for the yard was the double launching of *Picuda* and *Pampanito* from the new building basin on 12 July 1943, marking the first time that submarines had been fabricated below water level at Portsmouth Navy Yard. This practice, of course, would become the key to Portsmouth's success once Dry Dock #1 was put into use for the construction of new submarines. The construction of multiple submarines below the waterline in the building basin and Dry Dock #1 would enable the shipyard to dramatically increase production, despite the severe limitation in traditional building ways. The yard improved upon its dual launchings with the first triple submarine launching on 28 October 1943 when the *Sterlet* and *Pomfret* were floated in the new building basin and the *Piranha* was launched in the traditional manner from the building ways.⁹⁰ On 27 January 1944, the shipyard went one better and set another world's record by launching four submarines on the same day. *Razorback*, *Redfish*, and *Ronquil* were floated in Drydock #1 and *Scabbardfish* slid down a building way.⁹¹ A fifth submarine, the *Segundo*, was launched from a building way ten days later making it five launchings in eleven days.⁹²

⁸⁹ *Portsmouth Herald*, 21 Jun 1942, "Marks Yard's 6th, 7th Sub of 1942," 1.

⁹⁰ *Portsmouth Herald*, 25 Oct. 1943, "Three-Sub Launching Wednesday," 1.

⁹¹ *Portsmouth Herald*, 27 Jan. 1944, "4 New Subs Launched for World's Record," 1. To keep the record straight and acknowledge that other shipyards were also achieving remarkable production during the war, it should be noted that the front page of the *Portsmouth Herald*, of 2 Mar 1943 has a picture of four new destroyers being launched in fourteen minutes at the Federal Shipbuilding and Dry Dock Company at Kearny, N.J. earlier that year.

⁹² *Portsmouth Herald*, 5 Feb. 1944, "5th Sub Here in Ten Days," 1.

The time from the laying of the keel until completion of a submarine was cut more than in half between November 1941, when USS *Drum* (SS 228) was delivered in 469 days, and December 1942, when USS *Steelhead* (SS 280) was delivered in 222 days. Portsmouth would eventually reduce submarine building time to 173 days and set another record by launching USS *Cisco* (SS290) just 56 days after laying the keel.⁹³ The production numbers leave little doubt that Portsmouth was a superior shipyard.



Figure 16: Rear Admiral Withers and Managers Displaying “E” Award. Courtesy of Milne Special Collections, University of New Hampshire, Durham, N.H.

Those numbers led to six Army-Navy Production “E” Awards between 10 August 1942 and 18 July 1945. Portsmouth Navy Yard had the distinction of being the first naval

⁹³ *Administrative History: Portsmouth Navy Yard in World War II*, Portsmouth Naval Shipyard Museum Archives, Kittery, Me., 69.

establishment to receive the award.⁹⁴ The initial award was presented by Assistant Secretary of the Navy Ralph A. Bard at a ceremony with two governors, two Senators, a Congressman and 10,000 shipyard employees in attendance. The five renewals of the semi-annual award that followed meant that the yard was continuously recognized throughout the war for superior production performance.⁹⁵ The yard won the award every time it was eligible for the award.

Table 10 compares the World War II performance of Portsmouth Navy Yard against its primary competitors, Electric Boat, Groton, Ct. and Mare Island Navy Yard, Vallejo, Ca.:⁹⁶

Table 10 – Submarine Shipyard Schedule Performance (World War II)

<u>Shipyard</u>	<u>Subs Built 1940-45</u>	<u>No. Bldg Ways</u>		<u>Shortest Bldg Pd</u>	<u>Shortest Time on Bldg Ways</u>
		<u>1941</u>	<u>1945</u>		
Portsmouth	79	5	9	173 days	56 days
Electric Boat ⁹⁷	78	11	21	317 days	est. 8 mos.
Mare Island ⁹⁸	17	2	8	273 days	192 days

Compared to its competitors, Portsmouth submarines spent remarkably less time on the building ways and were completed many months sooner. With only nine building ways at Portsmouth, compared to twenty-one ways at Electric Boat,

⁹⁴ *Portsmouth Herald*, 8 August 1942, 'Navy Yard Hailed for 'Practical Patriotism;' Gets E Award Monday,' 1.

⁹⁵ *Administrative History, Portsmouth Navy Yard in World War II*, Portsmouth Naval Shipyard Museum Archives, Kittery, Me., 73.

⁹⁶ David Randall Hinkle, Editor-in-Chief, *United States Submarines* (Annandale: Navy Submarine League, 2002), 114 -115.

⁹⁷ John D. Horn, *Submarines and the Electric Boat Company*, Page V-3, Electric Boat had 11 building ways in 1940. Page V-5, Ten building ways were added with the Victory Yard in 1941. Navy Department Library, Naval Historical Center, Washington, D.C.

⁹⁸ *United States Naval Administration in World War II, Bureau of Ships*, 1946, Navy Department Library, Naval Historical Center, Washington, D.C. 635-637.

Portsmouth-built submarines were launched at a rate that was over four times faster than those at Electric Boat. As has been repeatedly emphasized throughout this study, it was this unusually high launch rate that was critical to the success of Portsmouth Navy Yard.

A comparison to the average time on the building ways for Liberty ships, which were simply designed for rapid construction by the hundreds, sheds even more light on Portsmouth's remarkable achievement. After averaging about 150 days on the ways in January 1942, Liberty ships were routinely launched in 40 days by late 1942, and that performance remained typical for the remainder of the war.⁹⁹ As noted earlier, the submarine USS *Cisco* was launched at Portsmouth in late 1942 after just 56 days on the ways. By late 1942, private shipyards had progressed well down the learning curve for Liberty ships and the yards were mass producing the vital shipping needed to replace that being sunk at record rates by German U-boats. Portsmouth was making comparable progress towards the mass production of submarines that would eventually return the favor.

The shipyard's record of consistent, outstanding production performance was well recognized during the war. In April 1944, the Chief of Naval Operations acknowledged the fleet's appreciation of Portsmouth Navy Yard's performance:

The Chief of Naval Operations desires to extend his congratulations to the Commandant, to the officers and men under him, and to the civilian employees who have contributed a part to the submarine building program. Their wholehearted cooperation and thorough workmanship, characteristic of

⁹⁹ Frederick C. Lane, *The Navy and the Industrial Mobilization in World War II*, 174.

all Portsmouth boats, is a factor that has contributed in no small part to our Navy's success in the submarine war to date.¹⁰⁰

Portsmouth Navy Yard's remarkable production and the quality of Portsmouth-built submarines as well, were recognized and appreciated at the highest levels of the U.S. Navy.

Costs

It was not that Portsmouth Navy Yard management did not care about costs. Rather, early on, they had decided that the importance of costs paled in comparison to time when building submarines for national defense. The report issued by Captain Andrew.I. McKee's industrial review team on 8 December 1941 concluded with a statement emphasizing the importance of time versus costs:

Time which is lost now can not later be made up no matter how great the effort. In comparison with time, cost is now of so little importance that it must be completely disregarded if thereby a loss of time can be avoided.¹⁰¹

Thus, from the day the war started, it was the shipyard's strategy to essentially disregard costs for the sake of production and accelerated submarine completions. The analysis that follows will show that this management strategy that placed extreme emphasis on production efficiency also produced excellent cost performance as a byproduct.

Any cost analysis of operations at Portsmouth Navy Yard during war suffers because of abbreviated and incomplete accounting records. However, there is sufficient information available to evaluate the cost performance of Portsmouth relative to other navy yards in selected areas. In addition, local records are available that show dramatic

¹⁰⁰ Chief of Naval Operations letter of 26 Apr 1944 to Commandant Portsmouth Navy Yard. NARA College Park, RG 38, Chief of Naval Operations General Correspondence, Box 1182, Folder NY1, 1 Jul 1943 - 30 Jun 1944.

¹⁰¹ Portsmouth Industrial Survey #1 (December 1941), 15.

reductions in the number of labor manhours (labor costs) required to build a submarine as the war progressed.

Table 11 shows the average manday costs of productive labor and the indirect overhead expense as a percentage of productive labor for all navy yards for FY 1942.¹⁰²

Table 11 - Navy Yard Costs Performance (1 July 1942 to 30 June 1943)

	<u>Ave. man-day Cost of Productive Labor (\$)</u>	<u>Indirect Ovhd Expense % P.L.</u>
Portsmouth	8.32	39.8
Boston	8.41	37.7
New York	8.74	46.1
Philadelphia	8.48	42.7
Washington	8.15	83.0
Norfolk	7.65	43.7
Charleston	7.67	38.0
Mare Island	8.64	42.2
Puget Sound	8.77	54.9
Pearl Harbor	9.10	65.2
Average All Yards	8.38	47.2

For comparison purposes, it can be seen that the average cost per labor manday at Portsmouth Navy Yard was slightly above the average at all navy yards, while the overhead expense was considerably less than the average at all navy yards. The labor costs are more geographically influenced than indicators of individual yard efficiency; the West Coast yards being the highest, the southern yards the lowest, and the East Coast yards in the middle. However, overhead expenses, the indirect costs and support required for productive labor to accomplish its work, is an indicator of shipyard efficiency and Portsmouth is among the leaders in this category, far below the average of all navy yards.

¹⁰² Chart entitled, "Comparative Statement --- Expense Trends at Navy Yards - Percentages of Productive Labor." NARA College Park, RG 24, Bureau of Naval Personnel General Correspondence 1941-45, Box 1601, Folder NY Jan 1, 1943.

Streamlining shipyard operations for submarine new construction, especially independent small teams that required little support, would have contributed to low overhead rates.

On a macro scale, the above analysis indicates that Portsmouth Navy Yard was very competitive with other navy yards as far as labor and overhead costs were concerned. However, that cost competitiveness would only result in cost reduction and cost savings if the yard was able to improve its performance on each successive submarine.

It was not a simple matter to determine the cost of a submarine built at Portsmouth Navy Yard during the war. Part of the streamlining of processes for new construction was the issuance of job orders by classes of submarines and not for individual submarines, because the same jobs were accomplished on all submarines of the same class. Consequently, costs were not collected on individual submarines but rather on the entire order of a group of submarines. Thus, return costs were not available until the last submarine of the order was completed and, even then, much prorating of costs was involved. This practice prevented the use of return costs as a management tool. However, a popular maxim of the shipyard industry is that "time is money," meaning that ships require expenditures as long as they remain at the shipyard. At a minimum, ships require services and utilities, and, being the complicated piece of machinery that they are, something always requires maintenance or repair. Thus, while Portsmouth was not monitoring and managing costs on an individual ship basis, the shipyard was certainly keeping costs under control by delivering a submarine to the fleet every few weeks during the height of the war.

In March 1945, responding to the Booz-Allen Industrial Survey (1944) that noted a lack of production and cost control records, Commandant Rear Admiral Withers emphasized that the shipyard's first priority during the war had been production, but cost reduction had also been a by-product of that priority:

During the war and until recently the Yard's principal business has been the construction of submarines. The Yard completed 12 submarines in 1942, 19 in 1943, and 32 in 1944. Production records covering man hours required to build those vessels and most of their important components during the three years are available and clearly indicate that costs were reduced progressively as the volume of production increased.¹⁰³

Figure A-4, Portsmouth Navy Yard Man Hour Curve per Submarine (1940-1945), illustrates well the cost reduction to which Commandant Withers was referring. Note on Figure A-4 that the manhours required to build a submarine decreased from close to 2,000,000 on 7 December 1941 to 665,000 during the second quarter of 1944. It can be concluded that the labor cost per submarine delivered in 1944 was about one third the labor cost per submarine delivered in late 1941.

Portsmouth's ability to deliver submarines at the end of the war, at 33 percent of the manhour cost required at the start of the war, compares favorably with the manhour cost reductions experienced on Liberty ships. At the start of 1942, the first Liberty ships delivered required about 1,250,000 manhours to construct. By mid-1945, the manhours had dropped to about 400,000 per ship, 32 percent of the initial cost.¹⁰⁴ One can conclude that Portsmouth Navy Yard achieved cost reductions on submarines during the war that were almost identical to those achieved on Liberty ships, a product that was much less

¹⁰³ Commandant Portsmouth Navy Yard letter of 23 Mar 1945 to Bureau of Ships. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 15, Folder L-5, "Inspection Naval Yard, 1945-48."

¹⁰⁴ Frederick C. Lane, *The Navy and the Industrial Mobilization in World War II*, 231, Figure 19.

complicated than submarines and specifically designed for ease of construction.¹⁰⁵ When examined in light of the well documented efficiencies of Liberty ship construction, Portsmouth's war record is all the more impressive.

But how did Portsmouth cost performance compare to its prime competitor, Electric Boat? Naval historian Gary Weir says that, "Of the five building yards producing the Navy's submarines during the war, EB did the job more cheaply than the others."¹⁰⁶ Citing an Electric Boat cost of \$2,765,000 for SS222, Weir shows that, "When compared by the Price Adjustment Board in the spring of 1942, EB's unit cost on the SS222 fell below those recorded at Portsmouth and Mare Island by about \$1 million [36% less]."¹⁰⁷ Weir also cites a 1938 Navy Department study comparing the cost of building ships at private versus public yards that concludes that private yards could build ships more cheaply for reasons that included lower pay rates and less generous leave policies. The study noted, however, that comparisons "could only be made in the most general terms."¹⁰⁸ Only general comparisons could be made because the cost accounting practices were different between public and private yards. Weir closes his analysis of construction costs by noting that in the spring of 1942, Electric Boat took an average of fourteen months to complete a submarine whereas Portsmouth took only nine and one half months, 32 % less time. The completion of a submarine in 32% less time at 36% more cost argues against the "time is money" argument presented earlier. The analysis

¹⁰⁵ Twenty-seven hundred Liberty Ships were built during the war. Another three thousand ships of all types were built, including 1,556 naval vessels. David M. Kennedy, *Freedom from Fear*, 653.

¹⁰⁶ Gary Weir, *Forged in War*, 34.

¹⁰⁷ *Ibid.*

¹⁰⁸ *Ibid.*, note 70.

that follows will clarify this apparent discrepancy and show that, had the Price Adjustment Board done a similar review of submarine construction costs in 1944, during the peak production years of the war, Portsmouth's costs would have compared much more favorably to Electric Boat's costs.

World War II actual cost data for submarine construction is scarce at best. However, in early 1941, Captain Davis's staff provided him the following cost estimates for submarines under construction at Portsmouth; USS *Marlin* (SS205) - \$3.6 Million, USS *Grayling* (SS209) - \$4.3 million, and USS *Drum* (SS228) and USS *Runner* (SS275) - \$4.5 million each.¹⁰⁹ The last three submarines are of the same class as the Electric Boat submarines that resulted in the average unit cost of \$2.765 million reported earlier. Thus, an apples-to-apples comparison is possible. At first blush, it appears that the average cost differential between Portsmouth and Electric Boat was even greater than the \$1 million reported by the Price Adjustment Board.

Analyzing Figure A-4, showing the average labor manhours required per submarine at Portsmouth, will further clarify the yard's cost performance. The high cost estimates provided the Industrial Manager in early 1941 were most likely based on the yard's recent performance in 1940, when the yard required about 1.75 million manhours to complete a submarine. By the spring of 1942, when the Price Adjustment Board provided its comparison figures, Portsmouth had reduced their labor per submarine to about 1.4 million manhours. This 20% reduction in labor manhours would have reduced actual costs on SS228 and SS275 proportionately to about \$3.6 million, roughly equal to the \$1 million differential cited by the Price Adjustment Board in the spring of 1942. The

¹⁰⁹ Memorandum for Manager of 5 Feb 1941, Subject: Estimate of Statistical Cost of Submarines Under Construction. NARA Waltham, Portsmouth Naval Shipyard General Correspondence (Central Files), Box 26, Folder A19, "Conferences, Congresses, and Conventions."

question is, "Is that a fair comparison of Portsmouth and Electric Boat costs for the remainder of the war years?" When asking that question, one should keep in mind that almost all of the submarines built by Portsmouth (79) and Electric Boat (78) during the war were built after the Price Adjustment Board's report in the spring of 1942.

Another look at Figure A-4 leads one to conclude that the comparison is fair and accurate only if Electric Boat made the same dramatic labor savings as did Portsmouth throughout the remainder of 1942, 1943, and the first half of 1944. In other words, Electric Boat would have had to reduce labor costs by over 50%, as did Portsmouth, between the spring of 1942 and the summer of 1944, for the comparison to be valid in 1944.

Granted, Electric Boat probably experienced labor savings during those years. However, this is where the "time is money" argument reenters the picture. As it turns out, in the spring of 1942, Portsmouth was still turning out submarines in 12 or 13 months and not the 9 ½ months reported earlier.¹¹⁰ By the summer of 1944, Portsmouth was routinely completing submarines in six months or less. Thus, between the spring of 1942 and the summer of 1944, Portsmouth reduced its average building period approximately 50% while reducing costs by about the same 50%. Electric Boat did not experience a similar dramatic reduction in building durations. As noted in Table 10, Electric Boat's shortest building period was a little over ten months. If one gives Electric Boat a seemingly

¹¹⁰ *Administrative History, Portsmouth Navy Yard in World War II*. Portsmouth Naval Shipyard Museum Archives, Kittery, Me. An addendum provides a chart showing dates for keel laying, launching, and completion for all Portsmouth-built submarines between 1940 and 1945. In the spring of 1942, completions had been reduced to 12 or 13 months. On June 6, 1942 Portsmouth Industrial Survey I, 1 reported, "The time required to build submarines between keel laying and completion has been reduced from 15 months for the fastest built ships at this yard before December 1, 1941 to a few days less than 12 months for the latest completed ship. To date the shortest building time at other yards has been 12 1/3 months at Groton and 14 months at Mare Island."

generous credit of 25% improvement in building time, it seems reasonable to conclude that a cost comparison between the two yards in 1944, when both were operating at maximum efficiency, would have found Portsmouth comparing much more favorably than it did in the spring of 1942.

There is another factor to be considered when comparing costs between Portsmouth and Electric Boat. It will be argued later in this section that Portsmouth-built submarines were typically more complete and better equipped with the latest design improvements than were submarines delivered by Electric Boat. That is to say that Portsmouth, a government shipyard, was more accommodating to contract modifications that added work, than was Electric Boat, a private shipyard. Late work is often costly and disruptive to other planned work. Portsmouth's costs would have been driven up accordingly.

In the shipyard's response to the Booz-Allen Industrial Survey Report (1944), Commandant Withers explained that the recent curtailment of orders for new submarines, and the assignment of other miscellaneous work to the yard, required the shipyard to pay closer attention to the forecasting of workload and manpower requirements. Also, Withers explained that the yard was returning to former cost control and cost monitoring practices that included the keeping of material usage and tonnage records of production in the Blacksmith Shop and Foundry, the rate of use of each type of welding rod, and the issuance of individual ship job orders.¹¹¹ Thus, in May 1945, the yard began to undo

¹¹¹ Commandant Portsmouth Navy Yard letter P20-1 (8927-1) of 23 Mar 1945 to Bureau of Ships. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 15, Folder L-5, "Inspection Naval Yard, 1945-48."

much of the streamlining for new construction that had carried it so successfully through the war.

In highlighting the return to cost control measures with the winding down of the war, the shipyard was confirming the assignment of secondary importance to such measures during the war. Portsmouth Navy Yard's emphasis was on maximum production during the war, not keeping records. Returning to Figure A-4, it can be noted that, with the reinstatement of record keeping and cost monitoring practices, the manhours expended per submarine increased dramatically in 1945. Many factors contributed to this labor cost increase, including a drop in orders for new construction, an increasing repair and miscellaneous workload, and the efficiency disruptions that typically accompany a dramatic reduction in workforce in an industrial environment. Even more difficult to measure, but definitely a factor, was the psychological return to normalcy and more relaxed work rates after working under supercharged wartime conditions for four years. If nothing else, the inefficiencies realized in late 1945 validated the golden era of production that Portsmouth Navy Yard had experienced during the war, when the decks had been cleared for new construction and processes had been streamlined towards that end.

Quality

Lacking modern quality control records, the quality of Portsmouth submarines built during World War II is best judged by the reports of the Board of Inspection and Survey and the testimonials of the men who sailed them to war. For example, the material condition of the *USS Trout*, one of the first submarines that the yard delivered to the fleet after Pearl Harbor, was praised by the Board of Inspection and Survey: "The *Trout* was in

an unusually advanced stage of completion and excellent operation condition.

Workmanship is excellent. This vessel is an achievement that reflects credit upon the Portsmouth yard.”¹¹² Portsmouth-built submarines were routinely praised by inspection teams.

The fleet’s high regard for Portsmouth-built boats was acknowledged by the Vice Chief of Naval Operations, in March 1945, when he sent the shipyard the following excerpt from the war report of a recently returned U.S. submarine, “The officers and crew of this submarine heartily endorse the Navy Yard, Portsmouth, New Hampshire, as a builder of rugged submarines.”¹¹³ The choice of the adjective “rugged” to describe Portsmouth-built submarines was most likely made by a submarine Commanding Officer whose ship and crew had survived a depth charge attack, thanks to the skilled workmanship of Portsmouth employees.

Between 10 January 1944 and 7 July 1945, the Commanding Officers of ten different submarines commended the shipyard for the fine construction and workmanship on their Portsmouth-built boats.¹¹⁴ Those compliments included one from Lieutenant Commander George Street, Medal of Honor recipient as Commanding Officer of Portsmouth-built USS *Tirante*. Lieutenant Commander Street thanked Portsmouth Naval Yard “for building us such a crackerjack submarine.” He reported that the “Japs tested

¹¹² *The Portsmouth Herald*, 19 Feb 1941, “Commends Navy Yard on Sub Trout,” 1.

¹¹³ Chief of Naval Operations letter of 27 May 1944 to Commandant Portsmouth Navy Yard. NARA College Park, RG 38, Chief of Naval Operations General Correspondence, Box 79, Folder; Portsmouth, 1 Jul 1943 - 30 Jun 1944.

¹¹⁴ *Administrative History: Portsmouth Naval Shipyard in World War II*, Portsmouth Naval Shipyard Museum Archives, Kittery, Me., 69.

the hull” and the “crew found it eminently satisfactory.”¹¹⁵ It was an accumulation of such accolades that caused the Chief of Naval Operations to cite the “thorough workmanship, characteristic of all Portsmouth boats”¹¹⁶ in an April 1944 letter to the shipyard.

The Booz-Allen Industrial Survey (1944) confirmed what the fleet already knew when it concluded that the result of Portsmouth’s efforts “has been an outstanding performance, not only in numbers of vessels produced, but in the satisfactory quality and performance of these vessels, as evidenced by favorable comment of commanding officers.”¹¹⁷ Indeed, the best measurement of the quality of a shipyard’s workmanship is the favorable endorsement of the Commanding Officers and sailors who sailed its ships into harm’s way.

A submarine sailor’s perception of quality has much to do with the time and effort required of him to make repairs. Submarines built in private yards apparently sailed from the yard with incomplete work that was left for sailors to finish. On the other hand, a Portsmouth-built boat left the yard a much more complete product. According to submarine historian Commander John D. Alden:

As a government yard, Portsmouth was quick to correct problems encountered during service, whereas the boats delivered from the private

¹¹⁵ Portsmouth Naval Base Notice of 8 May 1945. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 9, Folder A7-1 “Notices Navy Yard and Naval Base Jan 1 1945 – to 1950.”

¹¹⁶ Chief of Naval Operations, letter of 26 Apr 1944 to Commandant Portsmouth Navy Yard. NARA College Park, RG 38, Chief of Naval Operations General Correspondence, Box 1182, Folder NY1, 1 Jul 1943 - 30 Jun 1944.

¹¹⁷ Secretary of the Navy letter of 6 Nov 1944, to Commandant Portsmouth Navy Yard. NARA, College Park, RG 19, Bureau of Ships General Correspondence 1940-45, Box 785, Folder NY1/A3.

yards had to have more last-minute changes made at Pearl Harbor or other advanced bases before going on patrol.¹¹⁸

From this standpoint alone, one can understand the fleet's appreciation for a Portsmouth-built boat.

In closing this discussion on quality, it is appropriate to highlight the fact that Portsmouth maintained consistently high quality despite frequent first-time installations of important new design features on its submarines. With a career background steeped in submarine tactics and technical needs, Commandant Withers had a compelling interest in expediting the latest design upgrades to the fleet. The designers, draftsmen, and planners who worked for the Planning Officer, Captain A. I. McKee, were responsible for working out the details and sending the upgrades to the production schedulers. As noted earlier, the yard was blessed with a cadre of experienced and talented designers who were able to expedite those upgrades. Captain McKee, who held the important Planning Officer position from March 1938 until January 1945, brought considerable experience and consistency to the process that hastened design changes to the fleet.

Portsmouth Navy Yard, as the primary submarine design yard during the war, often delivered its submarines with state-of-the-art technical upgrades far in advance of other submarine shipyards. Shipyard records note, with considerable pride, the important technical features that the yard was able to progressively and routinely incorporate into the basic World War II fleet-type submarine design that existed at the start of the war:

Included in these changes were: the increase of hull strength, or maximum depth for submergence; addition of several types of radar; a change to direct drive with slow speed motors instead of noise-producing reduction gears; addition of considerable sonar equipment; equipment capable of withstanding the shock of depth-charge; sound isolation methods to minimize noise

¹¹⁸ Cdr. John D. Alden, USN (Ret), "Victorious Submarines in World War II," in David Randle Hinkle, Ed., *United States Submarines* (Annandale, Va.: Naval Submarine League, 2002), 115.

transmitted through the hull by auxiliary machinery and electrical equipment, and many others.¹¹⁹

First-time installations of design changes require special attention and extra effort to insure satisfactory performance and compatibility with other shipboard systems. They are typically costly and not trouble-free. Portsmouth Navy Yard's ability to routinely install design upgrades, while achieving remarkable production rates and consistently high quality, reflects even more credit on the shipyard management and employees. More importantly, submarine Commanding Officers could confidently go to sea in a Portsmouth-built submarine knowing that it was well built and technically superior to other submarines.

Considerable evidence supports the conclusion that Portsmouth Navy Yard's remarkable production performance during the war was achieved with no sacrifice to cost and quality. The well advertised production numbers speak for themselves and a closer look at cost and quality has shown equally impressive results.

¹¹⁹ *Administrative History: Portsmouth Naval Shipyard in World War II*, Portsmouth Naval Shipyard Museum Archives, Kittery, Me., 2.

CHAPTER VI

ENVIRONMENTAL CONSEQUENCES

“By the mid-twentieth century . . . sources responsible for air and water pollution as well as solid waste had long since dumped their waste on the most readily available land, into nearby streams, or into the air. Most of these argued that this strategy of dispersion should continue.”¹

Samuel P. Hayes

Beauty, Health, and Permanence: Environmental Politics in the United States 1955-1985

Shipbuilding and submarine construction has had an environmental impact on the natural resources of the seacoast area of New Hampshire and southern Maine for over three hundred years. Shipbuilding started locally at New Castle in 1690, subsequently moved to Badger’s Island, and the Portsmouth Navy Yard was established in 1800. During the era of wooden sailing ships, local forests were cleared for shipbuilding timber including, at the time, the world’s best supply of tall, large diameter pines that were ideal for masts for ships of the Royal Navy. The 19th century also saw the shipyard land area greatly expanded through extensive marshland reclamation and the filling of shoal waters between islands. This shipyard tradition of land accrual continued well into the 20th century and peaked during World War II. Diesel powered submarines were first built at the yard in 1915 and nuclear submarines were constructed at the site between 1965 and 1972. The primary business of the yard, since 1972, has been the repair and overhaul of

¹ Samuel P. Hays, *Beauty, Health, and Permanence: Environmental Politics in the United States 1955-1985* (Cambridge: Cambridge University Press, 1987), 72.

nuclear submarines.² As shipbuilding materials and technology advanced and the construction of submarines became the primary business of the yard, the by-products of the industrial processes took an increased toll on the environment. As it turned out, that environmental toll had long term consequences that were little appreciated at the time. A significant milestone in the environmental history of the yard was reached in 1994 when the yard was declared a Superfund site as the result of the local dumping of industrial waste, subsequently found to be hazardous, for many years. The roots of many of the waste disposal practices that led to the Superfund status can be traced to World War II activity at the yard.³

Many of the environmental events discussed in this chapter were of little concern during the war. This is not so much a reflection on the shortcomings of Portsmouth Navy Yard, as it is a measure of the need to restructure priorities, whatever the cost, to support the war effort, and an ignorance and innocence towards environmental matters typical of the times. In particular, there was little appreciation for the long-term consequences of unsatisfactory waste disposal practices. The shipyard dumped raw sewage and industrial effluents directly into the Piscataqua River during the war, as did most of the communities surrounding the yard. Not only was there little concern for this practice, but the visible pollution occasionally reported by inspectors went, to a large degree, unnoticed by shipyard workers. If noticed, it was quickly accepted as a cost of doing business. That business, of course, was to win a war. The dedication and effort needed to

² The last submarine to be built at Portsmouth Naval Shipyard, the USS Sand Lance (SSN 660), was completed in 1972. The shipyard continues to overhaul nuclear submarines, and will do so for the foreseeable future, after surviving an attempt by the Department of Defense to close the yard in 2005.

³ The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) is an EPA national program to identify and assess past hazardous waste disposal sites posing a potential threat to human health or the environment. Sites gaining this dubious honor are referred to as Superfund sites in recognition of the costs that are normally incurred to restore the sites.

win the war overwhelmed any thoughts of moderating industrial activity to accommodate concerns for natural resources.

Environmental Protection Agency (EPA) studies in the 1980s found extensive evidence of inadequate postwar waste disposal practices for hazardous materials, at the shipyard, that included chromium, lead and cadmium-plating sludge, asbestos insulation, volatile organic compounds, waste and paint solvents, mercury-contaminated materials, and sandblasting grit containing various metal wastes. According to those studies, many of these materials were dumped on the shipyard's tidal flats as part of land reclamation projects. This dumping, and other similar practices, caused the shipyard to be placed on the National Priorities List (NPL) for Superfund projects in 1994. Recovery actions to date have required the expenditure of millions of dollars in clean-up projects.⁴

The EPA studies of Portsmouth Naval Shipyard seldom extend back into the World War II era for lack of records and evidence. As noted earlier in this study, record keeping during the war was greatly abbreviated. This study, however, does show that the filling of shipyard tidal flats and shoreline shoal waters occurred during the war. The nature of the yard's work and the associated work practices did not change appreciably with the conclusion of the war. Consequently, waste used as fill material during the war probably contained many of the same waste products that EPA studies attribute to postwar practices.

EPA studies also concluded that the shipyard's postwar operations included the discharge of raw sewage and industrial waste into the Piscataqua River. That industrial

⁴ http://yosemite.epa.gov/r1/npl_pad.nsf. U.S. Environmental Protection Agency Waste Site. Cleanup & Reuse in New England.

waste included acidic and alkaline wastes, waste battery acid and lead sludge, as well as waste water and spent baths from electroplating. EPA studies identified three postwar liquid discharge sites immediately off shore from the shipyard's fitting out piers with high levels of heavy metals, polychlorinated biphenyls (PCBs), cyanide, phenol, oils and grease.⁵ This study shows that the shipyard's sewage system was greatly overloaded during the war and, there is reason to believe, that the wartime sewage overload included many of the same hazardous materials that the EPA attributes to postwar operations.

Many of the EPA's findings deal with the use of industrial waste products as fill material to increase the shipyard's acreage. The use of this waste for fill material conformed to practices and procedures that were acceptable at the time but were later found to be inadequate. The following table shows estimates of hazardous waste reportedly disposed of at the Jamaica Island Landfill during the postwar period from 1945 to the mid-1970s:⁶

<u>Substance</u>	<u>Estimated Quantity</u>
Chrome Plating Sludge	5,000-10,000 pounds
Lead Plating Sludge	5,000-10,000 pounds
Cadmium Plating Sludge	5,000-10,000 pounds
Asbestos Insulation	several thousand pounds
Waste Paints and Solvents	500,000 gallons
Sand Blasting Grit	5,000 tons/year

If these wastes were being dumped in the Jamaica Island Landfill immediately after the war, it is reasonable to assume that even greater annual rates were dumped during the war years when the industrial activity was several times higher than it was at any time in the

⁵ Frederick T. Short et al., *The Ecology of the Great Bay Estuary, New Hampshire and Maine: an Estuarine Profile and Bibliography* (Durham: University of New Hampshire, 1992), 85, Table 6.12.

⁶ *Ibid.*, 82, Table 6.11.

postwar period. This dissertation provides evidence of inadequate processes associated with the above waste products.

Land recovery has been so critical to the shipyard's development that the practice has occurred almost continuously since the shipyard's establishment in 1800. As a result, the shipyard's landscape and topography have been transformed significantly over the last 200 years. Much of that transformation occurred during World War II. Prior to analyzing wartime land reclamation projects, it is appropriate to review the historical importance of such projects to the growth and development the yard. This longtime practice has obviously been a mixed blessing.

Shipyard Land Reclamation (1800 to WW II)

A current map places Portsmouth Naval Shipyard on Seavey's Island in the Piscataqua River in the state of Maine. As can be seen from Figure A-5 in the appendix, the current Seavey's Island is the result of the combining of major four islands; Dennett's Island, the original Seavey's Island, Pumpkin Island, and Jamaica Island.⁷ Figure A-5 highlights the extensive filling of shoal waters that has been required to enable the shipyard to reach its current size.

⁷ The shipyard islands experienced numerous name changes prior to 1800. According to Walter E. H. Fentress, *Centennial History of the United States Navy Yard at Portsmouth N.H.*, (Portsmouth: O.M. Knight, Publisher, 1876), 8, two of the islands are noted in the Records of York County (1631) as Puddington Islands, "so called because a John Puddington used the islands for drying fish." In 1645, the Puddington Islands were granted to Thomas Furnell by the colonial representative of Charles I. Early *Kittery Town Records* show many land grants to the Fernald family (John Sr., Nathaniel, Samuel, James, William, and John), starting in 1660, and no Furnell entries. Early maps show the original shipyard island as Fernald Island suggesting a derivative of the Furnell name some time after the purchase of the island by Thomas Furnell. In 1794, James Sheafe purchased the island destined to be the site of the shipyard from an heir of Thomas Fernald and, in turn, sold it to William Dennett just three months later. Dennett purchased the island in anticipation of its need by the U.S. Navy. According to the *York Registry of Deeds*, Book 65, Page 87, (transcribed printed copy held at the Kittery, Me. Town Office), Dennett sold the fifty-eight acre island to the government in 1800 for \$5,500. This study will consistently refer to Dennett's Island when referring to the original shipyard island.

Marshland reclamation increased the initial shipyard on Dennett's Island from 58 acres to 64.37 acres by 1843 and the shipyard more than doubled in size again with the U.S. Navy's purchase of Seavey's Island's 105 acres for \$105,000 in 1866. The accrual of Pumpkin Island and Jamaica Island, which occurred during World War II, constitutes a large part of the shipyard transformation described in detail later in this study. World War II and subsequent reclamation projects have increased the shipyard acreage to a total of 287 acres.⁸ It is noteworthy that the 50 acres of Superfund sites identified in the 1990s were only slightly less than the shipyard's original 58 acres on Dennett's Island.

With the creation of the Department of the Navy in 1798, Congress authorized the building of six 74-gun frigates. The frigates were to be built, one each, at navy yards to be established at Portsmouth, Boston, New York, Philadelphia, Norfolk, and Washington D.C. Surveys for the proposed Portsmouth yard found nearby Dennett's Island to be a more favorable site for long-term naval construction than Badger's Island, which had been the construction site for substantial colonial shipbuilding. Dennett's Island was much larger, fifty-eight acres as compared to Badger Island's twenty acres, and better suited for timber storage. In addition to a deep harbor and convenient access from the ocean, Joshua Humphries, the Chief Naval Constructor of the United States, noted that "There is sufficient quantity of stone [on Dennett's Island] for any building that may be thought necessary to be erected for the use of the navy-yard."⁹ Humphries' report goes on

⁸ Clarke's Island was added to the shipyard in the 1960s when it was acquired to accommodate a much needed sound pier.

⁹ Joshua Humphries' Report, January 29, 1800. Excerpts quoted in George Henry Preble, Rear Admiral, *History of the United States Navy-Yard*, Portsmouth, N.H. (Washington D.C.: Government Printing Office, 1892), 24.

to note several disadvantages including “rapidity of the current” and a “hard, stony bottom” that would complicate future wharf and pier construction. On a final note, he added that the island is “never troubled with ice” because of the rapid currents. The rapid river currents that prevented the accumulation of ice in 1800 were also thought to provide adequate flushing of the yard’s sewage discharge to the river during World War II.

The Navy completed the purchase of Dennett’s Island from William and Sarah Dennett on 12 June 1800. As can be seen from Figure A-6 in the appendix, the 1800 plan for the proposed Portsmouth Navy Yard, the Navy purchased a sparsely populated island with topographical limitations for future development. Much of the island was unusable, steep, rocky highland, or lowland swamp. In the near term, limited shipyard operations could begin on the south shore where the few houses on the island had been built. This part of the island was also blessed with deep water and accessible waterfront. However, full advantage could not be taken of those attributes until the highlands and rocky cliffs were leveled and the lowlands filled to allow construction and development. The useable southern portion of the island, near the deep water, was squeezed into the very limited waterfront area available between the highlands and the shoreline.¹⁰ The highlands would have to go if the shipyard was to grow.

Beginning in 1833, annual appropriations for leveling the yard, filling in low grounds, and extending the wharves and waterfront area became routine. Most of this activity was limited to the portion of the island directly across the river from what is now

¹⁰ Again, during World War II the shipyard was faced with the need to develop and extend the southern portion of the shipyard into the river to take maximum advantage of the deep water and accessible waterfront. The most obvious example is the reclamation and development of Pumpkin Island Shoals, opposite Strawberry Banke, at the start of the war to accommodate the construction of the five acre fitting-out pier.

Portsmouth's Strawberry Bank. In May 1843, the commandant was able to report to the Secretary of the Navy that the original 58 acres of Dennett's Island had grown to 64.37 acres, a 16% increase.¹¹ A few months later, in July 1843, a local contractor, Mr. Murgridge, one of many bidding on another major excavation project in the yard, wrote:

Proposal for removing Stone and earth at the Navy Yard and depositing the Same within the Quay walls now being constructed . . . I will remove the Ledge [by blasting] & earth in front of the Store House near the landing place, and what may be required to finish the remainder of the contract, the materials to be taken from the Ledge where I am now at work. . . .sixty three cents per Cubic Yard.¹²

Murgridge apparently won the contract because, a year later, the shipyard reported to the Bureau of Yards and Docks that Murgridge had fulfilled his contract and removed 10,000 cubic yards of ledge and earth.¹³ By the middle of the nineteenth century, the leveling of the shipyard was nearing completion and marshland recovery had become a well established practice.

In reclaiming marshlands, the navy yard was merely following the lead of many local colonial communities. As towns like Boston and Portsmouth grew and exhausted the immediately available real estate, the marshes became hindrances to urban prosperity. Early Boston consisted of 1,185 acres of dry land with 485 acres of salt marsh and 1,570 acres of mudflats and shallow water surrounding the growing commercial and residential

¹¹ George Henry Preble, Rear Admiral, *History of the United States Navy-Yard, Portsmouth, N.H.* (Washington D.C.: Government Printing Office, 1892), 72.

¹² Murgridge memo to Captain G.W. Storer of 11 July 1843. NARA, Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence, Box 7, Folder "Misc. Letters. Received."

¹³ Captain G.W. Storer letter to Chief Bureau of Yards and Docks of 5 July 1844. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence, Box 3, Folder "Letters to Bureau Yards & Docks."

development. By 1640, Boston's population had reached 1,200 and lowlands greatly restricted future growth. Reclamation of lowlands became a commercial necessity if Boston was to grow and become the hub of New England. By 1647, the same year Kittery was established, Boston had converted much of its natural salt marsh to useful town property.¹⁴ Portsmouth experienced a similar expansion through the reclamation of lowlands around Puddle Dock and other waterfront salt marsh areas.¹⁵ In time, urban development at Boston and Portsmouth demanded more than just the reclamation of lowlands. Large landmasses were added to city boundaries by filling in channels that had previously separated nearby islands. Well before the shipyard's founding in 1800, the New England tradition of lowland recovery and island accrual, by filling in shoal waters, was well established. It was only natural that the shipyard would follow a similar pattern to acquire the real estate needed to insure its continued development.¹⁶

As discussed earlier, Dry Docks #1 and #2 were critical to the shipyard's success during the war. Both were constructed on sites with topographical advantages conducive to dry dock construction and operation. A review of the historical development of those sites will serve to illustrate important shipyard transformations leading up to World War II. Dry Dock #1, the site of the launching of three submarines in January 1944, evolved from a natural cove on the original Dennett's Island. Examining Figure A-6 (1800 map), with an eye towards the future transformation and development of the shipyard, the cove labeled "deep water cove most suitable for a dry dock" in the southwest corner of the

¹⁴ Ann Vileisis, *Discovering the Unknown Landscape: A History of America's Wetlands* (Washington D.C.: Island Press, 1997), 31-32.

¹⁵ See W. Jeffrey Bolster, ed., *Cross-Grained & Wily Waters- A Guide to the Piscataqua Maritime Region* (Peter E. Randall Publisher: Portsmouth, N.H., 2002), 68-73 for an account of the Puddle Dock transformation.

shipyard would evolve, by 1874, into a dock basin with a marine railway to pull ships out of the water for hull repairs. Figure 17 below (1874 map) shows the rectangular shaped dock basin and marine railway at the eight o'clock position on the island as part of the post-Civil war expansion of the shipyard. The dock basin would contain the first shipyard floating wooden dry dock, in the late 1800s, and become the site of Dry Dock #1 in 1942. It was the use of Dry Dock #1 for submarine construction that enabled the yard to achieve remarkable production despite a shortage of traditional building ways.



Figure 17: Portsmouth Navy Yard Map of 1874. Courtesy Of Milne Special Collections. Universtiy of New Hampshire Library, Durham, N.H.

Figure 17 also shows the early development on Seavey Island, in the lower right corner, after its purchase by the Navy in 1866. Dry Dock #2, the submarine repair and overhaul dock during the war, was built between 1899 and 1906 in Jenkins Gut, the channel separating Dennett's Island and Seavey's Island. A stone dry dock was

constructed and the earth and rocks from the excavation for the dry dock, were used to fill the remainder of the channel between the islands to accommodate building sites for further shipyard development. Figure A-1 (1939 map) shows Dry Dock #2 in the heart of the shipyard. Dry Dock #2, and the buildings surrounding the dock, were the center of shipyard activity until construction during World War II moved the shipyard center of operations decidedly south and west towards the new dry dock and fitting out pier shown on Figure A-2 (1945 map).

Thus, the dry docks that were so critical to Portsmouth Navy Yard's performance during World War II were historically the products of natural topographical features transformed through dredging, extensive reclamation of wetlands, and the filling of shoal waters throughout the 19th and early 20th centuries. World War II developments at the yard continued the topographical transformation that had been evolving over the past two hundred years.

One final, near instantaneous, topographical transformation will complete this pre-World War II review of important shipyard topographical changes. With the advent of the deeper draft steel ships at the turn of the 20th century, deeper and safer access to the shipyard was needed. On July 22, 1905, 18,000 people crammed into wharves, islands, and every available vantage point to watch the largest manmade explosion to that point, when thirty-six tons of dynamite dislodged and crumpled 70,000 tons of rock at Henderson's Point. The blast removed the most southern tip of Seavey's Island and widened the Piscataqua River by 400 feet at its narrowest point.¹⁷ When dredged to 35 feet, the navigable waters leading to the shipyard were greatly increased and improved.

¹⁷ What is left of Henderson Point is shown Figure A-2 (1945 map), the southern most tip of the shipyard in the center of the map. Also see W. Jeffrey Bolster, ed., *Cross-Grained & Wily Waters- A Guide*

With improved access to the yard, the first half of the twentieth century saw continued, gradual development of the shipyard. Between 1910 and 1940, the shipyard experienced no major topographical changes. The emphasis, during this period, was on the construction of the shops and facilities needed to accommodate the construction and repair of steel hulled steam vessels, and then submarines, to the extent that federal funding was available. The release of federal funds, for the ramp up for World War II, renewed and accelerated the development and topographical transformation of the yard.

Shipyard Land Reclamation during World War II

As noted earlier, the shipyard's land reclamation projects during the war included the use of industrial waste as fill material. Shop records were greatly abbreviated during the war. Consequently, it is difficult to determine what wartime industrial waste was dumped in which locations. With the postwar reemphasis on record keeping and material accountability, it became easier to track waste materials. The postwar evidence was more than sufficient to make the EPA's case for Superfund status so there was no need to attempt to reconstruct wartime industrial dumping. This study does resurrect evidence of wartime dumping.

A memorandum from Commandant Rear Admiral C.W. Cole to shipyard managers, dated 12 April 1939, indicates that inappropriate industrial waste was being used for land fills on the eve of World War II. After a tour of the shipyard, Commandant Cole wrote:

It is noticed that considerable burnable material (including food) is being dumped in the Old Timber Basin adjacent to Bldg. 129. All burnable material must be burned and the incinerator is maintained for that purpose. It is also noted that tin cans and drums of various capacities are being disposed of

Guide to the Piscataqua Maritime Region (Peter E. Randall Publisher: Portsmouth, N.H., 2002), 193-197 for a series of photographs showing Henderson Point before, during, and after the explosion..

without any effort being made to crush these containers. This practice not only causes the area to be unsightly but will result in a very unstable fill. All containers must be crushed before disposal in any fill.¹⁸

It is highly probable that the cans and drums were petroleum containers with environmental consequences that were unappreciated at the time. Commandant Cole was not objecting to the routine use of cans and drums for fill material, or expressing any concerns about the original contents of the containers. Rather, his prime concern was that the drums be crushed to promote the long-term stability of the fill. The reclaimed timber basin was to be transformed into building sites for an expanding shipyard, following the shipyard's well established practice of lowland reclamation. With this example of the shipyard's industrial dumping practices immediately prior to the war, one can only imagine the extent of dumping activity that must have accompanied the great increase in production during the war. The few records available show evidence of no special handling of waste that must have included lead based paints, petroleum products, asbestos, lead celled batteries, and mercury filled instruments.

The purchase of Jamaica Island early in the war, for ammunition storage, eventually required extensive landfill to permit efficient access to the island. Shortly after purchase a causeway was built to provide that access. Additional fill in the area of the causeway started late in the war and continued after the war with the bulk of the Jamaica Island landfill occurring in the post war era. Jamaica Island is not even shown on Figure A-1 (1939 map) and it is shown, fully developed, with a substantial land connection to the shipyard proper, on the upper right hand corner, of Figure A-2 (1945 map). Figures A-7 (1941 map enlarged) and A-8 (1945 map enlarged) show in more detail the

¹⁸ Commandant Portsmouth Navy Yard Rear Admiral C.W. Cole letter of 12 April 1939, Subject: Grounds, and refuse material – care of. NARA Waltham, RG 181, Portsmouth Naval Base Files, Box 15, Folder N1-1, “Grounds 1925-39.”

development of this portion of the shipyard. It is obvious that much fill material was needed to connect the islands and it appears logical that the practice used to reclaim the nearby timber basin in 1939, the dumping of drums and other industrial waste, would have provided much of that fill.¹⁹ A 1950 report, discussing the disposal of shipyard waste, confirms the continuation of the practice observed by Commandant Cole in 1939. According to that 1950 report, large items and cans were sent to a burning dump and what did not burn was “carried to fill area near Jamaica Island.”²⁰ It is not surprising that the Jamaica landfill was one of the most troublesome of the Superfund sites and that millions of dollars would be required to clean up the area fifty years later.

The war also saw extensive reclamation of shoal waters on the northern shorelines of Seavey Island. Figure A-8, an enclosure to the shipyard’s five year development plan, submitted in June 1946, shows these areas annotated “FILL” with arrows pointing to the filled areas. The annotation done in June 1946, on a shipyard map dated 30 June 1945, appears to indicate that there was considerable dumping activity in these areas during the final year of the war. These areas were also revisited and reworked as Superfund Sites in the 1990s.

The largest reclamation project during the war was the dredging and filling of Pumpkin Island shoal that reclaimed over four acres of land for the construction and development of the new fitting out pier. This area is highlighted on Figure A-2 (1945 map) that shows the new fitting out pier in the lower left hand corner jutting out into the

¹⁹ The timber basin is shown on Figure A-1 (1939 map) just south of the northern shoreline at the 12 o’clock position on the map.

²⁰ Portsmouth Navy Yard Medical Officer’s Semi-Annual Report for 1950 of 4 Jan 1950 to the Commandant. NARA Waltham, RG 181, Naval Station General Correspondence, Box 10, Folder “A9-1 Sanitary Reports.”

river. This project extended the shipyard real estate well out into the Piscataqua River towards Strawberry Banke and provided 1100 feet of additional pier space and berths for submarines. The filling of Pumpkin Island Shoal was reminiscent of the process that began in the early 19th century, when highlands in the same general area were leveled and marshlands filled to develop those portions of the shipyard nearest the deepest channels of the river. The Pumpkin Shoal reclamation did not become a Superfund Site. Much of the fill for this reclamation was brought in from off the yard.²¹ Nearby dredging operations that deepened the river access to the new fitting out piers also provided clean uncontaminated fill.

Dr. C.F. Jackson's *Biological Survey of Great Bay New Hampshire* (1944) gives some indication of the probable environmental consequences of the shipyard's land reclamation projects during the war. According to Jackson, "The mid-channel of the lower Piscataqua and that of Little Bay have probably changed but little in the last several hundred years. They are rock strewn and little erosion or sedimentation could have occurred."²² The river tidal flats, however, provided a protected "nursery for young fish and a refuge for an abundance of fish food." Historically, an abundance of eel grass provided a protective carpet that prevented erosion of the tidal flats and efficiently strained the heavy silt that otherwise would have covered clam beds and fish spawning grounds. About 1931, "a disease attacked the eel grass along the Atlantic coast causing its virtual disappearance." Consequently, silting of mud flats had become a problem of

²¹ According to James Dolph, the Portsmouth Naval Shipyard historian, much of the fill material for the new fitting out pier was trucked in from off-yard because the Jamaica Island fill was consuming all the shipyard generated waste then believed suitable for fill material. Telephone interview with James Dolph of 16 March 2007.

²² All quotes in this paragraph are from Jackson, *A Biological Survey of Great Bay New Hampshire*, 24.

increasing proportions in the 1930s. During the war, Dr. Jackson and others were still experimenting with various “disease-resistant strain[s] of eel grass” with hopes of rejuvenating the mud flats. Thus, the Pumpkin Island, Jamaica Island, and other shipyard land reclamation projects during the war that filled in tidal flats must have further reduced a shrinking fish and marine life food supply. And the shipyard’s uncontrolled sewage and industrial waste discharges into the river would have compounded the problem.

The reclamation of wetlands for shipyard expansion during the war was by no means limited to Portsmouth Navy Yard. During the first few years of the war, Mare Island Navy Yard more than doubled in size, expanding from 635 to 1500 acres, and much of that expansion involved the reclamation of wetlands.²³ Describing the environmental consequences of accelerated shipbuilding in the Bay Area, Wayne Bonnet says:

At the time, unavoidable physical degradation of the land and shoreline was an acceptable cost. To accommodate new shipyards, hills and rocks were dynamited, channels dredged, wetlands diked and filled.²⁴

Shipyard construction, or expansion, required an accommodation between the sea accesses and the land and facilities where the work was to be done. It was inevitable that real estate would have to be rearranged and shore lines adjusted. Portsmouth Navy yard was no exception.

²³ *U.S. Naval Administration in World War II, Bureau of Yards and Docks*, Vol. 1. Navy Department Library, Naval Historical Center, Washington, D.C., 196.

²⁴ <http://www.cr.nps.gov/nr/travel/wwIIbayarea/shipbuilding.htm>. “World War II Shipbuilding in the San Francisco Bay Area,” 3.

Industrial Sewage

Portsmouth Navy Yard discharged sewage and other shop effluents directly into the Piscataqua River prior to, and during, World War II. The shipyard was not unlike the rest of the country in this regard. According to Samuel P. Hays, urban sewage treatment “did not receive much attention until the New Deal public-works programs in the 1930s, and was not taken up by most cities until massive federal funding became available beginning in the 1960s.”²⁵ Hays notes that it was not until after World War II that industrial discharges began to arouse as much interest as did municipal sewage.²⁶ Until about 1950, a strategy of pollution dispersion prevailed whereby the dumping of wastes into nearby streams was accepted practice.²⁷ What little environmental conscience the shipyard possessed during the war can be summed up in the belief that the disposal of sewage and industrial waste to the swift flowing Piscataqua River was an acceptable and effective practice.

Limited pre-World War II efforts by state agencies to get the Portsmouth Navy Yard, and other federal shore establishments, to comply with suggested state policies for sewage treatment had no substantial legal basis for enforcement. Consequently, the attempts were treated, for the most part, with benign neglect by the Navy and Portsmouth Navy Yard. Once the war started, attention was focused on more urgent matters.²⁸

²⁵ Samuel P. Hays, *Beauty, Health, and Permanence: Environmental Politics in the United States 1955-1985*, 77.

²⁶ *Ibid.*

²⁷ *Ibid.*, 72.

²⁸ Portsmouth Navy Yard did not get a sewage waste treatment facility until 1975. However, Admiralty Village, the housing project built in 1941 for naval personnel and shipyard employees did include a waste treatment facility.

The origins of the legal argument that prevented states from enforcing waste discharge policies on federal navy yards can be traced back to Chief Justice John Marshall and the *McCullough v. Maryland* (1819) Supreme Court decision. This decision established the supremacy clause of the Constitution and thus made federal facilities immune from state and local regulation.²⁹ This federal immunity gradually eroded after World War II with the passage of legislation that included the Fresh Water Quality Assurance Act (1948), the Clean Water Restoration Act (1966), subsequent Clean Water Acts and amendments, and the establishment of the Environmental Protection Agency (1970). Slowly but surely, federal shore facilities were held to increasingly demanding environmental regulations administered through the EPA. However, prior to that time, the Navy and its shore facilities treated attempts at regulation with a definite lack of enthusiasm, as evidenced by events at Portsmouth Navy Yard in the mid-1930's and early 1940's.

The dumping of raw sewage by local communities, including the Portsmouth Navy Yard, into the Piscataqua River, was a long-time practice that began to come under increased scrutiny in the mid-1930s as the result of growing national concerns about such practices. Prompted by Congress, the Chief of the Bureau of Yards and Docks in September 1935 advised the shipyard that, "A resolution adopted by the House of Representatives on 7 August 1935 requested the President to inform the House of the number and distribution of Federal institutions and establishments of every kind and character, which are depositing untreated sewage into the navigable or non-navigable

²⁹ Commander Charles W. Tucker, JAGC, USN, "Compliance by Federal Facilities with State and Local Environmental Regulations," in *The Naval Law Review*, Spring 1986, 87-112.

waters of the United States.”³⁰ The supremacy clause of the Constitution was evident in the dismissive nature of the resolution that merely requested that the executive side of the government inform the House of Representatives of the extent of dumping of untreated sewage by federal shore facilities.

The Bureau of Yards and Docks, not having concerned itself with such matters in the past, surveyed its shore facilities in September 1935, to determine what each was doing with raw sewage, so that it could report back to the House of Representatives. In response, Portsmouth Navy Yard reported that a shipyard population of about 2800 people (380 residents and 2400 employees) produced an estimated 18,000 cubic feet of raw, untreated sewage daily that was dumped directly into the Piscataqua River through several sewers.³¹ The shipyard made no apologies for the dumping, or noted any plans for future treatment of the sewage.

Jumping ahead to the World War II years of this study, it is an interesting exercise to scale the estimated 18,000 cubic feet of raw sewage per day for 2800 people in 1935 to the high activity periods of the World War II years, when the shipyard employment reached greater than 20,000 people. At that time, the daily population of the yard probably approached 25,000 including residents, prisoners, submarine crews, hospital staff and patients, and contractors. That estimate equates, proportionately, to roughly 160,000 cubic feet of shipyard waste dumped daily into the Piscataqua River during the peak years of World War II. That volume represents about four acres (1 acre = 43,560

³⁰ Chief of Bureau of Yards and Docks letter of 16 Sep 1935 to Commandant, Navy Yard, Portsmouth, N.H., Subject: Disposal of Untreated Sewage into Waters of the United States. NARA Waltham, RG 181, PNSY Central Files, Box 36, Folder 26-7, “Sewers and Sewage.”

³¹ Commandant, Navy Yard, Portsmouth, N.H. letter of 20 Sep 1935 to Chief of Bureau of Yards and Docks, Subject: Disposal of Untreated Sewage into Waters of the United States. NARA Waltham, RG 181, PNSY Central Files, Box 36, Folder 26-7, “Sewers and Sewage.”

square feet) of raw sewage at a depth of one foot. If anything, this estimate is probably on the low side, when one considers the greatly increased pace of industrial operations during the war and the increased shop industrial waste that must have been generated.

Illustrating an innocence, and lack of awareness, of the dangers of environmental pollution typical of the times, the shipyard's 1937 annual sanitary report described the shipyard's sewage system as "excellent" with "no open drains," and flowing "directly into the Piscataqua River, either into the main channel or back channel" and "carried to the ocean by the river current or tide."³² Great confidence was placed in the ability of the river to flush itself clean and carry the waste out of sight to a safe place.

In 1940, the Chief of the Bureau of Yards and Docks received another prompting about the discharge of raw sewage. This time it was from the Surgeon General of the United States. The Bureau advised the naval shore establishments, in December 1940, that it had met with state health officials and the Surgeon General of the Public Health Service in Washington on 16 and 17 September 1940, relative to the discharge of domestic and industrial sewage at industrial plants essential to the national defense. The meeting resulted in a resolution that it be "brought to the attention of the heads of defense agencies" that naval shore establishments "should conform to the standards of the Department of Health of the State in which such facilities may be located." The Bureau further advised, "If there is any question as to the adequacy of the methods proposed or now in use, it is suggested that conferences be arranged with local or state health departments to determine any additional steps in the protection of water supply and

³² Portsmouth Naval Yard Medical Officer's Annual Reports for 1937 – 1939 to the Commandant. NARA Waltham, RG 181, Naval Station General Correspondence, Box 10, Folder A9-1, "Sanitary Reports."

disposal of wastes which may be required, and that, where necessary, suitable recommendations be forwarded to the Bureau.”³³ Here again, the recommendation that federal facilities comply with state policies for sewage discharge was respectful of the federal government’s superior legal position. The request was couched in terms of suggestions of what should be done as opposed to mandated compliance.

The Bureau of Yards and Docks felt no obligation to commit resources towards compliance but, rather, directed the navy yards to study the problem some more. The yards were tasked to establish liaison with the appropriate states, regarding sewage discharge, and report the findings back to the Bureau of Yards and Docks. Indicative of the lack of priority given environmental issues at the time, a year went by before the Bureau of Yards and Docks next addressed the dumping of raw sewage. One week prior to the attack on Pearl Harbor, the Bureau advised the shipyards that it had “moderate funds” budgeted for “rectifying those faulty conditions [of sewage discharge] of a minor nature” and sought details for larger projects needed to comply with state policies. The Bureau stated its plans to attempt to obtain the needed funding through future legislation and then pursue those projects “if funds become available.” The Bureau’s intentions were good, if not aggressive, but the timing was bad, as the nation’s need for submarines quickly overwhelmed concerns about industrial sewage discharge.³⁴

³³ Chief of Bureau of Yards and Docks letter of 5 Dec 1940 to Commandant Portsmouth Navy Yard, Subject: Water Supply and Discharge of Domestic Sewage at Training Areas and Industrial Plants essential to the National Defense. NARA Waltham, RG 181, Portsmouth Naval Shipyard Central Files, Box 36, Folder 26-7, “Sewers and Sewage.”

³⁴ Chief of Bureau of Yards and Docks letter of 28 Nov 1941 to Commandant Portsmouth Navy Yard, Subject: Water Supply and Discharge of Domestic Sewage – Navy Yard Portsmouth, N.H. Waltham, RG 181, Portsmouth Naval Shipyard Central Files, Box 36, Folder 26-7, “Sewers and Sewage.”

Despite the start of the war, Portsmouth Navy Yard pursued the matter with its two border states and learned, first, from the Department of Health and Welfare of the state of Maine on December 24, 1941 that:

The policy of this Department concerning the discharge of sewage into the Piscataqua River near the Navy Yard at Kittery and Eliot is the same as we have had for a number of years relating to the discharge of sewage along the seashore in that vicinity. We have *recommended*³⁵ to the various towns that no raw sewage be emptied into such waters and as a result of this, primary settling tanks have been installed at Oqunquit, York, York Beach, and other communities along the shore. We believe that at least this degree of treatment *should* be supplied for any sewage disposal projects emptying into the Piscataqua River or nearby tributaries.³⁶

Here again, the state of Maine could merely *recommend* that the federal shipyard *should* comply with its long-standing policy.

New Hampshire's response, of December 16, 1941, was even more revealing of the times. Responding to the shipyard's request for the state's policy and laws regarding discharge of sewage into the Piscataqua River, the state said:

As applicable to a case of this kind, *the latter [laws] are nil, except in so far as ground for a charge of nuisance could be found, and this would scarcely be possible here.* That is, there is no legal action this department could take respecting the existent sewage disposals at Dover, Portsmouth, and the Navy Yard.³⁷

In other words, the state was powerless to regulate shipyard sewage discharges except under conditions of a nuisance complaint. Unstated, but implied, is that a national defense

³⁵ The italics in this quote, and on the remainder of this page, are the author's, to emphasize the weak position of the states relative to that of the federal government.

³⁶ Department of Health and Welfare, Bureau of Health, State House, Augusta letter of 24 Dec 1941 to Commandant, Navy Yard, Portsmouth, N.H. NARA Waltham, RG 181, Portsmouth Naval Shipyard Central Files, Box 36, Folder 26-7, "Sewers and Sewage."

³⁷ The State of New Hampshire, State Board of Health letter of 16 Dec 1941 to Commandant, U.S. Navy Yard, Portsmouth, N.H. NARA Waltham, RG 181, Portsmouth Naval Shipyard Central Files, Box 36, Folder 26-7, "Sewers and Sewage" (emphasis added).

facility, such as the shipyard, would never be subject to nuisance laws. New Hampshire's response, dated a week after Pearl Harbor, recognized that the shipyard had more important matters on its agenda than sewage discharge.

Dutifully wrapping things up, despite the outbreak of World War II, Portsmouth Navy Yard advised the Bureau of Yards and Docks on December 28, 1941 that "The present number of sewer outlets at the Yard is the same as has been in existence for a number of years and the raw sewage is emptied into the Piscataqua River."³⁸ Indicative of the sewage change that was in the air [pardon the pun], the shipyard's report added that, "At the Navy Yard Housing Development at Kittery, Maine, raw sewage is [at present] emptied into Spruce Creek . . . A Federal Grant has been issued for a sewage treatment plant and garbage incinerator for the Housing Development."³⁹ The shipyard neglected to provide any cost estimates for sewage treatment facilities it might need and turned its attention to the multi-million dollar facility upgrades that were then underway in the yard to increase submarine production.

A year later, in December 1942, the Bureau of Yards and Docks provided further direction on sewage discharges. At that time, it merely restated its intentions to "comply with legitimate requests from local health officials in regard to the treatment of the sewage from naval shore establishments." However, those intentions had to be weighed relative to "the current shortage in steel, copper, and mechanical equipment." Furthermore, the Bureau added, "It is requested that the apparent necessity for sewage

³⁸ Commandant Portsmouth Navy Yard letter of 30 Dec 1941 to Bureau of Yards and Docks, Subject: Water Supply and Disposal of Domestic Sewage – Navy Yard, Portsmouth, N.H. NARA Waltham, RG 181, Portsmouth Naval Shipyard Central Files, Box 36, Folder 26-7, "Sewers and Sewage."

³⁹ *Ibid.*

treatment at any station be investigated thoroughly before arrangements are made to install sewage treatment structures since there are conditions where, by a reasonable extension of the outfall sewer, the immediate need for sewer treatment may be removed and the treatment plant may be omitted for the present.”⁴⁰ The treatment plant was omitted not only for the present, but for the next thirty years, as Portsmouth Navy Yard did not get a sewage and industrial waste treatment plant until 1975.

The tone of the correspondence between the navy and state health officials, regarding the potential compliance with state policies for sewage discharge, illustrates well the positions of the state versus the federal government regarding environmental protection in 1940-41. First, the states were in no position to dictate sewage discharge requirements to federal facilities involved in national defense. They could merely bring the matter to the attention of the Navy and note that naval facilities should comply with local and state requirements. Second, the Bureau of Yards and Docks had no intention of mandating, across the board, that all its facilities immediately comply with local requirements. Instead, the facilities were repeatedly told to investigate local requirements, and communicate those requirements back to the Bureau where any costs involved would be weighed relative to other and probably more urgent priorities.

As estimated earlier, the increased activity at the shipyard in the early 1940s must have greatly overloaded the sewage system. This speculation is confirmed by the shipyard medical officer’s annual report for 1942:

⁴⁰ Chief of the Bureau of Yards and Docks letter of 18 Dec 1942 to Officer-in-Charge of Construction Bureau Yards & Docks Contracts, U.S. Navy Yard, Portsmouth, N.H., Subject: Sewerage and Sewage Treatment Facilities at Naval Stations. NARA Waltham, RG 181, Portsmouth Naval Shipyard Central Files, Box 36, Folder 26-7, “Sewers and Sewage.”

With all the new toilet fixtures and with an increase in personnel several times the former figures, the amount of sewage now emptying into the river is great. There have been several complaints about the odor. Some of it has a tendency to lodge about piers and has to be cleaned away.⁴¹

Raw stinking sewage sloughing around underneath the piers was apparently a cost of doing business, when that business was mounting the industrial effort needed to build the large number of submarines needed to win the war. The medical officer's report went on to say that "Consultation with Public Works resulted in conclusion that it would be a major task to extend the sewer down the river [as recommended by the Bureau of Yards and Docks]."⁴² And finally it was suggested that, "Since there is apparently no health hazard such an undertaking is not recommended for the duration of the war."⁴³ Many projects and lives were put on hold during the war.

The above examples highlight the relative unimportance assigned open and unsanitary sewage disposal by health officials during the war. Not to be overlooked is the tolerance of shipyard employees who routinely accepted the unhealthy situation as a cost of doing business. It is also obvious that the Navy lacked any serious commitment to the expenditure of funds for sewage treatment upgrades when faced with more urgent wartime priorities. Finally, states were unable to push federal facilities to comply with state policies and regulations because of their inferior legal position. All of this would change dramatically with time but, in the early 1940s, the Navy and Portsmouth Navy Yard were focused on other matters.

⁴¹ Portsmouth Naval Yard Medical Officer's Annual Reports for 1942 to the Commandant. NARA Waltham, RG 181, Naval Station General Correspondence, Box 10, Folder A9-1, "Sanitary Reports."

⁴² *Ibid.*

⁴³ *Ibid.*

The communities surrounding the navy yard were no more responsible with sewage discharge than was the yard. According to the 1943 Portsmouth Health and Welfare Survey:

All of the sewage from the community is discharged raw into the Piscataqua River with the exception of sewage from the Wentworth Acres section. . . The sewage system has grown gradually as the city increased in population. However, as in many instances, little attention has been given to the engineering phases. For this reason, some of the mains are undersized and, under proper tidal conditions, back flooding in the low areas occurs. Also, some of the sewer outlets are not submerged, or have not been extended sufficiently, at times giving rise to localized odor nuisances.⁴⁴

Conditions along the waterfront in Portsmouth were not unlike the odiferous and fouled waters around the piers at the navy yard. The Portsmouth Health and Welfare Survey (1944) noted that the raw sewage being dumped did “add materially to the pollution of Great Bay, thereby having a direct effect on the shellfish and recreational potentialities of the areas.”⁴⁵ Local leaders took some satisfaction from the fact that “there are several other towns and cities bordering on streams discharging into the Bay and they also contribute to the pollution.”⁴⁶ At least there was some recognition of the long term effects of the continued dumping of raw sewage into the river. However, as with the navy yard, the focus of the local communities was elsewhere and, besides, everyone was dumping sewage into the river.

In 1944, however, the focus of University of New Hampshire’s Dr. C.F. Jackson was on the increasing pollution of Great Bay. His report in conjunction with the Marine Fisheries Commission, *A Biological Survey of Great Bay New Hampshire*, introduced a

⁴⁴ “Survey of Health and Welfare in the Portsmouth Defense Area,” Cumings Library, Strawberry Banke Museum, Portsmouth, N.H. MS 96, Box 2, Folder 14,” 56.

⁴⁵ *Ibid.*

⁴⁶ *Ibid.*

new era of concern for the increasing pollution of local streams. Jackson's survey of microbial contamination showed a coliform bacteria count of 2,400 per 100 milliliters of water for the lower Piscataqua River. The U.S. Public Health Service Standard for shellfish waters at the time was 70 coliform bacteria per 100 milliliters of water. There can be little doubt that Portsmouth Navy Yard's untreated sewage discharges endangered Piscataqua River shellfish. Before one is overly critical of the shipyard, it is appropriate to note that the coliform bacteria levels reported in the Cocheco and Exeter Rivers were 10,634 and 9,020 respectively.⁴⁷ The shipyard was but one of many activities, including riverside textile mills, that were guilty of polluting the local rivers..

William Tebo remembers the local rivers turning colors, in the early 1940s, when the textile mills changed dye colors. Worse yet, he remembers swimming in the Technicolored rivers.⁴⁸ Tebo's recollections are validated in Jackson's report. By lowering a simple instrument known as a Secchi disc, "a disc ten inches in diameter, the alternative quarters of which are painted black and white,"⁴⁹ into local streams until the disc disappeared from sight, Jackson gained an appreciation of stream pollution. According to Jackson, "Much of the material coming from the print mills is colored, and the use of the disc gave a fair idea of the amount of this type of pollution [chemical] that was present."⁵⁰ Of course, any other suspended matter [physical pollution] in the water would also affect the clarity of the water. At any rate, test results showed that the disc disappeared at a depth of about three feet in rivers with a high density of mills such as the

⁴⁷ C.F. Jackson, *A Biological Survey of Great Bay New Hampshire*, 35-37 and Table IV.

⁴⁸ Oral interview with William Tebo, 3 Nov 2006, at the Portsmouth Navy Yard Museum.

⁴⁹ C.F. Jackson, *A Biological Survey of Great Bay New Hampshire*, 32-33.

⁵⁰ *Ibid.*

Salmon Falls, Cocheco, and Bellamy Rivers. On the other hand, the disc disappeared at a depth of six feet one inch in the Piscataqua River.⁵¹ Thus, at first glance, the navy yard did not appear to contribute to the pollution of local waters as much as the textile mills.

Jackson was working towards an eventual evaluation of the effect of pollution on all local marine life including clams, oysters, lobsters, and fish. However, the 1944 report addressed only the status of clam flats by specific river locations. For the Lower Piscataqua River, it was concluded that “The clam flats of the Lower Piscataqua are in better shape than most of the other rivers. A reasonably swift current keeps silt removed and brings food organisms to the growing clams.”⁵² Thus, from the standpoint of chemical, physical, and bacterial pollution, as well as the quality of the clam flats, the lower Piscataqua River was judged to be less polluted than other local rivers. That is not to say that pollution in the Piscataqua River was not increasing. Indeed, the noted decrease in marine life and their foodstuffs suggested otherwise and that was the motivation for Jackson’s survey.

As noted by Samuel P. Hays, up until the mid-twentieth century “Sources responsible for air and water pollution as well as solid waste had long since dumped their waste on the most readily available land, into nearby streams, or into the air.”⁵³ Jackson’s study had shown that the shipyard and local communities should be counted among those polluters who dumped their waste in the most readily available streams, the Piscataqua and other local rivers.

⁵¹ *Ibid.*

⁵² *Ibid.*, 40.

⁵³ Samuel P. Hays, *Beauty, Health, and Permanence: Environmental Politics in the United States 1955-1985* (Cambridge: Cambridge University Press, 1987), 72.

The report of the shipyard medical officer for 1947 noted another consequence of the discharge of extensive waste products to the Piscataqua River; heavy silting in the waters around the shipyard. According to the report, "The silting at Dry Dock #2 was reported to be so bad that it interfered with docking operations."⁵⁴ Had the war continued past 1945, it is highly possible that operations in Dry Dock #2 would have had to be suspended for the period of time necessary to dredge the river of shipyard waste.

Subsequent reports in 1950 noted as many as thirty-two shipyard sewage discharges into the river.⁵⁵ Later, EPA studies of the 1980s identified six shoreline areas for cleanup that had contained sewage and industrial waste outfalls to the river, prior to the building of the waste treatment plant in 1975.⁵⁶ The discharge of industrial waste directly to the river was obviously a large problem during the war years, which went relatively unnoticed by local authorities.

The sewage situation at the shipyard and surrounding communities was not unlike other shipyard boomtowns and, in some respects, it was much better. Lorraine McConaghy's study of another wartime shipyard boomtown, Kirkland, Washington, is a

⁵⁴ Portsmouth Naval Yard Medical Officer's Annual Reports to the Commandant, 1946 report. NARA Waltham, RG 181, Naval Station General Correspondence, Box 10, Folder A9-1, "Sanitary Reports."

⁵⁵ Portsmouth Naval Yard Medical Officer's Semi-Annual Report for 1950 of 14 July 1950 to the Commandant. NARA Waltham, RG 181, Naval Station General Correspondence, Box 10, Folder A9-1, "Sanitary Reports."

⁵⁶ Revised OU3 Risk Assessment, Portsmouth Naval Shipyard, Kittery, Maine, Northern Division, Naval Facilities Engineering Command, Contract Task Order 0166 of May 2000, 2-6,7.

horror story in comparison.⁵⁷ Kirkland, located on the eastern shore of Lake Washington, doubled in population to about 15,000 during the war when employment at its shipyard grew from a few hundred to 8,000. Not blessed with the natural hydraulic current and tidal flushing of the Piscataqua River, the uncontrolled sewage dumped into Lake Washington caused a public health catastrophe. In the spring of 1943, shipyard workers became ill when drinking from fountains in the yard and beaches were closed because they were unsafe for swimming. In the summer of 1944, Kirkland's water supply was declared unfit for human consumption due to sewage leaking into the drinking water supply and raising E coli bacteria to five times the permissible level. A portable chlorinator alleviated the problem, but drinking water had to be boiled for a period of time. Portsmouth's sewage problems, while not as severe as those of Kirkland, Washington, were nevertheless a growing concern for Dr. C. Floyd Jackson and others who were becoming more and more aware of the increased pollution of local waters.

Pickling Tanks

Pickling of steel plates to remove oxide scale, prior to form-rolling for pressure hull sections, was another under-appreciated environmental hazard prior to, and during, the war. Pickling required large tanks, of approximately 2000 cubic feet in volume, typically filled with a 10% sulfuric acid at about 200 degrees Fahrenheit, into which the steel plates were submerged for long periods of time, to loosen and dislodge the scale, forming sludge in the bottom of the tank. At the Portsmouth Navy Yard, the tanks were installed in underground pits conveniently close enough to the river to periodically flush the tanks to the river. To further complicate the problem, up into the 1940s, many of the

⁵⁷ Lorraine McConaghy, "Wartime Boomtown: Kirkland, Washington, a Small Town during World War II," 42-51.

tanks were of a wooden construction, which required constant attention to the seams, and tightening of fasteners, to avoid leakage.

In 1936, the Assistant Secretary of the Navy forwarded an article about the design, construction, and maintenance of wooden pickling tanks to all the navy yards for their information and compliance.⁵⁸ The article explained that wood selection was critical to well-designed tanks, with yellow pine being the preferred wood. The pitch (resin) of well-seasoned yellow pine increased the resistance of the lumber to corrosives and the wood also experienced less shrinkage than other woods over time. The article elaborates: "Water, either hot or cold, will swell any tank; but hot sulfuric acid, even at low concentrations . . . has a dehydrating effect on the lumber, and it will shrink the wood with which it comes in contact." Repeated expansion and contraction of wooden tanks often resulted in excessive leakage of the acidic pickling bath. Another design consideration was the potential for accelerated electrolytic action that the sulfuric acid would accommodate between dissimilar metals of fasteners or tie rods, leading to even more leakage. The article concludes with a discussion of the importance of observing the tank closely, when in operation, and consistently and sequentially tightening fasteners to prevent leakage. Pickling tanks were accidents waiting to happen.

In 1938, the Bureau of Construction and Repair assigned Portsmouth Navy Yard the task of running a side-by-side evaluation of a wooden and a new steel tank as replacements for two badly deteriorated wooden tanks. Portsmouth Navy Yard subsequently reported that, "On 10 October a steel rubber lined pickling tank manufactured by B.F. Goodrich Company, . . . and a long leaf yellow pine wooden

⁵⁸ Assistant Secretary of the Navy (Shore Establishment Division) letter of 9 Jan 1936 with enclosure "Wooden Pickling Tanks," from *Steel* of December 2, 1935. NARA Waltham, RG 181, Portsmouth Naval Shipyard (Central Files), Box 36, Folder N5-15, "Pickling Plant."

pickling tank were installed in the galvanizing plant.”⁵⁹ The letter also cites the advantages of the steel tank that was lined with rubber and further sheathed with acid proof brick. Regarding the wooden tank, the commandant noted the difficulty of acquiring suitable lumber for the new tank, as well as the unsatisfactory performance of the new and previous wooden pickling tanks:

The securing of lumber for this tank was very difficult, and extended over a period of three years, including three rejections of lumber, before suitable material could be found. . . . Every effort was made to make this wooden tank the very best that could be constructed. . . . Up to this time it has been impossible to make this tank absolutely tight. . . . The leakage of the acid from the wooden tank is particularly undesirable, as the leakage from the two original wooden tanks so destroyed the concrete foundations of the pickling plant, that a new floor and foundations had to be installed after the old tanks were removed, and prior to installation of the two subject tanks.⁶⁰

Such gross leakage, and resultant damage, from a carefully constructed state-of-the-art wooden pickling tank in 1938, leaves one with questions about other long-term material and human health consequences of the shipyard’s pickling operations. Pickling operations at the yard began in the early twentieth century when steel hulled ship construction began at the shipyard. Surely the sulfuric acid solution leakage that ate concrete floors must have caused other unreported damage.

The story of Portsmouth Navy Yard pickling tanks becomes even more intriguing, one year after the side-by-side evaluation of the steel and wooden tanks, when the shipyard made plans for the installation of a large steel pickling tank (Length – 31 ½ feet, Depth – 12 feet, Width - 6 feet at top and 8 feet at bottom) and a vertical lime tank of

⁵⁹ Commandant Portsmouth Navy Yard letter of 27 Oct 1938 to Bureau of Construction and Repair, Subject: Pickling Tanks – Report on. NARA Waltham, RG 181, Portsmouth Naval Shipyard (Central Files), Box 36, Folder 15-5, “Pickling Plant.”

⁶⁰ *Ibid.*

similar dimensions in a new storage area. The tanks were to be sunk to a depth of 6 ½ feet to 7 feet below the existing ground level within a concrete lined pit. The Production Officer explained the need that the tank be designed to accommodate flushing to the river:

It is further desired that a drain pipe and valve be installed leading from the pit through the adjacent sea wall. It is realized that the bottom of the pit will be below high tide level. The valve will prevent flooding of the pit at high tide and will permit drainage and washing down of the pit at low tide.⁶¹

Thus, the shipyard planned to avoid the type of concrete deterioration experienced earlier with the wooden tanks by periodically flushing the concrete pit for the new steel tanks into the river, a practice totally consistent with the wide-spread flushing of other shop industrial waste through the sewer drains. The pickling tanks, approved and installed as designed adjacent to the plate yard, were in operation in 1942.⁶² The extent of tank flushing that occurred during the war is unknown.

Galvanizing Plant

Galvanizing is a process that increases the corrosive resistance of steel components, by applying a protective coating of zinc, acquired through an immersion or electrolytic process. The process requires a thorough cleaning of the steel components in acid tanks, not unlike the pickling operation. Portsmouth Navy Yard constructed a galvanizing plant in Building 184 in 1943. The plant's pit, containing the acid cleaning tanks, was filled in and covered with a concrete floor in the 1960s, when the building was

⁶¹ Production Officer memo of 22 Dec 1939 to the Public Works Officer, Subject: Pit for Vertical Pickling Tank. NARA Waltham, RG 181, Portsmouth Naval Shipyard Central Files, Box 36, Folder 15-5, "Pickling Plant."

⁶² Commandant Portsmouth Navy Yard Rear Admiral Withers letter of 10 Nov 1942 to Bureau of Ships, Subject: Building for Metal Cleaning Equipment at Navy Yard, Portsmouth, N.H. NARA College Park, Record Group 19, Bureau of Ships General Correspondence 1940-45, Box 791, Folder NY1/N5.

converted to use as a welding school. An acidic crystalline growth on the walls of the building caused it to be designated a Superfund site in 1994.⁶³ As recently as October 2006, a letter printed in the *Portsmouth Herald* reported, “The curious crystals growing along the bottom of the walls in the Welding School building have been cleaned once again and the affected areas covered with protective plastic sheets. The basic problem remains unresolved but the building is now much safer for welder training.”⁶⁴ The periodic reappearance of acidic crystals in Building 184 continues the legacy of the shipyard’s World War II galvanizing operations.

In 1939, Portsmouth Navy Yard management was not interested in a proposed in-yard galvanizing plant, as long as the yard could continue to efficiently and economically contract for outside galvanizing as it had done for many years.⁶⁵ This position changed, in late 1942, when wartime needs caused a dramatic increase to the shipyard’s need for galvanizing services. Faced with the need to clean 500,000 pounds of metal in calendar year 1943, the shipyard anticipated contractor shortages and sought a new galvanizing facility and building. The new facility was to include “a tank for Oakite solution, cold spray tank, sulfuric acid tank, hot dip tank, and a sandblasting machine with drying racks

⁶³ Portsmouth Naval Shipyard Installation Restoration Program Site 30 EE/CA Fact Sheet contained in Feasibility Study Report for Operable Unit 3 Volume I of II Portsmouth Naval Shipyard Kittery, Maine, November 2000, prepared by Northern Division Naval Facilities Engineering Command, Contract Number N62472-90-D-1298, Contract Task Order 0166.

⁶⁴ *Portsmouth Herald*, 13 Oct 2006, A12, “PNS cleanup is Paying Off,” James O. Horrigan, RAB member, Seacoast Anti-Pollution League.

⁶⁵ Commandant Portsmouth Navy Yard letter of 11 Jun 1941 to Lcdr. Philip Lemler, Bureau of Ships. NARA Waltham, RG 181, Portsmouth Naval Shipyard Central Files, Box 2, Folder A1-1, “Developments.”

and storage space.”⁶⁶ When the facility was initially rejected by the Bureau of Ships, Portsmouth Navy Yard quickly requested reconsideration because of the excessive costs and inefficiencies of contracting for galvanizing services.⁶⁷ The Bureau of Ships subsequently approved the facility.

The new galvanizing plant was built and performed even better than anticipated. In early 1944, the shipyard reported the galvanizing of large quantities of material at remarkable savings and predicted a quick return of investment:

The galvanizing plant . . . has now been put into very successful operation. It is therefore taking care of all the present needs of the Yard, approximately 426,909 pounds of material galvanized per month. The current cost is estimated at approximately \$.015 per pound, compared with the recent contract cost of \$.035 per pound. It is estimated, therefore, that the first cost of the plant, \$175,000, will be saved in twenty months. The plant is operating one eight hour shift. In addition to the sandblasting and pickling required for the above galvanizing, approximately 300,000 pounds of pickling and 50,000 pounds of sandblasting have been done preparatory to painting or treatment other than galvanizing. It is further estimated that 500,000 pounds can be galvanized per month, operating single shift, at a cost of \$.015 per pound.⁶⁸

The capacity of the plant had exceeded all expectations and things got even better the next year. In April 1945, Lieutenant Junior Grade William P. Gregory reported to the Bureau of Ships that:

It is worth noting in the year 1944, this shop produced 3,680,881 pounds of finished material at a cost of \$.02 per pound . . . For the first quarter of 1945,

⁶⁶ Commandant Portsmouth Navy Yard T. Withers letter of 2 Oct 1942 to Bureau of Ships, Subject: Building for Metal Cleaning Equipment at Navy Yard, Portsmouth, N.H. NARA College Park, RG 19, Bureau of Ships General Correspondence 1940-45, Box 791, Folder NY1/N5.

⁶⁷ Commandant Portsmouth Navy Yard H.F.D. Davis letter by direction of 25 Nov 1942 to Bureau of Ships, Subject: Construction of Galvanizing Plant. NARA Waltham, RG 181, 1930-1950, Portsmouth Naval Base General Correspondence, Box 1, Folder A1, “New Construction June 1940 to Dec 1943.”

⁶⁸ Commandant Portsmouth Navy Yard T. Withers, letter of 18 Feb 1944 to Bureau of Ships, Subject: Galvanizing Plant. NARA College Park, RG 19, Bureau of Ships General Correspondence 1940-45, Box 791, Folder NY1/N5.

the shop produced 1,029,596 pounds of finished material at a cost of \$.0205 per pound.⁶⁹

The initially predicted annual cleaning rate of one half million pounds of metal in 1943 had increased to over four million pounds of metal per year by the first quarter of 1945. There is every reason to believe that the eight fold increase in galvanizing operations was typical of the increased demand of many operations and processes throughout the yard. Similarly, one might expect an eight fold increase in waste products, with essentially no increase in the means or efficiency of disposal.

The financial success story of Portsmouth Navy Yard's World War II galvanizing plant is tempered somewhat by the EPA's findings, reported in November 2000:

The pit was closed for the last time in the 1960s. At that time the pit was filled in and covered over with a concrete floor. And since then the building has been used as a welding school. . . . At various times since the pit was filled, a crystalline substance has been noted to form on the inside wall of the building near the former pit. The crystalline growth was found to be acidic based of a low pH. . . . Investigation at the site indicated that there is a potential risk to people working in the building who come in direct contact (skin contact) with the acidic crystals. The investigation showed that the fill material (including water in the pit) is the likely source of the crystalline growth. In addition, there is a concern that if there were a release from the pit, the high metals concentrations in the pit water could potentially adversely impact ground water under the site.⁷⁰

The pit was subsequently uncovered, the pit fill material excavated, the site cleaned, and the concrete floor restored. If the site was judged to be a potential health risk to people

⁶⁹ Ltjg USNR William P. Gregory (PNY) letter to Cdr. William Spowers (BuShips) of 21 Apr 1945. NARA College Park, RG 19, Bureau of Ships General Correspondence 1940-45, Box 791, Folder NY1/N5.

⁷⁰ Portsmouth Naval Shipyard Installation Restoration Program Site 30 EE/CA Fact Sheet, contained in Feasibility Study Report for Operable Unit 3 Volume I of II, Portsmouth Naval Shipyard Kittery, Maine, November 2000. Prepared by Northern Division Naval Facilities Engineering Command, Contract Number N62472-90-D-1298, Contract Task Order 0166.

forty years after it was last used, what must the potential risks have been in 1944, when 3,680,881 pounds of material were processed through the tanks of the galvanizing plant.

A photograph in Nelson H. Lawry's *Portsmouth Harbor's Military and Naval Heritage* which shows metal piping being cleaned in the shipyard's sulfuric acid and trisodium phosphate baths gives some indication of the risks involved. With heavy fumes rising from the baths, the picture caption reads, "Although one of these men is wearing rubber gloves, they are little protected from fumes as they lower a section of piping into the TSP tank in the 1940s."⁷¹ Indeed, the two workers are shown standing in the fumes with no breathing or body protection except for the rubber gloves mentioned. Industrial risks were little appreciated in the yard's shops during the war. However, the acid that continues to seep through, and crystallize on, the walls of Building 184 serves as a constant reminder of those unappreciated risks.

Painting Operations

Correspondence, detailing the need for a galvanizing plant in late 1942, describes the existing shipyard sandblasting operation to prepare components for galvanizing. According to that correspondence, the sandblasting that took place in Building 63, a former unheated and unventilated wagon shed, was unsatisfactory because it created a "large amount of dust dangerous to personnel and machines with which it comes in contact."⁷² Airborne dust and dirt in the sandblasting shop was another condition tolerated as a cost of doing business.

⁷¹ Nelson H. Lawry, Glen M. Williford, and Leo K. Polaski., *Portsmouth Harbor's Military and Naval Heritage* (Portsmouth, N.H.: Arcadia Publishing, 2004), 100.

⁷² Commandant Portsmouth Navy Yard T. Withers letter of 10 Nov 1942 to Bureau of Ships, Subject: Building for Metal Cleaning Equipment at Navy Yard, Portsmouth, N.H. NARA College Park, RG19, Bureau of Ships General Correspondence 1940-45, Box 791, Folder NY1/N5.

The scraping and cleaning of marine growth and loose paint from submarine hulls, in the dry dock, produced equally hazardous airborne dust and debris. This operation was especially hazardous in that the resulting airborne contamination contained chemicals designed to kill marine growth that also caused health problems for workers. Copper based anti-foulant coatings had been in use for over two hundred years to kill marine growth. Other, more effective metal bases, like lead, were being investigated during World War II. While the hazards of such paints are well known today, one can not help but wonder how many health-damaging incidents occurred during the frantic efforts to overhaul and repair war damaged ships and submarines.

Hand scraping, and brushing rather than sand blasting, was routinely employed to remove antifoulant paint systems from submarine hulls at Portsmouth Navy Yard. That scraping and brushing produced considerable airborne contamination. Worse yet, it was often impossible to know the composition of paint systems that had been applied to foreign submarines that visited the shipyard during the war. One particularly noteworthy incident of dry dock airborne contamination occurred at Portsmouth Navy Yard in September 1941. The incident involved the visiting French-built submarine *Surcouf*, the largest submarine in the world at the time. During the brushing of the *Surcouf's* underwater hull, in preparation for renewing the preservation and anti-foulant coatings, workers experienced unusual skin and eye irritation that they believed to be caused by the unusual amount of dust generated by their cleaning of the hull. The medical officer's report shows that the problem was so severe that seventeen of the men working in the dry dock reported to the dispensary complaining of burning eyes, nose, and face. The

medical officer suspected some unknown pollutant in the paint to be the cause. Further investigation showed that:

The ship had been in dry dock over a week and the bottom was thoroughly dry. There had been no rain for several days and there was practically no wind yesterday so that the workmen were in a cloud of dust raised by the brushes. A Frenchman reported that the bottom was last painted in England with English paint. There was no difficulty when the bottom of the English ships were scraped [Portsmouth had overhauled a couple English submarines earlier that year] but it so happened that they were scraped during rainy weather which prevented dust. Four men developed skin irritation on August 2nd while working in a ballast tank on an English ship and six men had the same experience on August 19th while working in the battery compartment of a French ship. It has not been possible to determine the composition of the English paint, but it is certain that there is some ingredient in their paint that is not present in ours as we have not had previous similar experiences.⁷³

The men with the burning symptoms were treated and released, but no attempt was made to determine the composition of the paint. This is an example of the hazards of working on foreign submarines, as well as another example of the casual acceptance of work related injuries.

Further examples of this casual acceptance of risk, associated with painting operations, can be found in a 1942 study, done by the U.S. Public Health Service, to evaluate the toxicity of a new fireproof paint containing antimony oxide. The new paint was developed by the U. S. Navy to replace more flammable paint systems that were then being used to paint ship interior compartments and living spaces. The study concluded that “the new antimony paint is no more hazardous than the control [existing] paint,”⁷⁴

⁷³ Medical Officer Portsmouth Navy Yard H. F. Lawrence memo of 10 Sep 1941 to Commandant, Subject: Special report of injuries of Yard employees investigated by Ltjg J.L. Hatch. NARA Waltham, RG 181, Portsmouth Naval Shipyard Industrial General Correspondence, Box 43, Folder EP13/L9-3 (161) “British Empire *Surcouf* 1941-42.”

⁷⁴ U.S. Public Health Service memo from Principal Industrial Toxicologist L.T. Fairhill and Surgeon Paul A. Neal to the Commander N.A. Ingram of 1 October 1942. NARA College Park, RG 80 General Records of the Department of the Navy 1798-1947, Formerly Security Classified General Correspondence of the CNO / Secretary of the Navy, 1940-1947, Box 18, Folder P2-4 (vol 3).

implying that some level of risk was inevitable and acceptable. The study explained that guinea pig mortality rates were high when exposed to the burning fumes of both paints. The animals experienced mortality rates of 75% to 100% when exposed for one hour to fumes emanating from the paints heated to 650 degrees Fahrenheit. As the deaths were due to lung irritation and damage rather than toxic poisoning, the study concluded that “the usual precautions (such as respiratory apparatus, etc.) necessary for the application of paints in general, must be taken in the use of antimony paints.” While it is somewhat reassuring to know that the potential for toxic poisoning was considered in the development of shipboard interior paint systems in 1942, it is also clear that flammable interior paints had found widespread use on ships of the U.S. Navy.

Industrial Scrap and Rubbish Disposal

Industrial scrap and routine rubbish, that found its way to the river and shipyard dump sites, produced another set of problems. A memorandum, written in 1926 by Shipyard Manager Captain H.W. Osterhaus, indicates that the shipyard routinely dumped industrial scrap in the harbor. In the memorandum, Captain Osterhaus chastised shop managers for the cluttered and untidy appearance of their spaces and encouraged them to collect excess junk and dispose of it in the river. Referring to some boilers that were rusting in the industrial area, he wrote, “The boilers, if of no value, and if they cannot be sold as junk, could be put on the lighter and dumped overboard as is done at regular intervals when a load has been accumulated.”⁷⁵ In 1926, it had apparently been a long

⁷⁵ Manager Captain. H.W. Osterhaus memo of 12 Apr 1926, Subject: General Appearance in the vicinity of shops. NARA Waltham, RG 181, Portsmouth Naval Base Files, Box 15, Folder N1-1, “Grounds 1925-39.”

time practice to periodically clean up the shipyard by dumping barge loads of useless junk in the harbor.

It is not clear how long the practice of dumping industrial scrap in the harbor continued. However, a report in the *Portsmouth Herald* of 1 September 1942 raised questions about the yard's handling of industrial scrap. Reporting on a local salvage drive, the paper reported that the navy yard had contributed 2,555 tons of scrap during the eight weeks of the drive. The shipyard's contribution to the scrap drive was more than the average displacement of a typical Portsmouth-built submarine during the war. With the yard's help, the final total of 3,526 tons had almost tripled the original goal for the drive. Rear Admiral Withers was quoted as saying that the report of the scrap drive "will materially assist in putting a stop to the vicious rumors that have sprung up about the scrap salvage program at the yard."⁷⁶ Unfortunately, there were no amplifying remarks about the vicious rumors, leaving one to speculate about what might have happened to 2,555 tons of shipyard scrap had it not been contributed to the scrap drive.

Exhibiting the same naiveté towards the dumping of trash and rubbish, annual reports by the shipyard medical officer, from the mid-1920s through the 1930s, considered the shipyard's handling of rubbish to be entirely satisfactory, if not excellent. The 1932 report noted satisfactory conditions as the result of on-station incineration,⁷⁷

⁷⁶ *Portsmouth Herald*, 1 Sep 1942, "Navy Yard Ups City Total," 1 & 5.

⁷⁷ According to James Dolph, Portsmouth Naval Shipyard historian, the yard began incinerating trash in the 1890s. Over the years, it became the practice to burn as much industrial waste as possible and use for landfill that waste which would not burn. The residue and ash remaining after burning was then bulldozed as fill material for nearby lowlands. Telephone interview with James Dolph of 26 March 2007.

contract removal services, and well-managed dumps.⁷⁸ Throughout the 1930s and the early war years, the reports were, for the most part, free of criticism of the yard's waste and scrap handling practices.

In 1930, however, the shipyard was critical of its neighbors in Kittery, who were guilty of routinely dumping trash in the waters between the mainland and the shipyard. Unlike the shipyard's dumping of waste products and junk in the middle of the river where it was out of sight and out of mind, the town's trash cluttered the shoreline and entrance to the shipyard. In 1930, Commandant Rear Admiral W.W. Phelps complained to the Kittery Board of Selectmen that the properties bordering the approach to the bridge to the shipyard were "unsanitary and unsightly."⁷⁹ The Board's response was to build a high board fence across the inner end of the old navy yard bridge to "prevent some of the dumping of rubbish that makes the Southwest shore of the Yard approach unsightly."⁸⁰ In 1930, concerns about the pollution of shorelines and harbors had more to do with appearance and tidiness than concern for disease.

Benign annual sanitary reports continued until 1944 when, with the war winding down, and without previous warning, it was noted that, "The presence of rats and

⁷⁸ Portsmouth Naval Yard Medical Officer's Annual Reports for 1932 of 18 January 1931 to the Commandant. NARA Waltham, RG 181, Naval Station General Correspondence, Box 10, Folder A9-1, "Sanitary Reports."

⁷⁹ Portsmouth Navy Yard Commandant Rear Admiral W.W. Phelps letter of 7 May 1930 to the Kittery Selectmen. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence Box 20, Folder EM "Kittery 1925-47."

⁸⁰ Kittery Selectmen letter of 13 May 1930 to Commandant Portsmouth Navy Yard. NARA Waltham, RG 181, 1930-1950, Portsmouth Naval Base General Correspondence Box 20, Folder EM "Kittery 1925-47."

cockroaches presents a problem in maintaining good sanitation in the yard.”⁸¹ The overloaded wartime shipyard conditions that contributed to sewage sloshing around the piers were also apparently contributing to an infestation of rats and roaches.

The shipyard’s postwar efforts to bring the infestation problem under control were of limited success. Rat infestation became such an unbearable problem by 1950 that the district medical officer was called in to conduct a rat infestation survey and recommend methods to be taken to bring the problem under control. In the process, the shipyard handling of waste was described in considerable detail. “Refuse, very often mixed with food and scrap material is picked up from all sources, such as submarine barracks, cafeteria, shops, and quarters,” and sent, first, to the incinerator in Building 46, where it is sorted by hand for burning. The area around the incinerator was found to be “unclean and large chunks of meat scraps were scattered over the ground, attracting sea gulls, and being a source of food supply to rats and flies.”⁸² As terrible as it sounds, this description probably fits the conditions found at most town dumps across the United States in 1950. Granted, a rat infestation of an island community such as the shipyard was a more serious problem.

There is no reason to believe that the shipyard’s waste disposal and dump practices were any better or any worse than those of other industries. And there is certainly no reason to believe that the yard’s practices during, or prior to, the war were any better than they were in 1950. Indeed, the shipyard had been struggling with the rat

⁸¹ Portsmouth Navy Yard Medical Officer’s Annual Reports for 1944 of 15 Jan 1945 to the Commandant. NARA Waltham, RG 191, Naval Base General Correspondence, Box 10, Folder A9-1, “Sanitary Reports.”

⁸² Portsmouth Naval Yard Medical Officer’s Semi-Annual Report for 1950 of 17 Jan 1950 to the Commandant. NARA Waltham, RG 191, Naval Station General Correspondence, Box 10, Folder A9-1, “Sanitary Reports.”

infestation problem since first identified in 1944 and had probably improved conditions to those reported in 1950. The conditions reported in 1950 had more than likely existed for a long time and simply were never judged to be unusual or important enough to merit discussion in previous reports. One is left to speculate about what sanitary conditions must have been like in 1944 with an employment of over 20,000 if an employment under 5,000 in 1950 produced an infestation of rats.

Water

The Medical Officer's Annual Sanitary Reports contain evidence of periodic concerns about the quality of the shipyard's water supply. At various times between 1929 and 1936, the shipyard's water, provided from local reservoirs through the Kittery municipal water system, was reported to be muddy, taste of fish, and have a bad odor.⁸³ At other times, the positive reports of water quality were couched in such terms as "taste improved" or "free of disagreeable odor and taste" that hint of past problems.⁸⁴

A March 1944 Sanitary Survey of the yard by an Epidemiology Unit from Newport, R.I. found that "solids were very high for treated water" and that "the 26 ppm of organic material could be a basis for future trouble."⁸⁵ According to the report:

In so far as can be ascertained, there has never been on the station serious outbreaks of diseases which have been directly attributable to the water supply. It may be noted however, that it might have occurred as an epidemic

⁸³ Medical Officer's Annual Sanitary Reports for 1929, 1930, 1931, 1932, and 1936. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence 1930-1950, Box 10, Folder A9-1, "Sanitary Reports."

⁸⁴ Medical Officer's Sanitary Reports for 1935 and 1938. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence 1930-1950, Box 10, Folder A9-1, "Sanitary Reports."

⁸⁵ Officer in Charge, Epidemiology Unit #11, Newport, R.I. letter of 14 Mar 1944 to Medical Officer, First Naval District, Boston, Mass, Subject: Sanitary Survey of U.S. Navy Yard, Portsmouth, N.H., 6. NARA College Park, RG 52, Records of the Bureau of Medicine and Surgery General Correspondence 1842-1951, Box 134, Folder NY/A3-1 to NY2/N33.

of gastro-intestinal upsets not severe enough to incapacitate, among the civilian personnel of the shops w/o coming to the attention of the medical department of the yard.⁸⁶

The next year, a similar survey reported that chemical and bacteriological examinations over the previous year had found “no signs of pollution.”⁸⁷

While pollution was not a problem in May 1944, later in the year the Medical Officer reported that foreign organisms had been observed in the shipyard’s water:

In May and June of this year, “wrigglers” were found in the water from several of the taps in the Yard. . . . A report was received that these microscopic living organisms were larvae of the midge family and were non-pathogenic. The Yard Medical Officer consulted with the Superintendent of the Kittery Water System, who stated that the condition had occurred before and was due to the change in the water at the reservoir and these living organisms come from the bottom layer and are carried through the pipes to the Yard. Because there is no filtration system, he advised flushing all mains in the Yard.⁸⁸

Like so many other aspects of shipyard life during the war, many marginal sanitary conditions were merely inconveniences to be tolerated. The Medical section of this chapter provides a disease history of the yard that is characterized by periodic outbreaks of fevers, sore throats, and stomach aches of vague description. It is possible that, as alluded to in the 1944 Sanitary Report, the shipyard’s water problems caused health issues that were misdiagnosed.

⁸⁶ *Ibid.*, 14.

⁸⁷ First Naval District Medical Officer letter of 9 May 1945 to Commandant First Naval District, Subject: Report of Inspection of Medical Department, U.S. Navy Yard, Portsmouth, N.H. NARA College Park, RG 52, Records of the Bureau of Medicine and Surgery General Correspondence 1842-1951, Box 134, Folder NY/A3-1 to NY2/N33.

⁸⁸ Medical Officer’s Annual Sanitary Report for 1944. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence 1930-1950, Box 10, Folder A9-1, “Sanitary Reports.”

Other Environmental Issues

The diesel powered submarines of the World War II era required the shipyard to process and store large quantities of diesel fuel oil. Fuel oil had to be offloaded from submarines arriving at the yard for overhaul and newly constructed submarines had to be fueled before leaving the yard. Lesser volumes of lubricating oils and gasoline were also required to service the various pieces of shipboard and shipyard machinery. Leakage was more an economic than environmental concern.

The Public Works Officer's annual inspection report for 1947 indicates that during the past year the twenty-four year old #2 fuel storage tank (150,000 barrels capacity) had to be drained to be repaired because it leaked badly. The outside shell had settled 6-8 inches more than the bottom and had pulled the bottom plates at their connection to the shell plates. Repairs were also needed on #1 fuel storage tank (150,000 barrels capacity) because a similar condition existed. The smaller #5 gasoline stowage tank (90,000 gallons capacity) was reported to be in even worse condition and not worth the cost to repair.⁸⁹ Subsequent EPA risk assessment surveys in the 1980s did not identify the site of these tanks for clean-up or further monitoring. The tanks were removed in 1998.⁹⁰

The area that had contained two other oil tanks (Waste Oil Tanks Nos. 6 and 7), used between 1943 and 1989 for the storage of shop waste oils prior to offsite disposal, was designated as a Superfund site when elevated levels of lead and other contaminants

⁸⁹ Public Works Officer memo of 19 May 1947 to Commandant Portsmouth Naval Base, Subject: Report of Annual Inspection, Public Works and Public Utilities. NARA Waltham, RG 181, Portsmouth Naval Base Files, Box 15, Folder L-5, "Inspection Naval Yard, 1945-48."

⁹⁰ *Cultural Resources Survey, Portsmouth Naval Shipyard*, United States Department of Defense, Legacy Resource Management Program, April 2003. Prepared by the Louis Berger Group, Inc. for the Engineering Field Activity Northeast Naval Facilities Engineering Command, 39.

were found during the EPA surveys. The stored waste oils included motor oils, hydraulic oils, transmission oils, and other oils suspected of containing various metals. The tanks were removed in 1989, along with 332 tons of contaminated soil that were excavated and disposed in an approved offsite facility.

Efforts to control mosquitoes on the yard have introduced other environmental issues, some more serious than others. One of the less serious, almost humorous, incidents involved an attempt to control mosquitoes through the stocking of ponds with mosquito-eating fish. In the 1920s, the shipyard's ponds were stocked with goldfish that were purported to devour large populations of mosquitoes. In 1926, further stocking of the ponds with gambusia (generic name of small freshwater fish useful in mosquito control) was under consideration until the Department of Fisheries recommended against it. According to the Department of Fisheries, "As the ponds at the Navy yard have been stocked with goldfish it would be inadvisable to further stock them with gambusia as the former would devour the latter and that furthermore, goldfish tend to keep down mosquitoes."⁹¹

That same year, 1926, Commandant H.W. Osterhaus led an effort to fill lowlands "where water will stand after a rain and where mosquitoes breed rapidly."⁹² The shipyard continued to battle the mosquito problem, as evidenced by the medical officer's annual report of 1930 that cites the problem as a particular nuisance, since the shipyard had

⁹¹ Department of Commerce, Dr E. A. Logan letter of 19 Apr 1926 Subject: Stocking ponds in Portsmouth Navy Yard. NARA Waltham, RG 181, Portsmouth Naval Base Files, Box 15, Folder N1-1, "Grounds1925-39."

⁹² Commandant Portsmouth Navy Yard Rear Admiral H.W. Osterhaus memo of 12 Jun 1926. NARA Waltham, RG 181, Portsmouth Naval Base Files, Box 15, Folder N1-1, "Grounds1925-39."

discontinued the practice of spreading oil on the ponds to discourage breeding.⁹³ What example could better illustrate ignorance towards environmental matters than purposeful oil contamination of ponds to discourage the breeding of mosquitoes?

Numerous mosquitoes and flies were again highlighted in the 1935 report, but the high numbers were considered to be of minor concern because disease rates were low. As late as 1944, a malaria control survey of the shipyard reported that the mosquito population on the yard appeared well under control, due to the continued efforts of a large number of resident goldfish in the yard's ponds:

Mosquito producing areas were not encountered during the course of the survey. The two ponds appeared ideal for mosquito breeding but undoubtedly the mosquitoes are destroyed by the large numbers of goldfish existing there.⁹⁴

The stocking of shipyard ponds with goldfish, which started sometime prior to 1926, continued to be an effective mosquito control practice at the end of World War II.

Towards the end of the war, the use of DDT as an insecticide was increasing in popularity. A *Portsmouth Herald* editorial of 23 October 1945, in discussing the drawbacks of the use of DDT, noted that "it kills honey bees and other good insects,"⁹⁵ with no mention of any harmful effects to human beings. The editorial predicted a "bright future as a gardener's weapon" because it killed many insects, was effective longer than other insecticides, and was less dangerous to handle than other compounds. One wonders

⁹³ Medical Officer's Sanitary Report for 1930. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence 1930-1950, Box 10, Folder A9-1, "Sanitary Reports."

⁹⁴ Lt (MC) J.L. Garey, Epidemiology Unit #42 letter of 24 Sep 1944 to Commandant, First Naval District, Subject: Malaria Control Survey at the U.S. Navy Yard, Portsmouth, N.H. NARA College Park, RG 52, Records of the Bureau of Medicine and Surgery General Correspondence 1842-1951, Box 134, Folder NY/A3-1 to NY2/N33.

⁹⁵ *Portsmouth Herald*, 23 Oct 1945, "DDT in the Garden," 4.

how something that killed honeybees and was not safe, but merely less dangerous than other compounds, could have a bright future in a gardener's tool kit. In 1945, society was beginning to appreciate the need to clean up our rivers and streams, but it would be another fifteen or twenty years before it would begin to awaken to the dangers of insecticides like DDT.

One last example will serve to further illustrate a prewar lack of concern for the environmental consequences of the mishandling of hazardous materials. The example concerns a misplaced emphasis on the need for the careful handling of mercury thermometers. The breakage of mercury thermometers, like diesel oil leakage, was more an economic than environmental concern. An innocuous internal shipyard memo of 15 November 1929 advises of an apparent cost savings as the result of reducing the number of thermometers broken by guards at the main gate bridge who routinely threw tethered thermometers from the bridge to take the daily seawater temperature.

This is to bring your attention to the excessive breakage of water thermometers in use at the main gate, where the guard takes the temperature of the sea water. In years past it has been the practice to fill a bucket with seawater and take the temperature of the water in the bucket. This saves throwing the thermometer overboard from the bridge, thus eliminating danger of breakage.⁹⁶

As with a number of other hazardous materials discussed in this section, the writer's primary concern was cost savings, as the result of reduced thermometer breakage, and

⁹⁶ Memorandum [Believed to be from the Main Gate Security Office] to Captain of the Yard of 15 November 1929. NARA College Park, Waltham, RG 181, PNSY Central Files, Box 26, Folder H15, "Seawater."

certainly not the reduction of mercury contamination in the back channel of the shipyard.⁹⁷

All things considered, Portsmouth Navy Yard was not an environmentally friendly place during the peak production years of World War II. Increased production brought industrial hazards that included acid fumes from pickling operations and airborne dust of unknown chemical composition during the removal of hull paint from foreign submarines. Large land reclamation projects dominated both extremes of Seavey Island, with the incessant noise and confusion that accompany such projects. Raw sewage and industrial waste were dumped into the river or landfills with little or no controls. Sanitary conditions cited as unsatisfactory after the war, in 1950, must have been even worse during peak production years of the war, when shipyard employment was four times greater.

The war effort demanded sacrifices of the yard's patriotic and dedicated workforce, not the least of which was the overlooking of marginal sanitary conditions and occasional wigglers in the water. In retrospect, the shipyard could not have been a very healthy or pleasant place to work during the war. Yet, all the people interviewed in the course of this study were proud of their service at the yard during the war and none voiced any complaints whatsoever about their work environment or any of the conditions described in this study, their focus and priorities being elsewhere.

⁹⁷ Mercury is a toxicant that is easily absorbed through the skin, respiratory, and gastrointestinal tissues. Mercury contaminated foodstuffs are especially harmful to humans, causing reproductive failure, intestinal damage, stomach disruption, DNA alteration, and kidney damage. Mercury contamination can enter the human food chain through large fish that absorb and accumulate mercury in contaminated water. EPA Fact Sheet, EPA-823-F-01-011, June 2001, "Mercury Update on Fish Advisories."

CHAPTER VII

HEALTH CONSEQUENCES

“City’s Venereal Disease Record Shows Improvement . . . due to the alertness of the local police and increased vigilance on their part, Portsmouth has not been named as the source of venereal disease as often as it was previous to the formation of the [Portsmouth Social Protection] committee last spring.”¹

Portsmouth Herald
20 October 1944

The increased population and industrial activity at the yard during the war caused numerous health and medical problems. Comprehensive shipyard records permit confident analysis for some of those issues. For example, monthly shipyard reports on the frequency and severity of accidents, and the shipyard medical officer’s monthly reports on communicable diseases, permit analysis for accident and disease rates and trends. A review of the medical officer’s reports quickly leads one to the conclusion that venereal disease was a rampant problem among enlisted military men at the shipyard during the war. The efforts to control venereal disease took on a life of its own as the shipyard leadership sought local cooperation to eliminate the source of the disease by ridding Portsmouth of prostitution. At the same time, Portsmouth’s civic leaders had considerable difficulty admitting the existence of such a vice in their fair town.

¹ *Portsmouth Herald*, 20 Oct 1944, “City’s Venereal Disease Record Shows Improvement, Report Says,” 1.

Submarine industrial work has historically involved considerable handling of hazardous materials. During World War II, the shipyard routinely processed large quantities of asbestos insulation, lead based paints, lead battery storage cells, mercury gauges and thermometers, various petroleum products, and other hazardous materials. During the war, procedures for the handling and disposal of the industrial waste from these materials were often weak or nonexistent. In most cases, only fragmented and anecdotal evidence exists for the health issues that can be traced to these materials. Although fragmented, this evidence does show how lightly regarded were the long-term effects of some industrial materials that were later determined to be extremely hazardous.

One of the byproducts of the greatly increased industrial activity at the shipyard was increased accident rates. For example, accident rates increased during the early and late years of the war, when the yard workload and workforce were in transition. The yard experienced its highest lost time accident frequency and severity rates in late 1942 when the hiring rate was the steepest and thousands of newly hired employees were being introduced to the industrial hazards of a rapidly expanding shipyard. To the shipyard's credit, the accident rates decreased significantly in the following years as the employees were successfully assimilated into the workforce.

The densely populated shipyard also experienced limited, but noticeably increased, communicable disease rates. The focus of the study of communicable diseases that follows is primarily on shipyard military personnel, as the archives contain comprehensive and quantifiable records for only the military population on the shipyard during the war. Within that cohort, the communicable disease rate rose and fell during the war as dictated, most often, by the latest outbreak of fevers, sore throats, and measles.

The notable exception was the rate of venereal disease which rose throughout the war and peaked dramatically in 1943 and 1944. High rates of venereal disease prompted shipyard leaders to pressure local civic officials to rid the area of prostitutes and increase monitoring of the establishments they frequented. Venereal disease dominated the health concerns of shipyard officials during the war and it also, appropriately, dominates the following study of communicable diseases.

The increased use of asbestos insulation on ships and submarines during the war contributed to an increase of asbestosis among shipyard workers. While Portsmouth Navy Yard was not singled out as one of the shipyards with a high incidence of asbestosis, the yard was included in a 1945 asbestosis study of three navy yards and two private yards. The study included atmosphere surveys of shop and shipboard conditions at each yard that allow analysis of conditions at Portsmouth and comparisons to other yards.

Two other important medical issues, cited in shipyard medical reports during the war, were Vincent's Infection (trench mouth) and Brassfounder's Ague. Trench mouth was detected among visiting foreign submarine crews that had served under extremely unsanitary shipboard conditions. Precautions against the disease included immediate fumigation of foreign submarines upon arrival at the shipyard. Brassfounders ague was an industrial respiratory disease of the era that was all too common to poorly ventilated foundries and metal working shops. This section concludes with a discussion of these two health issues.

Lost Time Accidents

There is little doubt that a rapidly increasing, and inexperienced, workforce contributes to increased accident rates. However, that is by no means the only factor that

increases the frequency of accidents. During the early years of the war, widespread new construction and renovation of buildings and piers, increased numbers of work sites, and the need to reinvent and abbreviate processes to meet accelerated schedules all contributed to unusual and chaotic conditions in the yard that could cause accidents to increase.

The following table summarizes the frequency and severity of lost-time accidents at Portsmouth Navy Yard during the war.

Table 12 – Lost Time Accidents (1942, 1943 & 1944)²

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Frequency												
1942								16.99	13.06	8.16	10.96	8.44
1943	7.82	8.39	7.49	4.54	NA	3.12	4.20	5.88	4.6	5.59	5.49	5.02
1944	6.59	5.47	3.52	9.29	NA	9.04	9.15	8.78	8.29	3.56	10.00	1.80
Severity												
1942								.35	.27	.19	2.19	2.05
1943	.20	.15	.26	.12	NA	.12	.10	.08	.25	.74	.08	7.06
1944	.004	.130	.180	2.11	NA	.14	.06	2.10	.08	2.06	.09	2.09

According to the shipyard medical officer’s annual report for 1942, the number of lost time accidents peaked at 51 in August of that year. The accident frequency (number of lost-time accidents x 1,000,000/ number of employees) and accident severity (days lost / thousand man-hours worked) remained high through the end of the year, as shown in Table 12. The severity rate peaked in November and December 1942 and then dropped

² Table 12 is constructed from data included in the Portsmouth Naval Yard Medical Officer’s Annual Reports for the years 1942 to 1944 to the Commandant. NARA Waltham, RG 181, Naval Station General Correspondence, Box 10, Folder A9-1, “Annual Reports.” When reviewing these numbers for accident frequency and severity, it is well to keep in mind that the frequency of accidents will, in general, be the more consistent number, with smoother transitions from month to month. On the other hand, the severity index is more likely to jump around, from month to month, as it could be heavily influenced by a few very serious accidents that result in many production days lost. The occasional death on the job will spike the severity index and hardly affect the frequency index. For example, the four severity peaks greater than 2.00 in 1944 are attributed to the four deaths due to accidents in 1944. Portsmouth Naval Yard Medical Officer’s Annual Report for the year 1944, 5.

dramatically in January 1943. As the new workforce gained experience and became more familiar with the hazards of the shipyard work environment, the frequency and severity of lost-time accidents continued to decline in 1943.

For the period 1 January 1942 to 1 July 1945, the shipyard reported an average accident frequency rate of 8.05 per million man-hours and a severity rate of 0.468 days lost per thousand man-hours worked.³ The above table shows high accident rates during the latter half of 1942 and 1944, both periods of rapidly changing shipyard employment. Employment was increasing rapidly in late 1942 and decreasing at a similar rate in late 1944. However, as shown in Table 13, the yard's relatively high accident frequency rates during these peak periods (July-December 1942 and July-December 1944) were well below the annual averages reported for Bureau of Ships activities and naval activities in general.⁴

Table 13 - Accident Frequency Rates

Activity	1942	1943	1944	1945
Portsmouth Peaks	5.13 (Jul-Dec)		6.93 (Jul-Dec)	
BuShips Average		15.08	12.55	9.90
All Navy Average		15.35	14.01	10.58

Despite the impressive low accident frequency rates shown in Table 13, the best that can be said about Portsmouth Navy Yard's safety record was that the yard was recognized as

³ *Administrative History: Portsmouth Naval Shipyard in World War II*, Portsmouth Naval Shipyard Museum Archives, Kittery, Me., 42.

⁴ Navy Department (J.L.Bird, Acting Chief Office of Industrial Relations) letter of 16 Aug 1946 to Chief of Bureau of Medicine and Surgery. NARA College Park, RG 52, Records of the Bureau of Medicine and Surgery, Headquarters Records Correspondence 1842-1951, General Correspondence 1942-1946, Box 140, Folder P2-4/LL 1945-1946.

the third best of the nine Navy Yards in 1943 and 1944.⁵ The yard's performance continued to improve, as evidenced by a Bureau of Ships Safety Engineering Survey in August 1945 that noted, "The yard accident frequency and severity rates are well below the rate for all Navy Yards."⁶ However, unlike the Production "E" Awards that the shipyard earned at every opportunity, the yard was less frequently recognized for excellent safety performance.

Venereal Disease

Early in the shipyard's history and up until the 1920s, the annual report of the yard medical officer gave statistical data for the entire shipyard population, including both civilian and military employees. Disease and injury numbers and rates were based on both populations. However, by World War II, that report comprehensively covered only the shipyard military personnel, with occasional discussion of civilian employees on a case basis, or to report unusual circumstances. Consequently, the discussion of disease rates that follows, unless otherwise indicated, is necessarily restricted to the shipyard military population.

Table 14, constructed from the annual reports of the shipyard medical officer, provides annual communicable disease rates for the shipyard military population (enlisted

⁵ *Administrative History: Portsmouth Navy Yard in World War II*, Portsmouth Naval Shipyard Museum Archives, Kittery, Me., 42.

⁶ Bureau of Ships letter of 27 Sep 1945 to Commandant Portsmouth Navy Yard, Subject: Safety Engineering Survey of the U.S. Navy Yard Portsmouth New Hampshire on 14 August 1945. NARA College Park, RG 80, General Records of the Department of the Navy 1798-1947, Formerly Security Classified General Correspondence of the CNO/ Secretary of the Navy , 1940-1947, Box 18, Folder P2-4 (vol 3).

and officers) during the war.⁷ As no cases of venereal disease were reported among the officers during the war years, the venereal disease rates shown are for the enlisted population. The total absence of any cases of venereal disease from the officer ranks is curious and suspect, but one must work with the data available.⁸

Table 14 – Communicable Disease Rates at Portsmouth Navy Yard (1939-44)

	1939	1940	1941	1942	1943	1944
Average monthly SY population	3757	5874	9309	16934	21389	20932
Ave. monthly enlisted military population ⁹	219	327	850	1340	948	900
No. cases communicable diseases (all military)	17	33	64	193	214	219
Venereal Disease Cases (enlisted)	5	11	16	27	65	94
Communicable Rate per 1000 w/VD (all)	4.76	5.61	6.88	11.40	10.00	10.41
Communicable Rate per 1000 w/o VD (all)	3.19	3.75	5.16	9.80	7.20	5.97
VD Rate per 1000 enlisted	22.83	33.6	18.82	17.91	68.56	104.44

Referring to the boxed lines in Table 14, the communicable disease rate per thousand, with VD included, increased from 4.76 in 1939 to 11.40 in 1942 and then held fairly steady at that high rate through 1944. With VD excluded, the communicable disease rate was 3.19 in 1939, peaked at 9.8 in 1943, and dropped to 5.97 in 1944. The specific diseases that contributed to these trends will be analyzed later in this section. The real issue is highlighted by the last row of Table 14, the high incidence of syphilis and

⁷ Portsmouth Naval Yard Medical Officer's Annual Reports for the years 1939 to 1944 to the Commandant. NARA Waltham, RG 181, Naval Station General Correspondence, Box 10, Folder A9-1, "Sanitary Reports."

⁸ In way of explanation of Table 12, the first five rows of the table are as presented in the annual reports, with venereal disease included along with all the other communicable diseases. Consequently, the fifth row labeled "Communicable Rate per 1000 w/VD (all)" is heavily skewed by the increasingly high percentage of VD, compared to the other communicable diseases. The last two rows are constructions by the author to separate venereal disease rates from the other communicable diseases rates to give a more accurate representation of each. The total shipyard population figures that include employees, relief workers, and military personnel are provided to show how relatively small the enlisted population was compared to the total shipyard population.

⁹ The enlisted military population includes all the enlisted men serviced by the Portsmouth Navy Yard hospital. This population consists of the enlisted men assigned to the navy yard and the crews of submarines that were in the yard at the time.

gonorrhoea among enlisted men during the war. The next several pages of this study address that issue.

The VD rates for enlisted personnel were high throughout the war years, with huge increases in 1943 (68.56) and 1944 (104.44). Portsmouth Navy Yard's VD rate of 104.44 per thousand late in 1944 was higher than the rates experienced navy-wide at the close of the war. A post-war Bureau of Medicine and Surgery letter noted that, "Within the past few months there has been a gradual lowering of the venereal disease rates [for the overall navy] to 95.8 per thousand per annum. However, this rate is still much greater than at the close of the war."¹⁰ The Navy's venereal disease rate was apparently higher than that of the Army. According to historian Alan M. Brandt:

Although in 1940 the venereal disease rate in the Army had risen to 42.5 per 1000, by 1943 it had fallen to 25. . . In fact, Army data for rates of infection within the military were essentially equivalent to civilian rates. For the entire duration of the war the average incidence of venereal disease was 37 per 1000.¹¹

Thus, the incidence of venereal disease at the Portsmouth Navy Yard during the early years of the war was lower than the national average while the rates at the end of the war were considerably above the national average. The shipyard's annual medical reports attribute the high rate of venereal disease to the prevalence of prostitution in the Portsmouth area. The report for 1944 notes that shipyard officials were working with

¹⁰ Bureau of Medicine and Surgery Circular Letter No.47-88 of 30 Jun 1947 to Commandants, All Naval District and River Commands, Subject: Venereal Disease Control Officers and Interviewers. NARA Waltham, RG 181, Portsmouth Naval Shipyard General Correspondence (Central Files), 1925-50, Box 8, Folder A2-11/EN10 "Bureau of Medicine and Surgery."

¹¹ Allan M. Brandt, *No Magic Bullet: A Social History of Venereal Disease in the United States Since 1880* (New York: Oxford University Press, 1987), 170.

civilian authorities to reduce the number of prostitutes in the local area. This effort met with limited success.

Portsmouth officials did not agree that their city was overrun with prostitutes. In fact, they went to great lengths to dispute early rumors to that effect. In November 1942, the chairman of the Portsmouth Board of Health, Dr. George A. Tredick, in a reply to an attorney's claim that Portsmouth was "overrun by vice and venereal disease,"¹² declared that "Portsmouth has no noticeable increase in prostitution or venereal disease."¹³ Dr. Tredick added, "Portsmouth does not live up to reputation visiting speakers have recently tried to give it of being a den of iniquity due to the influx of defense workers and men in the armed services."¹⁴ The high VD rates shown on the last line of Table 14 argued to the contrary.

By June 1943, the city was more accepting of the high venereal disease rates. The *Portsmouth Herald* headline of 9 June 1943 reported, "Portsmouth police act to smash vice rackets." The associated article noted that Army, Navy, and State Board of Health officials had reported that vice conditions, and the venereal disease rate, had recently increased substantially in Portsmouth. Navy doctors had reported that "There are more cases of venereal disease in the city now [during the first five months of 1943] than records show for all of last year." The smashing of vice rackets reportedly involved routine inspections of beer parlors where the prostitutes congregated to meet enlisted

¹² According to the *Portsmouth Herald*, 10 Nov. 1942, 1, Atty. Stanley Burns of Dover had told the Catholic Daughters of America, at a 4 Oct. 1942 meeting, that prostitution is being practiced indiscriminately in Portsmouth and that "Portsmouth police are trying to get rid of the menace of professional prostitutes but the job is too great for them in view of the tremendous increase in Portsmouth population."

¹³ *Portsmouth Herald*, 10 Nov. 1942, "Health Board Head Denies Portsmouth Overrun by Vice," 1.

¹⁴ *Ibid.*

men. Apparently, vice smashing also meant raiding homes and bedrooms because the next month the *Herald* reported that, "Two sailors and two Portsmouth girls were found guilty in municipal court this morning of a morals charge in the second vice case heard in the local court in less than a month."¹⁵ Slowly, but surely, the community was beginning to acknowledge to the problem. The *Portsmouth Herald* came close to admitting a Portsmouth prostitution problem, in June 1943, when it described some of the female visitors to beer parlors as "women who are involved with vice rackets here and who may be carriers of venereal disease."¹⁶

When Army and Navy doctors continued to raise concerns about the local prostitution problem, city officials and the local newspaper redefined the problem in more benign terms. The venereal disease problem was attributed, not to prostitutes, but to large numbers of young females, many local adolescents, who frequented the bars to meet servicemen. This explanation suggested that Portsmouth's problem was more associated with patriotism than prostitution. Portsmouth's "Girl Problem" will be explored in considerable detail later in this study, under a discussion of the community consequences of the population explosion. Suffice it to say, at this point, that the requests of shipyard medical officers for community assistance to solve the rampant venereal disease problem among shipyard enlisted men were met initially with a definite lack of enthusiasm and cooperation.

¹⁵ *Ibid.*, 7 Jul 1943, "Two Couples Found Guilty in Vice Case," 1.

¹⁶ *Portsmouth Herald*, 9 Jun 1943, "Beer Parlors to Undergo Inspections," 1.

According to shipyard medical reports, the dramatic increase in the number of VD cases, reported in 1943 (65) and 1944 (94), may be artificially inflated. Those reports attribute the high numbers, in 1943 and 1944, to the increased availability and effectiveness of penicillin as a treatment at the shipyard hospital. After experimenting with the drug in 1943, the shipyard hospital received its first million units of penicillin on 4 January 1944.¹⁷ Prior to the advent of penicillin, treatment of VD at the shipyard hospital required a period of hospitalization for which the men did not receive pay. Consequently, it was suspected that the enlisted men sought treatment elsewhere to avoid a loss of pay. This reasoning, of course, would also argue that the rates earlier in the war were artificially lower than reported if the sailors were seeking off-yard treatment.

The shipyard hospital was one of the first medical facilities to receive penicillin shipments. In early 1943, penicillin was being given experimentally to syphilitic rabbits. By September 1943, the U.S. Public Health Service announced successful results with humans and mass production of the antibiotic was underway shortly thereafter. Within a year, more than 10,000 patients had received penicillin for treatment of early syphilis and rates of cure were an unprecedented 90 to 97 percent. Portsmouth Navy Yard sailors were among the first to benefit from that remarkable success rate.¹⁸

The medical officer believed that, once penicillin was available, and patients could be treated without the need for overnight stays and lost pay, “those cases which were formerly treated by the outside practitioner are now reporting to the naval medical

¹⁷ *Administrative History: Portsmouth Navy Yard in World War II*, Portsmouth Naval Shipyard Museum Archives, Kittery, Me., 86.

¹⁸ Allan M. Brandt, *No Magic Bullet: A Social History of Venereal Disease in the United States Since 1880* (New York: Oxford University Press, 1987) 170-171.

officer for treatment.”¹⁹ The avoidance of lost pay was obviously a good reason to seek free treatment at the shipyard hospital, but the medical officer suspected another contributing factor. He also believed that the apparent effectiveness of penicillin created “a false sense of security” that caused “a lack of restraint and carelessness regarding prompt prophylaxis,” that contributed to even more VD and the need for more penicillin. Ironically, the cure was increasing the rate of the disease.

Some argued that the no-pay provision was an effective deterrent to the spreading of the disease, but other military officers increasingly argued that the no-pay provision led to concealment of the disease, clandestine treatment, and possible serious consequences. One report noted that “Pilots were found to be continuing to fly while taking [clandestine] treatment, a considerable risk.”²⁰ Congress put an end to the debate in September 1944 by repealing the law that required loss of pay for time hospitalized for treatment for venereal disease.²¹

Venereal disease had a clandestine history in the city of Portsmouth. Despite an 1883 law that required the Board of Health to report disease statistics, it was not until 1918 that syphilis and gonorrhea were listed in the city’s reports. According to a local medical history:

Perhaps the increased activity at the Navy Yard during the First World War had seriously increased the incidence of those previously unmentionable diseases or

¹⁹ Portsmouth Naval Yard Medical Officer’s Annual Report for 1942 of 19 Jan 1943, to the Commandant, 4. NARA Waltham, RG 181, Naval Base General Correspondence, Box 10, Folder A9-1, Sanitary Reports.”

²⁰ Alan M. Brandt, *No Magic Bullet*, ” 169.

²¹ *Ibid.*

perhaps the Board of Health had merely suppressed them from earlier published reports to spare the public's sensibilities.²²

During World War II, increased activity at the shipyard would once again increase the incidence of the unmentionable disease and challenge the public's sensibilities.

There are a number of indicators that venereal disease was more prevalent in the local community during the war than admitted at the time by local leaders. For example, the Portsmouth Health and Welfare Survey, dated August 1943, summarized diseases reported in Portsmouth from September 1941 to September 1942 as communicable (174), occupational (5), and venereal (34).²³ If one assumes that the 34 cases of venereal disease occurred among males in the 15 to 25 years of age group and that the group included about 2000 people in 1942,²⁴ a venereal disease rate of 17 per thousand results.²⁵ This rate closely approximated the VD rate in the navy yard (17.9) for the same period (1942). This is, at best, a rough approximation, but it is an indicator that venereal disease was probably a significant local health issue in late 1942, when it was also the most serious health concern at the shipyard.

Another section of the Portsmouth Health and Welfare Survey (1943) permits further analysis of Portsmouth's VD problem:

²² J. Worth Estes and David M. Goodman. *The Changing Humors of Portsmouth: The Medical Biography of an American Town, 1623-1983*. Boston: The Francis A. Countway Library of Medicine, 1984.

²³ "Survey of Health and Welfare in the Portsmouth Defense Area." Cumings Library, Strawbery Banke Museum, Portsmouth, N.H., Box 2, Folder 14, Table 9 "Diseases in Portsmouth from September 1941-September 1942."

²⁴ *Ibid.*, Table 11, "Portsmouth Defense Area Population - Age."

²⁵ The reported 34 cases of venereal disease are not defined by gender. The navy yard cohort was all young males. Also, as noted earlier, some enlisted men may have sought treatment at a civilian facility to avoid the confinement and loss of pay that resulted when treated at the navy yard.

For a two-year period, 1941 and 1942 (Oct. 15, 1942), the syphilis rate for the white population, on the basis of actual blood tests and not on a total population, was 1.8 percent [18 per thousand]. None was reported for the negro population.²⁶

Again, the rate of 18 per thousand is almost identical to the navy yard rate of 17.9 for 1942.

Penicillin was available much earlier at the navy yard than in the local civilian community. Whereas the navy yard received its first shipments of the drug in January 1944, penicillin was first used in Portsmouth in the fall of 1944. On 24 March 1945, the *Portsmouth Herald* reported that, "A total of 126 patients in 43 different disease classifications have been treated with penicillin at Portsmouth hospital during the past 10 months, from the time when the drug first was distributed in small quantities on a quota basis, until March 15, when it became available for general civilian use."²⁷ The article further explained that penicillin had been a most effective medicine in treating such diseases as pneumonia, cellulitis, and meningitis, but not others. It is interesting to note that, across the river in the navy yard, penicillin was the miracle drug of choice for the treatment of venereal disease, but no mention was made of penicillin being used as a treatment for venereal disease at the Portsmouth Hospital.

Finally, the frequency of venereal disease clinics at the Portsmouth General Hospital is further evidence of community concern. In August 1943, a venereal disease clinic was the only weekly disease clinic held at the hospital. As a comparison, the only

²⁶ "Survey of Health and Welfare in the Portsmouth Defense Area," 52. Cumings Library, Strawberry Banke Museum, Portsmouth, N.H., Box 2, Folder 14, Table 9 "Diseases in Portsmouth from September 1941-September 1942."

²⁷ *Portsmouth Herald*, 24 Mar 1945, "126 Patients Make Use of Penicillin in 10 Months at Portsmouth Hospital," 1.

other disease clinics were tuberculosis and cancer clinics that were held twice a month.²⁸

The hospital would not have held weekly venereal disease clinics without the customer base to support such a frequency.

Other Communicable Diseases

Venereal Disease was not the only communicable disease with a strong track record during the war. Table 15 shows that a large number of cases of irritating nose and throat symptoms were diagnosed and treated as catarrhal fever and tonsillitis during the war.

Table 15 – Most Common Communicable Diseases at PNY (1939-1944)

	1939	1940	1941	1942	1943	1944
Catarrhal Fever	14	15	40	99	94	64
Tonsillitis	1	4	6	22	36	36
German measles	0	0	0	25	15	0

An outbreak of German measles in 1942 and 1943 also contributed to increased rates of communicable diseases.²⁹ It was noted earlier that Portsmouth General Hospital recorded 174 cases of communicable diseases between September 1941 and September 1942.

According to that report, “Most of these cases were measles and German measles.”³⁰

Early in the war, when New Hampshire coastal observers were on guard for German ships, German submarines, and a possible German invasion, it was only German measles that managed to sweep through the area.

²⁸ *Ibid.*, 48.

²⁹ Portsmouth Naval Yard Medical Officer’s Annual Report for 1942 to the Commandant of 19 Jan 1943, 4. NARA Waltham, RG 181, Naval Station General Correspondence, Box 10, Folder A9-1, “Sanitary Reports.”

³⁰ Survey of Health and Welfare in the Portsmouth Defense Area, Table 9. Cummings Library, Strawberry Banke Museum, Portsmouth, N.H., Box 2, Folder 14, Table 9 “Diseases in Portsmouth from September 1941-September 1942.”

Finally, in December 1943, the local area, and most of the nation, experienced a flu epidemic. The *Portsmouth Herald* reported on 16 December 1943 that, "Portsmouth is adding many of its residents to the nationwide sick list of 1,000,000 influenza victims."³¹ It is more than likely that many of the fevers and sore throats reported at the shipyard dispensary in 1943 and 1944 could have equally been diagnosed as flu symptoms. The thousands of employees that commuted daily to and from the shipyard undoubtedly helped spread measles, flu, and other communicable diseases.

Asbestosis

In February 1945, the Bureau of Ships, responding to a Bath Iron Works report that several shipyard workers had asbestosis symptoms, requested that the Bureau of Medicine and Surgery investigate allegations that asbestos operations in navy yards might be an occupational hazard.³² In response to that request, the Chief of the Bureau of Medicine and Surgery, Vice Admiral Ross T. McIntire, minimized the hazards of asbestos operations at navy yards. McIntire wrote:

Reports of chest x-rays, which have been made of employees engaged in handling, processing, and applying asbestos to pipe in Boston and Bremerton Navy Yards do not indicate any diseases of the lungs from exposure to asbestos. Repeated observations by personnel of the Yard Safety and Industrial Health Departments indicate that the exposure of civilian employees in U.S. Navy Yards to asbestos do not form an occupational problem as alleged.³³

³¹ *Portsmouth Herald*, 16 December 1943, "Portsmouth Hit by Flu; Many Sick," 1.

³² Bureau of Ships letter of 24 Feb 1945 to the Bureau of Medicine and Surgery, Subject: Industrial Health and Safety Survey Concerning Asbestos. NARA College Park, RG 19, Bureau of Ships General Correspondence 1940-1945, Box 18, Folder P2-4 (vol. 3).

³³ Chief of the Bureau of Medicine and Surgery Vice Admiral Ross T. McIntire letter of 8 Mar 1945. NARA College Park, RG 19, Bureau of Ships General Correspondence 1940-1945, Box 18, Folder P2-4 (vol. 3).

The minimizing of the occupational hazards of exposure to asbestos by the U.S. Navy Bureau of Medicine and Surgery in 1945 appears to have been premature.

Further review of shipyard asbestos operations was conducted over the summer of 1945 under the leadership of Dr. Philip Drinker, Chief Health Consultant, U.S. Maritime Commission. The results of that study showed a similar disturbing lack of knowledge about the health hazards of working with asbestos. Drinker's study concluded that "This work [asbestos pipe covering], as found in our Navy Yards, is most unlikely to cause ill health."³⁴ The study claimed that previous asbestos studies had shown that "Asbestosis results from breathing asbestos fibers of relatively long lengths such as 15 to 75 microns [and] it is not caused by chopped up asbestos fibers of one or two microns." With shop air samples showing low percentages of long asbestos fibers and only 3 of 1074 employee lung x-rays showing asbestosis markings, the study pronounced that, "Asbestos covering is a relatively safe operation."³⁵

In retrospect, the study obviously looked at too short an exposure period and was too reliant on lung x-ray markings to draw valid conclusions about the dangers of asbestos exposure. Asbestos had only been used on ships and submarines about 15 years when the Drinker Report was published in 1945. According to the Occupational Safety and Health Administration, "The effects of long-term exposure to asbestos typically don't show up until 20 to 30 years after initial exposure."³⁶ Obviously, the Drinker Report

³⁴ Phillip Drinker, Chief Health Consultant, U.S. Maritime Commission letter of 21 Sep 1945 to Bureau of Ships forwarding enclosure (1), A Health Survey of Pipe Covering Operations in Constructing Naval Vessel. NARA College Park, RG 19, Bureau of Ships General Correspondence 1940-1945, Box 18, Folder P2-4 (vol. 3).

³⁵ *Ibid.*

³⁶ <http://www.osha.gov/SLTC/asbestos/index.html>. U.S. Department of Labor, OSHA website.

detected the most severe cases of asbestosis. Had the study been done fifteen years later, of the same workers, more asbestosis would probably have been found.

According to the Drinker Study, the use of asbestos for pipe and machinery insulation in the shipbuilding industry grew consistently throughout the 1930s, and peaked immediately prior to World War II with the accelerated shipbuilding programs. Asbestos blocks and blankets to insulate steam turbines and other machinery had been in use prior to 1930, but it was the development of asbestos felts and cements that could be applied to valves, fittings, and piping that greatly expanded its use during the 1930s. The material's low thermal conductivity, strength, and light weight made it an attractive shipbuilding material. High temperature asbestos pipe coverings, weighing 18 pounds per cubic foot, replaced previous magnesia insulators that weighed 26 pounds per cubic foot. Furthermore, the lower thermal conductivity of asbestos meant that less of it had to be used than previous insulators.

Weight savings, always a critical concern in shipbuilding design for reasons of stability and cargo carrying capacity, was even more of a concern in the 1930s because of the tonnage limitations of the various naval treaties.³⁷ With United States naval construction restricted to treaty tonnage limitations, the greater than thirty percent weight savings that resulted from the use of asbestos insulation on piping systems throughout the ship, was a significant advantage to the U.S. Navy. In addition, fire resistant asbestos insulations proved to be a good replacement for the flammable, and sometimes vermin infested, animal hair insulations that had been previously used on cold water pipes to

³⁷ *Ibid.*

reduce sweating. The end result was a rapid growth in the use of asbestos in the shipbuilding industries during the latter half of the 1930s. The naval shipbuilding boom during the mobilization for World War II greatly expanded the demand for the material, and the potential for increased asbestosis among shipyard workers.³⁸

The Drinker Study conclusions were based on a survey of the asbestos operations at Boston and Brooklyn Navy Yards and two private yards, Bethlehem Fore River and New York Shipbuilding. The survey included atmospheric sampling of shop ventilation for dust count and chemical content, and a review of the medical records of over one thousand workers at those yards. The survey also included a review of shop dust exposure data provided by Portsmouth Navy Yard. No on-site visits were made to Portsmouth and no Portsmouth employee medical records were reviewed. The study does, however, permit comparisons of Portsmouth asbestos shop and shipboard operations with the other yards surveyed.

The Drinker Study showed that the Portsmouth Navy Yard asbestos operation was small in comparison to the other yards surveyed. Portsmouth had only 5 asbestos shop workers and 35 shipboard workers, whereas Brooklyn Navy Yard had 50 shop and 700 shipboard employees and Boston Navy Yard had 34 shop and 467 shipboard employees. Portsmouth used only 2000 cubic feet of amosite [the generic name for the asbestos fiber] each month and Brooklyn and Boston used over 50,000 cubic feet of the material. Similarly, Portsmouth used 120 pounds of asbestos cement monthly and the other Brooklyn and Boston used 38,800 and 34,400 pounds respectively. Simple division shows that the 40 Portsmouth asbestos workers were exposed to an average of 50 pounds

³⁸ *Ibid.*

of asbestos fiber per month, whereas the Brooklyn and Boston asbestos workers were exposed to 66.7 and 99.8 pounds per month respectively. This one indicator suggests that Portsmouth workers were less exposed to asbestos than those in other yards surveyed.

Overall dust surveys show that the Portsmouth asbestos shop and ship atmospheres were significantly cleaner than the other two yards. However, long fiber asbestos surveys found Brooklyn to be the most contaminated yard, Boston the least contaminated, and Portsmouth somewhere in between the two. Table 16 shows total dust and asbestos (long fiber) dust counts for the three navy yards included in the Drinker Study:

Table 16 - Drinker Study Asbestos Shop Dust Counts

	Boston		Brooklyn		Portsmouth	
	Total	Asbestos	Total	Asbestos	Total	Asbestos
Shop Atmosphere	30	.26	26.9	1.0	6.9	1.0
Ship Atmosphere	142	.02	128	2.8	11.9	0.3

The total dust count on board ships, in the other two yards, is over ten times greater than that at Portsmouth. Shop dust counts were about four times greater at the other two yards. The extremely clean shipboard environment on submarines was probably more the product of the procedures applied to the overall submarine work environment than any special precautions for asbestos workers. Workers in the confined work spaces and tanks of submarines could not tolerate very dusty or otherwise contaminated atmospheric conditions.

Despite the superior overall cleanliness conditions, the prevalence of long fiber asbestos dust in the shops was greatest at the Portsmouth and Brooklyn Navy Yards and lowest at Boston. Thus, the study suggests, the asbestos shop workers at Portsmouth

Navy Yard were equally at risk for asbestosis as workers at the other yards. Knowing that, it is discouraging to note that the study reported that, of the forty Portsmouth asbestos workers, only the band saw operator wore a respirator. The study also noted a lack of shop ventilation fans. One small exhaust fan was used at the cementing station and all other ventilation was natural.³⁹

The Drinker Study deemed the asbestos operations at all three yards to be acceptable and safe. With such reassurances from the highest levels of the U.S. Navy, concern at Portsmouth Navy Yard and most other shipyards, for the dangers of asbestos, was low and precautions were few. This would change dramatically in years to come.

Other Industrial Diseases

The early visits of foreign submarines to Portsmouth Navy Yard, in the summer of 1941, contributed a few cases of Vincent's infection (trench mouth). Trench mouth is a severe form of gingivitis most often found among populations with poor nutrition and living conditions. According to the shipyard medical officer, "During the past year [1941], several co-belligerent submarines have put in for repair. . . To date, the only problems were several cases of Vincent's Infection which were promptly isolated and treated."⁴⁰ Vincent's Infection was also found among the crew members of the German U-boats that were brought to the yard in the summer of 1945.

Wartime sanitary conditions on the foreign submarines were far below the standards of U.S. submarines. According to Fred White, those submarines had an unusually high content of interior wood, compared to U.S. submarines, and the wood

³⁹ *Ibid.*

⁴⁰ Medical Officer's Sanitary Report for 1941. Held At NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence 1930-1950, Box 10, Folder A9-1, "Sanitary Reports."

often proved to be a breeding haven for roaches and occasional vermin.⁴¹ White remembered the German submarines that were impounded at the shipyard at the conclusion of the war as being especially unsanitary. The medical officer's report confirmed his observation, "During the period from 15 May 1945 to 5 June 1945, four surrendered German U-boats were inspected and, in each case, fumigation with carbonoxide gas was recommended [and accomplished]."⁴² The maintenance of satisfactory sanitary conditions onboard a submarine is always a challenge. Under wartime conditions, it obviously assumed an even lower priority. In this regard, the submarines had something in common with the shipyard and local communities bordering the Piscataqua River, which also sacrificed cleanliness for production.

In 1937, six cases of "brassfounder's ague" occurred in the foundry in Building No. 75. According to the shipyard's annual sanitary report:

These cases were typical text book pictures (chills, considerable elevation of temperature, and sweating with prostration). They were of moderate severity, lasting from 12 to 24 hours. The probable cause was that brass casting had increased six times the volume of the previous year with the necessary increase in personnel and with insufficient ventilation to care for the furnaces in cold weather.⁴³

The report goes on to say that the ague problem was eliminated with the installation of several exhaust blowers. Brassfounder's ague appears to have been another accepted hazard of the trade, as the report also mentioned that the problem had occurred from

⁴¹ Oral interview with Fred White, 3 April 2006, at his home in New Castle, N.H.

⁴² Medical Officer's Sanitary Report for 1945. Held At NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence 1930-1950, Box 10, Folder A9-1, "Sanitary Reports."

⁴³ Medical Officer's Sanitary Report for 1937. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence 1930-1950, Box 10, Folder A9-1, "Sanitary Reports."

“time to time” in previous years. Yet, it took another outbreak of the disease to cause the installation of a few fans.

By 1941, the foundry had been moved to Building No. 96, which also had ventilation problems that were noted in the Medical Officer’s annual report. He reported that, “under certain climatic conditions, when manganese or zinc is being melted, excessive fumes and smoke results and therefore menaces health.”⁴⁴ These foundry conditions, reported in 1941, were highly conducive to brassfounder’s ague, yet there is no specific mention of the disease. It is highly possible that the high fevers that passed in less than a day could have been misdiagnosed as symptoms of a more common disease.

Health and medical consequences accompanied the shipyard population explosion, and increased pace of industrial operations, during the war. To the shipyard’s credit, the increased accident rates that often characterize periods of extreme industrial employment and workload transitions were quickly stabilized and brought under control. Less successful were the efforts of shipyard medical officials to control the alarming rise in venereal disease among shipyard enlisted men. Much of this lack of success is attributed to reluctance on the part of Portsmouth civic leaders to take decisive action to rid the city of prostitutes. Although not readily acknowledged at the time, the community venereal disease rate was also high. Other communicable disease rates during the war varied with the latest outbreak of fevers, sore throats, or measles, and were often shared across shipyard and local community boundaries. Asbestos was not a significant health issue at the yard during the war. However, shop and shipboard conditions were rife for

⁴⁴ Medical Officer’s Sanitary Report for 1941. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence 1930-1950, Box 10, Folder A9-1, “Sanitary Reports.”

future asbestosis problems and precautions against such problems were few. Other medical byproducts of the increased activity at the yard during the war included trench mouth, attributed to the unsanitary conditions found on visiting foreign submarines, and brassfounder's ague due to increased foundry and metal ship operations.

CHAPTER VIII

COMMUNITY CONSEQUENCES

“Thus what was basically a prosperous New England port [Portsmouth], steeped in history and thriving as a summer resort, has been transformed swiftly into a war-production area with the only newcomers being yard workers, soldiers, and sailors. There is no one in the city whose life has not been altered by the transformation.”¹

**Milton Bracker
New York Times
5 October 1942**

Discussing the effects of wartime mobilization, *Portsmouth Herald* reporter Franklin E. Jordan wrote, “It is no exaggeration to state that Portsmouth now has the greatest problem in its 318 year history and that its future for the next 318 years will be affected by the way the problem is handled.”² One might assume that Jordan was writing near the end of World War II, after the city had experienced a tremendous population boom, with concerns about how the city would adjust to the postwar era. This was not the case. Jordan wrote of the greatest problem in the city’s history in the summer of 1941, four months before the attack on Pearl Harbor.

Portsmouth’s World War I experience was fresh in the minds of Jordan and many of Portsmouth’s civic leaders on the eve of World War II. During and after World War I,

¹ Milton Bracker, “Portsmouth Tries to Adjust to an Influx of Men and Money,” *The New York Times*, 5 Oct 1942, 1, 10.

² Franklin E. Jordan, “Portsmouth and National Defense,” 5. A series of 13 articles that appeared in the *Portsmouth Herald* in the summer of 1941 that were compiled and published by J.D. Hartford of the *Portsmouth Herald* on 1 August 1941. Cummings Library, Strawberry Banke Museum, Portsmouth, N.H., MS 96, Box 2, Folder 1, “State Council of Defense, Local Committees: Portsmouth.”

the city had struggled with a number of issues as the result of expanded operations at the yard, including a postwar economic recession. The city's infrastructure and services had been challenged when the population had increased from 11,269 to 13,569 during the war.³ At the same time, the local economy had benefited from the increased population and industrial activity. The end of the Great War brought employment reductions at the yard and an economic recession to the area. In the summer of 1941, when Jordan wrote his article, the shipyard employment had grown from 5,722 to 8,500 in a year and was still climbing rapidly. Who knew what problems the community would face if the shipyard grew to 15,000 or 20,000 employees, which it eventually did?

Jordan's primary concern was the aftermath of the anticipated home building, infrastructure development, and the increase in municipal services that would accompany the forthcoming population boom. How could the city financially support and maintain the new Portsmouth after the war, when the inevitable shipyard cutbacks occurred and federal funds were curtailed? Jordan conducted a comprehensive analysis of how the approaching mobilization, and the peace to follow, would affect the city's utilities, schools, hospitals, police and fire protection, government, recreational facilities, and other resources. Jordan concluded that, "Relief will be the greatest problem in a postwar depression."⁴ Thus, even before World War II began, recent memories of the Great Depression, and the belief that another postwar recession was inevitable, caused Portsmouth leaders to fret about the peace that would follow the war that was yet to start.

³ *Ibid.*, Table 1.

⁴ *Ibid.*, 84.

The greatly expanded operations at the Portsmouth Navy Yard during World War II did bring the population and economic booms that Jordan had predicted. Also, as predicted, the area was transformed and its future was largely determined by the wartime mobilization. The early stages of that transformation were the subject of an article in the *New York Times*, dated 5 October 1942, entitled "Portsmouth Tries to Adjust to an Influx of Men and Money." The article described the rapid growth in the Portsmouth Navy Yard's employment and payroll and the difference that both had made to Portsmouth's economy and quality of life:

Thus what was basically a prosperous New England port, steeped in history and thriving as a summer resort, has been transformed swiftly into a war-production area with the only newcomers being yard workers, soldiers, and sailors. There is no one in the city whose life has not been altered by the transformation.⁵

The transformation of Portsmouth included many challenging problems and unusual opportunities.

Population explosions, overloaded community services, deteriorated living conditions, and environmental impact due to accelerated shipbuilding programs were by no means unique to the Portsmouth Navy Yard and its environs during the war. Indeed, many communities throughout the United States had similar, and often more challenging, experiences than Portsmouth. According to historian Frederick C. Lane, "From the point of view of living conditions offered the workers, shipyards may be divided into two groups: those in or near metropolitan centers equipped to handle a large population, and those placed in what had been mere towns or very small cities."⁶ As implied, living

⁵ Milton Bracker, "Portsmouth Tries to Adjust to an Influx of Men and Money," *The New York Times*, 5 Oct 1942.

⁶ Frederick C. Lane, *Ships for Victory*, 437.

conditions were often marginal, at best, in the small towns that had exploded in population with the construction or expansion of a nearby shipyard. Lane cites Panama City, Florida, Pascagoula, Mississippi, and, to some extent, Mobile, Alabama as prime examples of those situations. Portsmouth, New Hampshire also fits the definition of a small wartime boomtown.

Pascagoula grew from 4,000 residents before the war to 30,000 in 1944. Likewise, Panama City grew from 20,000 to 60,000 in 1943. Mobile increased population from 114,000 in 1940 to 201,369 in 1943. Describing the deteriorated living conditions that accompanied the prefabricated housing quickly constructed in Pascagoula, Lane says, "They formed a community without adequate sewerage, stores, or pavements. . . Garbage stood in the streets and the town was overrun with rats." Similarly, in Mobile:

Some couples located places with cooking facilities, but if they had children they usually ended up in a tent, a trailer, or a shack. . . Sewers were desperately needed. . . The war was almost over before Mobile caught up with itself and, in the meantime the discontent of the workers with their living conditions had been expressed in "quits," in absenteeism, and even in strikes.⁷

The living conditions in Richmond, California were not any better:

Fire protection was woefully inadequate. There were not sufficient hospital beds nor doctors to care for the sick. The water supply was inadequate. . . Schools were overcrowded. . . Juvenile delinquency rose to alarming proportions.⁸

Suffice it to say that the population boom (25,029 to 35,293),⁹ experienced by Portsmouth, and its contiguous towns, defined for this study as Eliot, Greenland, Kittery,

⁷ *Ibid.*, 437-441.

⁸ *Ibid.*, 444.

⁹ Franklin E. Jordan, "Portsmouth and National Defense," Table 1. The population figures are for 1940 and 1943.

New Castle, Newington, Portsmouth, and Rye, during the war pales in comparison to the population booms experienced by other shipyard communities. Similarly, the wartime challenges and deteriorated living conditions experienced by Portsmouth residents, while extreme to local standards and previous experiences, were less severe than those found in other shipyard boomtowns.

Wayne Bonnett's *Build Ships! San Francisco Wartime Shipbuilding Photographs* tells a story not unlike much of this study. According to Bonnett, shipyards in the San Francisco Bay area also produced ships at a remarkable rate during World War II. Mare Island Navy Yard alone produced 17 submarines, 4 submarine tenders, 31 destroyer escorts, 33 small craft and more than 300 landing craft.¹⁰ Here too, civic and shipyard leaders in the San Francisco Bay area faced more serious sociological problems than their counterparts in the Portsmouth area. According to Bonnett:

In addition to delivering ships on schedule, shipyard management had to participate in dealing with labor unions and subcontractors, crime in shipyard boomtown and racial and gender conflicts. Problems naturally arose, breakdowns and accidents occurred, mistakes were made.¹¹

Portsmouth Navy Yard managers had relatively few problems in their dealings with labor unions and subcontractors. In addition, racial and gender conflicts were much less noticeable and crime in boomtown Portsmouth, N.H. was pretty much limited to the vice of prostitution and the frequent arrests of disorderly servicemen. While the criminal activity in the Portsmouth area was apparently less serious than that found in West Coast

¹⁰ <http://www.cr.nps.gov/nr/travel/wwIIbayarea/mar.htm>. "Mare Island Naval Shipyard: World War II in the San Francisco Bay Area." This site is an essay excerpted from Wayne Bonnet, *Build Ships! San Francisco Wartime Shipbuilding Photographs* (Windgate Press: Sausalito, CA, 2000).

¹¹ <http://www.cr.nps.gov/nr/travel/wwIIbayarea/shipbuilding.htm>. "World War II Shipbuilding in the San Francisco Bay Area," 3.

boomtowns, the impact of that activity on a previously tranquil New England town was significant.

Frederick C. Lane notes that the population of Richmond, California mushroomed from 23,000 in 1940 to 100,000 in 1943, including an African American population that rose from 400 to about 14,000. Lane says that, “Workers came from all over the Midwest and Southwest – the Okies, Arkies, and Texans were most evident.”¹² The wartime workers that migrated into the Portsmouth area traveled much shorter distances and represented much less ethnic diversity. In fact, many relocated from other New England towns to the area, or merely commuted long distances from hometowns in New Hampshire, Maine, and Massachusetts that were within the reach of the shipyard, once the far reaching bus service was implemented. In addition, the influx of Portsmouth workers added relatively few minorities to an area that already had a small percentage of minorities. Consequently, the potential for racial conflict was minimal.

Puget Sound also produced ships at a remarkable rate during the war and shared many of the same wartime experiences as Portsmouth and the Bay Area. Puget Sound Navy Yard built 19 major ships including 8 destroyers, 8 destroyer escorts, 5 escort aircraft carriers, and other vessels. Puget Sound’s primary role, however, was the repair of battle damaged ships in the Pacific theater. According to a local history of the Puget Sound area:

Labor shortages replaced unemployment lines and a great migration developed as Americans moved from poorer areas, particularly in the South, to areas with major war industries. Census takers in 1940 counted slightly

¹² Frederick C. Lane, *Ships for Victory*, 437.

more than 1.7 million Washington residents. The war effort quickly added a quarter-million more - including thousands of African Americans.¹³

The migration of workers into the Puget Sound area was also much larger and more diverse than that experienced in and around Portsmouth Navy Yard.

The government contracts awarded industries in the Puget Sound Area were considerably greater those assigned to the Portsmouth area. The National War Production Board, in August 1942, revealed that, up to July 1, 1942, "More than \$1 billion in contracts had been awarded Seattle's aircraft industry and \$709 million had been awarded shipyards in Seattle."¹⁴ In comparison, New Hampshire historian Phillip Guyol says that \$400 million federal dollars found their way to the Portsmouth area during the entire war.¹⁵ Albeit, that \$400 million was concentrated on a much smaller area than the federal funding that was spread across the entire Puget Sound area. At any rate, war brought an economic boom and prosperity to Portsmouth and southern Maine just as it did to the Puget Sound area, and many other shipyard communities, throughout the United States.

As can be seen from the above discussion, wartime Portsmouth was a microcosm of a nationwide phenomenon of boomtowns that struggled to adjust to large influxes of workers. Portsmouth's wartime experiences, as disruptive and challenging as they were by local standards, paled in comparison to the experiences of other shipyard communities across the nation. This fact makes Portsmouth no less deserving of study. In the final analysis, Portsmouth, the city and the shipyard, stood tall in the face of a myriad of boomtown issues and produced submarines beyond anyone's expectations. That wartime

¹³ http://www.historylink.org/essays/output.cfm?file_id=1664. "World War II Home Front on Puget Sound - - A Snapshot History."

¹⁴ *Ibid.*

¹⁵ Phillip N. Guyol, *Democracy Fights*, 162.

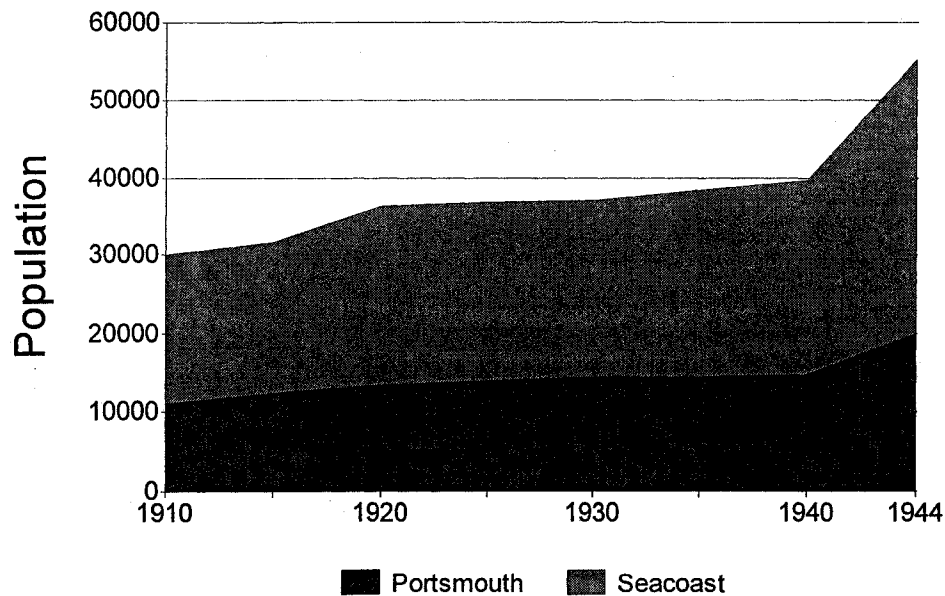
production, patriotism, and perseverance are sources of deep community pride that deserve further exploration and recognition.

The population, and economic, booms that the Portsmouth area experienced during World War II were all the more significant because of the twenty years of stability that preceded the war. Prior to analyzing the wartime factors that transformed the seacoast areas of New Hampshire and southern Maine, it is appropriate to investigate the calm before the storm.

The Calm

Figure 18 shows the population boom that Portsmouth and the surrounding communities experienced during World War II.¹⁶ The surrounding New Hampshire

Figure 18 - Population of Portsmouth and Seacoast Area (1910 - 1944)



¹⁶ "Survey of Health and Welfare in the Portsmouth Defense Area." Graph is constructed from figures in Table entitled "Population-Total Trend" in the Appendix and population discussion on page 18. Thayer Cumings Library and Archives, Strawberry Banke Museum, Portsmouth, N.H., MS 96, Box 2, Folder 1, "State Council of Defense, Local Committees: Portsmouth."

communities include Rye, Greenland, New Castle, Newington, and Portsmouth. The Maine communities include Kittery and Eliot. The graph also shows the calm before the boom. After a significant increase in population during World War I, also due to expansion of the navy yard workforce, the local population had remained fairly stable between 1920 and 1940.¹⁷

Returning to the *New York Times* quote, dated 5 October 1942, that described prewar Portsmouth as a “prosperous New England port, steeped in history and thriving as a summer resort,” one might add that nothing much had changed in the previous twenty years. Wallace Nutting’s *New Hampshire Beautiful* (1923) describes the Portsmouth of the 1920s that tourists found so appealing:

It is not strange that this district has become the main gateway for travelers in New England who seek the calm, the inspiration, and the beauty of its summers. . . Portsmouth itself has appealed to us as the most pleasing of all small shore cities. . . To those who love at once the old and picturesque together with some signs that Americans are not dead, Portsmouth appeals strongly. . . It may be as well that Portsmouth is no larger. Nevertheless, we have often wondered why, with its strategic location, it has not developed into a more populous center.¹⁸

In the 1920’s the Portsmouth area enjoyed a reputation as a quiet, under populated summer resort destination.

As reported in the American Guide Series *New Hampshire: A Guide to the Granite State* (1938), things had not changed much by 1938:

Apart from the Navy Yard, Portsmouth is not an industrial city . . . Popular as a resort, the city doubles its population each summer. . . This influx of summer visitors adds to the prosperity of the city, which even in winter is the

¹⁷ The shipyard employment grew from 1,450 in 1916 to 5,500 in 1918 and then fell to 2,850 in 1921. *Cradle of American Shipbuilding: Portsmouth Naval Shipyard* (Portsmouth Naval Shipyard: Government Printing Office, 1979), 76.

¹⁸ Wallace Nutting, *New Hampshire Beautiful* (Framingham: Old America Publishers, 1923), 76.

shopping center for a large area. . . The port . . . is occupied now only by an occasional naval vessel, small yachts, or a barge bringing in gypsum and taking out scrap iron. Portsmouth still hopes that it will again become a busy harbor.¹⁹

On the eve of World War II, Portsmouth continued to attract large numbers of summer visitors. Otherwise it was a relatively quiet city and harbor that lacked industry except for the navy yard.

If anything, between 1930 and 1940, the local area had become more rural, with a bent towards increased farming. Table 17 shows that, between 1930 and 1940, the local area saw almost no increase in urbanization, a large increase in the farming community, and a significant increase in the rural non-farming communities.²⁰

Table 17 – Local Urban vs Rural Population Distribution (1930 & 1940)

	<u>1930</u>	<u>1940</u>	<u>% Increase</u>
Urban (Portsmouth)	14,495	14,521	1.8%
Rural Farms	1,201	1,701	41.6%
Rural Non-farms	9,513	11,755	19.1%

Immediately prior to World War II, the city of Portsmouth was not attracting large numbers of new residents, and those that were attracted to the area were settling in rural communities. This rural trend was generally true throughout the state of New Hampshire, where the rural population had climbed to 42.4% in 1940 compared to 41.3% in 1930.²¹

¹⁹ *New Hampshire: A Guide to the Granite State*. American Guide Series. Written by Workers of the Federal Writer's Project of the Works Progress Administration for the State of New Hampshire. (Boston: Houghton Mifflin Company, 1938).

²⁰ "Survey of Health and Welfare in the Portsmouth Defense Area." Table is constructed from information included in Table entitled "Population – Location, 1930 – 1940" in the Appendix. Thayer Cumings Library and Archives, Strawberry Banke Museum, Portsmouth, N.H., MS 96, Box 2, Folder 1, "State Council of Defense, Local Committees: Portsmouth."

²¹ *Portsmouth Herald*, 8 Oct 1941, "Rural N.H. Like Topsy-Still Growing," 1.

Also, prior to the war, industrialization had not been a high priority with local civic leaders. The front page of the 2 September 1939 *Portsmouth Herald* announced the formation of the Portsmouth Industrial Association to stimulate community interest in bringing new industries to Portsmouth. According to the article, “The lack of diversified industries in our city has been felt by everyone with business interests for some time.” One week later, the paper’s editorial, discussing the lack of public support for the Portsmouth Industrial Association, cited a “lack of cooperation and coordination and a much too prevalent feeling of smug, complacent self satisfaction as far as community problems are concerned.” In the fall of 1939, there was no groundswell of public support for increased industrialization.

Another *Portsmouth Herald* editorial, in June 1939, entitled “The Portsmouth of Tomorrow,” presented a vision for the city that included moderate industrialization. That vision saw “highways with dividing strips and no left turns”, “restriction of business development to designated sites,” increased “happiness-giving recreation,” many “small, inexpensive, yet solid and attractively-designed homes, each with its plot of land”, and “many small private industries, utilizing the products of nearby farms in new ways.” Nowhere was there any mention of a behemoth industry, like the shipyard, that would dominate the area and spark a population boom that would lead to frantic housing construction, massive infrastructure development, and a deferral of “happiness-giving recreation.” In 1939, given its choice, it appears that Portsmouth’s leaders would have chosen a different path for its future than what emerged from World War II.²²

²² *Portsmouth Herald*, 24 June 1941, “The Portsmouth of Tomorrow,” 4.

The navy yard was a welcomed part of the economic and social fabric of the Portsmouth area in the late 1930s. One tourist guide book for New Hampshire noted:

The United States Navy Yard, possessor of a stirring history, is the backbone of modern Portsmouth, . . . The Navy Yard contributes much to the town, both financially and socially. The naval families are a distinct section of the population, and their presence adds much to the gaiety of the city. Balls and entertainments in the best naval tradition attract many of the townspeople and give the city a sophisticated air not common in New Hampshire. The sailors have their moments as in any seaboard town, and *occasionally too-happy hedonists are escorted to their quarters by naval police*²³

Immediately prior to mobilization for the war, during the calm before the storm, the navy yard was the backbone of the community, contributing gaiety, military balls, naval tradition, uncommon sophistication, and an occasional *too-happy hedonist* to the social scene. Things were about to change. Among other things, Portsmouth would soon be inundated with *happy hedonists*.

The *Portsmouth Herald's* editorial on 30 December 1939 took inventory of events in the seacoast area over the past year and spoke with optimism about the prognosis for 1940. The newspaper was enthused about the growing shipyard employment and continued its push for new industry that had been met with lukewarm support a few months earlier:

We have had a most excellent 1939 as a whole. The stores report excellent business during the Christmas season. The prospects for work at the navy yard are as bright if not brighter than a year ago. There are more men working there now than at any time since the close of the World War. . . The possibilities for new industries seem bright, and more industries mean more people living in this city which means more business for the merchants. . . Who knows what the new year may bring? We cannot tell, but we can be ready for whatever may benefit the community as a whole.²⁴

²³ *New Hampshire: A Guide to the Granite State*. American Guide Series. Written by Workers of the Federal Writer's Project of the Works Progress Administration for the State of New Hampshire. (Boston: Houghton Mifflin Company, 1938). Emphasis added.

²⁴ *Portsmouth Herald*, 30 Oct 1941, 4.

Things were unraveling in Europe in December 1939, but on the local scene business was improving, employment was up, and there was hope for attracting limited new industry and people to the city. Things were calm and the future looked bright and good for the new year. Assuming the city's primary newspaper accurately reflected the mood and attitude of the residents, neither had a clue about what the next year would bring.

Population Boom

Returning to the Figure 19 at the beginning of this section, it is obvious that 1940 brought a population boom to the area. Table 18 provides details for the population increases for the critical period 1940 to 1944.

Table 18 - Local Population Boom (1940-1944)

	1940	1944	Increase
Population Portsmouth and Contiguous Towns ²⁵ (Immediate Shopping Area)	25,039	35,294	41 %
Portsmouth	14,821	20,029	35 %
Kittery	5,374	9,475	76 %
Rockingham County ²⁶	58,142	60,276	3.6%
Other local towns – York, Durham, Exeter, etc. ²⁷ (Outer Shopping Area)	18,127	20,410	12 %
New Hampshire ²⁸	491,524	459,250	- 6.6 %

²⁵“Survey of Health and Welfare in the Portsmouth Defense Area,” Table entitled “Population-Total Trends” in the Appendix. The contiguous towns are Eliot, Greenland, Kittery, New Castle, Newington, and Rye.

²⁶ *Portsmouth Herald*, 15 Feb 1944, “Survey Shows Trends,” 1. The 3.6% gain is based on a comparison of the 1940 census with ration book distribution in 1944.

²⁷ “Survey of Health and Welfare in the Portsmouth Defense Area,” Table entitled “Population-Total Trends” in the Appendix. Thayer Cumings Library and Archives, Strawberry Banke Museum, Portsmouth, N.H., MS 96, Box 2, Folder 1, “State Council of Defense, Local Committees: Portsmouth.”

²⁸ The estimating of shifting populations during the war was inaccurate, at best. In this table, the 1940 figures are census based and presumably accurate. The 1944 town figures are based on ration book

As might be expected, with the rationing of automobiles and gasoline, the communities within walking distance of the shipyard, especially Portsmouth and Kittery, experienced tremendous growth. On the other hand, Rockingham County, the county where Portsmouth is located, only experienced a 3.6 % gain in population. With Portsmouth and its contiguous towns experiencing a 41% growth, while the entire county remained relatively stable, it appears that there was a great migration out of the southern and western parts of the county to the Portsmouth area. This is in sharp contrast to the San Francisco Bay and Puget Sound examples presented at the introduction to this chapter that experienced a massive influx of workers from distant parts of the United States.

In *The U.S. Economy in World War II*, economist Harold G. Vatter describes the dynamic migration westward of workers in search of job opportunities in the aircraft, shipbuilding, and other war related industries and the static or declining populations in eastern regions:

The great migration wave regionally was to the Pacific Coast. . . the three Pacific Coast states increasing their population by over 34%. . . Of the net national migration of about 3.5 million people between April 1940 and November 1943, nearly 1.5 million went to California. . . Almost all other regions experienced arrested population growth or losses. The New England, Middle Atlantic, and East North Central regions containing the old manufacturing belt barely held their own during the war.²⁹

distribution. The 1944 state figure is Guyol's estimate, exclusive of those in the armed services. Based on registrations for War Rations Books for May 1942 (470,000) and October 1943 (445,000), Guyol concludes that the decrease (25,000) reflects the loss of population to the armed forces. Guyol, 104 and note 3. All of this is to say that, if one uses the October 1943 ration book figure of 445,000, the decrease in the state's population could have been as high as 9.5%. I chose to keep the 6.6% because that is the figure commonly seen in the literature.

²⁹ Harold G. Vatter, *The U.S. Economy in World War II* (New York: Columbia University Press, 1985), 114-115.

The state of New Hampshire did not hold its own during the war. The state experienced a migration of population to out-of-state wartime manufacturing centers that led to the noted 6.6 % reduction in population during the first few years of the war, not including the losses to the military services. Over 20,000 new residents had relocated to the seacoast of New Hampshire during the war while the state had lost 30,000 residents overall. Clearly, the Portsmouth area was a beehive of growth and activity, as compared to the rest of the state. There is little doubt that the center of the state's population, manufacturing, and economy moved sharply in the direction of Portsmouth.

The 41% increase in population of the Portsmouth Defense Area between 1940 and 1944 was characterized by a significant shift in age distribution towards the youth, as shown in Table 19.³⁰

Table 19 – Local Age Distribution (1940-1943)

<u>Age</u>	<u>1940 Census</u>	<u>1943 Census</u>	<u>% Shift</u>
< 5	1750	3000	71.4 %
5-14	3800	5950	56.6 %
15-24	4100	5450	32.9 %
25-34	3950	4825	22.2 %
35-44	3650	4500	23.2 %
45-54	3125	4125	32.0 %
55-64	2250	2850	25.7 %
>65	2325	2450	5.4 %

Apparently the number of young adults, many with children, rushing to the seacoast area to find employment at the shipyard, more than compensated for those going into the armed forces. The result was a disproportionate increase in youth and adolescents. A

³⁰ "Survey of Health and Welfare in the Portsmouth Defense Area," Table is constructed from graph entitled "Portsmouth Defense Area Population-Age" in the Appendix. Note: the numbers in this table were read from the hand-drawn graph cited. Accuracy can be assumed to be within 25 people. Thayer Cumings Library and Archives, Strawberry Banke Museum, Portsmouth, N.H., MS 96, Box 2, Folder 1, "State Council of Defense, Local Committees: Portsmouth."

consequence of the increased number of adolescents, Portsmouth's "girl problem," will be discussed in considerable detail later.

As might be expected, a high percentage of the new seacoast residents worked at the shipyard. Table 20 shows the number and percentage of shipyard employees that resided in Portsmouth and Kittery and nearby communities.

Table 20 - Shipyard Employment Distribution by Town (1944)

	Population	Employed by Shipyard	Percentage
Population Portsmouth and Contiguous Towns ³¹	35,294	7,382	20.9 %
Portsmouth	20,029	4,355	21.7 %
Kittery	9,475	2,188	33.8 %
Other local towns – York, Durham, Exeter, etc. ³²	20,410	2,220	10.8 %
New Hampshire	459,260 ³³	12,981 ³⁴	2.8 %

In 1944, one out of every five local residents worked at the Portsmouth Navy Yard.

Nearly 3% of the state's entire population, and 7% of the state's labor force of 185,000,³⁵ worked at the yard. Moreover, in 1944, when the state had 12,981 people working at the shipyard, only 73,000 people were working in all the other manufacturing jobs throughout the state that included the textile, leather, paper, machinery, lumber, and other

³¹ "Survey of Health and Welfare in the Portsmouth Defense Area," Table 17. Thayer Cumings Library and Archives, Strawberry Banke Museum, Portsmouth, N.H., MS 96, Box 2, Folder 1, "State Council of Defense, Local Committees: Portsmouth."

³² *Ibid.*

³³ Phillip N. Guyol, *Democracy Fights*, 104, note 3.

³⁴ "Portsmouth Chamber of Commerce," 1. Thayer Cumings Library and Archives, Strawberry Banke Museum, Portsmouth, N.H., MS 96, Box 1, Folder 5, "Business and Industry."

³⁵ Phillip N. Guyol, *Democracy Fights* 131.

industries.³⁶ Manufacturing had quickly overtaken farming as the chief industry of the seacoast area.

Speaking to the local Rotary Club in January 1941, Mr. Lawrence M. Meyer, industrial agent of the New Hampshire Planning and Development Commission, noted that “the tremendous influx of [skilled] workers at the Portsmouth Navy Yard can be one of Portsmouth’s greatest assets in the future.” Meyer noted that the area had in the past “lost not one but several industrial opportunities because we did not have sufficient skilled labor.”³⁷ Meyer’s speech was a testimony to a shortage of industrialization in the seacoast area before the war and an accurate prediction of the abundance of skilled labor that would exist in the postwar era. That postwar skilled labor pool would ultimately exceed Meyer’s wildest imagination.

Portsmouth and its environs were transformed quickly, during the early years of the war, from an area with a rural and farm population that was growing faster than its urban population, to an overpopulated industrial area with a decidedly younger population. That transformation brought tremendous opportunities and serious challenges.

Economic Opportunities

The Portsmouth area and New Hampshire did not suffer as much economically, during the Great Depression, as most areas of the country. According to New Hampshire historian Philip N. Guyol, at the very bottom of the depression, in 1933 and 1934, New Hampshire stood twelfth in the United States in per capita income, and, during the lean

³⁶ *Ibid.*, 126, Chart II.

³⁷ *Portsmouth Herald*, 30 January 1941, “Navy Yard Workers Asset for City’s Future,” 1.

years, 1930 -1939 inclusive, the state's income per capita was comfortably above the national average. In 1939, the state stood seventeenth in per capita income.³⁸ And, as noted earlier, Portsmouth had an excellent year in 1939, with strong retail sales at the end of the year and employment on the rise. In April 1940, the *Portsmouth Herald* reported that the city had \$8.727 million in retail sales in 1939, as compared to \$8.57 million in 1938. Moreover, in 1939, with only 3.18% of the state's buying power, the city reported 5.7% of the state's retail sales.³⁹ The newspaper attributed the favorably disproportionate sales to recreational and value-minded visitors to the seacoast area. By any measure, the local area was not in dire economic straits at the start of 1940.

While the Portsmouth area experienced favorable economic conditions in mid-1940, the Great Depression still lingered on in other areas across the country. Economist Harold C. Vatter wrote:

Nevertheless, 1940 was the eleventh year of the Great Depression. . . 1940 GNP was still only 9 percent above 1929. This was a historically miserable performance, particularly if one were to allow for stimulus to the 1940 GNP from business anticipation of a forthcoming preparedness boom. . . With a civilian unemployment rate of 14.5%, the economy was still far from promising to absorb fully the army of unemployed.⁴⁰

Historian David M. Kennedy argues that the army of nine million unemployed workers in 1940, combined with greatly underutilized industrial facilities, was an advantage when the nation finally decided to mobilize. Unlike World War I, when the nation struggled to recruit soldiers from a fully employed work force and convert near capacity civilian

³⁸ Phillip N. Guyol, *Democracy Fights*, 187.

³⁹ *Portsmouth Herald*, 27 April 1940, editorial, 4.

⁴⁰ Harold C. Vatter, *The U.S. Economy in World War II*, 7.

production to military purposes, the start of World War II found manpower readily available and idle factories easily adapted to military purposes.⁴¹

Unlike much of the nation, in the summer of 1940, Portsmouth's economy was good and about to get much better. The city was well positioned to reap huge economic benefits from the increased activity at the shipyard. The local communities benefited greatly from the \$23 million of capital investment at the navy yard between the summer of 1940 and the summer of 1941. That investment, the rapidly increasing shipyard payroll, and other federal spending for defense related projects, provided an exceptional economic stimulus for the area. As shown on Table 21, between 15 July 1940 and 15 July 1941, the federal government authorized expenditures of \$37.5 million for the following projects:⁴²

**Table 21 – Local Federal Project Expenditures
(5 July 1940- 15 July 1941)**

Portsmouth Navy Yard	\$23.00M
Portsmouth Harbor Defense	\$1.50M
Bridges – State and Interstate	\$3.30M
Housing – Federal and Private	\$5.00M
City of Portsmouth Facilities	\$2.50M
Non-municipal Utilities	<u>\$1.40M</u>
Total	\$37.50M

The Portsmouth Navy Yard received most of the federal monies, but other federal projects brought additional funds to the city.

New Hampshire's primary industries, prior to the war, were textiles, leather, and wood and the industrial center of the state was inland near the mill-towns. The activity at

⁴¹ David M. Kennedy, *Freedom from Fear*, 617.

⁴² "Portsmouth and National Defense," a series of articles reprinted from the *Portsmouth Herald*, 1 Aug 1941. Thayer Cumings Library, Strawbery Banke Museum, Portsmouth, N.H., MS 96 Box 2, Folder 1, "State Council of Defense, Local Committees: Portsmouth."

the shipyard during World War II moved the state's industrial center decidedly towards the seacoast. During his analysis of New Hampshire industry during World War II, historian Phillip N. Guyol noted that "Perhaps the outstanding industrial phenomenon was the surge of Portsmouth Navy Yard to the position of the largest single employer in the state, at its peak employing about as many people [from all states] as the entire textile industry [in New Hampshire]." ⁴³ Guyol had strong grounds for his bold statement. Portsmouth Navy Yard invested a total of \$36,000,000 in plant additions and facilities between 1940 and 1945, much of which was directed into the local economy. ⁴⁴ In addition, during the same period, shipyard payrolls and expenditures to local merchants for products and services, excluding plant additions and facilities, generated almost another \$400,000,000 in charges. Those charges, which were a direct stimulant to the local economy, increased annually throughout the war as shown in the Table 22 below: ⁴⁵

Table 22 - PNY Annual Expenditures Excluding Facilities (1940-1945)

1940	\$11 M
1941	\$23 M
1942	\$43 M
1943	\$74 M
1944	\$100 M
1945	<u>\$141 M</u>
Total	\$392 M

There can be no doubt that the shipyard was a tremendous economic engine for the seacoast area.

⁴³ Philip N. Guyol, *Democracy Fights*, 139.

⁴⁴ *Ibid.*, 162.

⁴⁵ *Ibid.*

Fueled by federal spending, the local Chamber of Commerce claimed \$15.314 million in retail sales in 1943. The strength of the local economy, midway through the war, is revealed by Table 23, which compares Portsmouth retail sales in 1943 to the retail sales of the state and the nation.⁴⁶

Table 23 – Portsmouth Retail Sales Compared to State and Nation (1943)

	<u>Portsmouth % of Population</u>	<u>Portsmouth % of Retail Sales</u>
New Hampshire	4.42	6.69 ⁴⁷
United States	.016	.024

In way of clarification, with only 4.42% of the state’s population, Portsmouth accounted for 6.69% of the state’s retail sales and likewise, with only .016 % of the nation’s population, Portsmouth claimed .024% of retail sales for the nation. The high percentage of retail sales, while an indicator of local prosperity, was also heavily influenced by the tourist invasion that occurred every summer.

Further evidence of prosperity is provided by Table 24, which shows the average Portsmouth resident’s annual purchasing power relative to that of residents of the state and nation in 1943.⁴⁸

⁴⁶ “Portsmouth Chamber of Commerce,” 3. Thayer Cumings Library and Archives, Strawberry Banke Museum, Portsmouth, N.H., MS 96, Box 1, Folder 5, “Business and Industry.”

⁴⁷ It was noted earlier in this section that the *Portsmouth Herald* of 27 Apr 1940 reported that Portsmouth had 5.7% of the state’s retail sales in 1939. While the 1943 retail sales of 6.69% is obviously higher, direct comparisons suffer because the *Herald* did not define the towns included in the 1939 figure. *Portsmouth Herald*, 27 Apr 1940, editorial, 4.

⁴⁸ *Ibid.*

Table 24 – Local Purchasing Power (1943)

	Annual Purchasing Power	Portsmouth Multiple
Portsmouth	\$1,136	1.00
New Hampshire	\$833	1.36
United States	\$1,103	1.03

Portsmouth's annual purchasing power was only slightly higher than the national average, but it was 36% higher than the state average. The disparity between the annual buying incomes of residents of Portsmouth and the rest of the state of New Hampshire speaks to the lack of prosperity in the rest of the state.

According to Guyol, New Hampshire benefited the least economically of all the states during the war.

Total income payments to individuals in New Hampshire rose from \$268,000,000 in 1939 to \$460,000,000 in 1945, or from \$548 to \$971 per capita. New Hampshire moved down from seventeenth place in 1939 to thirty-fifth place in 1945. . . . during the whole period of wartime prosperity from 1940-1945 the gap between the two [state and national per capita incomes] attaining its maximum in 1944.⁴⁹

While prosperity had increased significantly in the seacoast area during the war, as shown earlier, the area and the state were not particularly depressed prior to the war. The local area probably remained more stable during the war than many other wartime boom towns that were rocketed out of the Great Depression with enormous government contracts. The picture was quite different in the rest of the New Hampshire, where incomes increased much less than the rest of the country. The Portsmouth area was an economic anomaly in the state of New Hampshire. The city had quickly become an affluent community, albeit,

⁴⁹ Philip N. Guyol, *Democracy Fights*, 187 and note 2.

an overpopulated affluent community with challenging problems and concerns for its future.

Challenges

While mobilization presented Portsmouth with challenging new problems, it is also true that the town entered the war with a number of unresolved community issues. An August 1943 study, "A Survey of Health and Welfare in the Portsmouth Defense Area," organized and coordinated by the New Hampshire Planning and Development Commission, noted that, "There are many problems of long standing in Portsmouth, which started prior to the war. Such for example are housing, government, and pollution. They should be distinguished from emergency problems growing out of the rapid influx of workers and their families into this area."⁵⁰ Existing problems with housing and pollution were further aggravated by the rapid increase in population. The same study noted some of the additional problems that the Portsmouth area had inherited:

Increased health hazards of a rapidly expanding community are overcrowding, growth in incidence of communicable diseases, rise of venereal disease, prevalence of unsanitary conditions attendant upon increased restaurant loads, overcrowding of hospital facilities and recreation centers, and taxing of medical, nursing, and school personnel. Many of these conditions will be found in Portsmouth, Greenland, New Castle, and Newington.⁵¹

The problems and challenges were many.

⁵⁰ "Survey of Health and Welfare in the Portsmouth Defense Area," 99. Thayer Cumings Library and Archives, Strawberry Banke Museum, Portsmouth, N.H., MS 96, Box 2, Folder 1, "State Council of Defense, Local Committees: Portsmouth."

⁵¹ *Ibid.*, 46.

Housing and Infrastructure

Not the least of those challenges was where the thousands of new residents would live. The first inkling of the housing problem was presented at a meeting, between yard and city officials, in January 1940, where Commandant Rear Admiral Cyrus W. Cole advised that, "An increase will practically double the civilian force at the Portsmouth Navy Yard and its officers and men proportionately during the coming year," and that "the lack of reasonable rentals, apartments, and rooms within a 25 mile radius is a serious problem." By the summer of 1940, the *Portsmouth Herald* reported the results of a shipyard survey that showed the housing shortage was preventing many shipyard employees from bringing their families to the area. Furthermore, "A far larger number [of employees] reported that, while their families were here, the housing secured was extremely inadequate with many conveniences, which are today considered necessary by most people, unavailable."⁵² A local history later confirmed the shortage of and inadequacy of housing in the Portsmouth area:

The Portsmouth City Planning Board reported that a survey of housing made in 1941 showed that more than half of the 4021 "dwelling units" in Portsmouth were more than 80 years old, while less than one quarter of the units in Manchester were even 40 years old. The situation in Portsmouth was so bad that the report only considered 28 housing units as "unfit for use" even though 70 units had no running water, 160 had no gas or electric lights, 162 had no toilets, and 879 had no bathtubs or showers. . . A federal housing survey conducted in 1940 determined that there was a need for 2200 new housing units within a 25 mile radius of the shipyard.⁵³

⁵² *Portsmouth Herald*, 16 July 1940, "Proposal Believed Likely to Materialize; Navy Yard Co-operating on Project," 1.

⁵³ Gregory C. Colati and Ryan H. Madden, "Victory Begins at Home: Portsmouth and Puddle Dock during World War II," in Barbara McLean Ward ed., *Produce & Conserve, Share & Play Square: The Grocer and the Consumer on the Home-front during World War II* (Portsmouth: Strawberry Banke Museum), 1994, 65.

In August 1940, the *Herald* reported that Portsmouth needed more than 2,000 new homes to accommodate the increased population in the area.⁵⁴ If 2,000 new housing units were needed in 1940, when the shipyard was at 8,000 employees, more than 4,000 new units would be needed by 1943, when shipyard employment exceeded 20,000. Available housing was a problem that would become progressively more severe as the shipyard grew in employment at a rate much greater than the availability of local housing. Ultimately, housing construction during the war fell far short of the number of new units needed.

When it became obvious, in 1939 and 1940, that the navy yard was going to increase several fold, the Federal Government sponsored three housing projects, Admiralty Village (600 units) in Kittery and Pannaway Manor (200 units) and Wentworth Acres (800 units) in Portsmouth. These projects, as urgently needed as they were, met with a certain amount of disapproval from local civic leaders. Pannaway Manor was believed to have a “monotony created by the unchanged proportions of the houses.” The location, number, and construction of the units at Wentworth Acres reportedly had been “determined against sound advice from local municipalities and against their wishes.” In addition, “the buildings were erected with as much speed and economy as possible and were not designed for long life.” Finally, Admiralty Village reportedly had “neighbor trouble” because of the lack of privacy due to the thin walls separating units, no back yards, and insufficient recreational space. From the initial conception and construction of the government housing projects, local authorities were

⁵⁴ *Portsmouth Herald*, 23 Aug 1940, “Present Projects Still Would Leave Housing Shortage,” 1.

concerned about inheriting long-term problems when the projects were turned over to the city after the war.⁵⁵

The city of Portsmouth had to expand much of its infrastructure and utilities to accommodate the increased numbers of residents. On 10 April 1941, the *Portsmouth Herald*, recapping the city's progress during the "first year of the emergency," noted that it had been about a year since the President had designated Portsmouth as a defense area for Federal Housing projects. During that year, most of the \$2 ½ million in federal aid the city had requested had been approved. Housing projects had been completed, bridges had been modernized, telephone, gas, electrical, and sewage service had been expanded, the water supply had been greatly increased and additions had been made to schools and hospital services. While the shipyard had been ramping up facilities and services, the city had been doing likewise. Confirming extensive local development, the local Chamber of Commerce noted in 1944 that:

There has also been much private building. There have been tremendous extensions of water and sewer mains, of telephone facilities and of the facilities of other utilities. New schools have been built, [as well as] new streets and sidewalks and roads.⁵⁶

The war had obviously challenged Portsmouth's municipal services. The city had met that challenge and brought greatly improved services to the residents of Portsmouth.

⁵⁵ All quotes in this paragraph are from "Survey of Health and Welfare in the Portsmouth Defense Area," 46. Thayer Cumings Library and Archives, Strawbery Banke Museum, Portsmouth, N.H., MS 96, Box 2, Folder 1, "State Council of Defense, Local Committees: Portsmouth."

⁵⁶ "Portsmouth Chamber of Commerce," 3. Thayer Cumings Library and Archives, Strawbery Banke Museum, Portsmouth, N.H., MS 96, Box 1, Folder 5, "Business and Industry."

Vice Control

The war also brought other challenges less successfully met by city officials, primarily the control of prostitution and venereal disease. Much of the war found the U.S. Navy on the offensive pushing Portsmouth officials to rid the city of disease carrying prostitutes, with the city officials being much less responsive than the Navy desired. The Navy had the upper hand in these encounters as the result of the May Act, passed in January 1941, making “vice activities near military installations a federal offense.”⁵⁷

According to Allan M. Brandt:

The May Act provided the legal power necessary for the Department of Justice to assume the policing of areas deemed too be hazardous to the troops by the secretary of the army or the secretary of the navy. In other words, if prostitution persisted in a given community, federal authorities could take action. . . Although only invoked twice during the course of the war – in Tennessee and North Carolina- the May Act nevertheless served as a prod to local officials to “clean up” their communities or be deposed by federal officials.⁵⁸

Thus the leverage that the Navy enjoyed through the May Act compelled Portsmouth city officials to be responsive to periodic accusations that the city should be “cleaned up” to reduce the shipyard’s spiraling venereal disease rate. This tug-of-war between the military and the city was characteristic of a scene that was played out in many military communities during World War II.

The aggressive effort to root out and quarantine prostitutes was a carry over from the military’s experience with combating venereal disease during World War I. Venereal disease had a tremendous impact upon American forces during World War I. According to historian Allan M. Brandt:

⁵⁷ Allan M. Brandt, *No Magic Bullet: A Social History of Venereal Disease in the United States Since 1880* (New York: Oxford University Press, 1987), 162.

⁵⁸ *Ibid*, 166.

Almost seven million days of active duty were lost to venereal diseases, the most common illness in the service next to influenza, which struck in epidemic proportions. A total of 383,706 soldiers were diagnosed with either syphilis, gonorrhea, or chancroid between April 1917 and December 1919. . . . Some 12.7 percent of the over two million men in the Army stationed in the United States were admitted to sick report with a diagnosed venereal disease. Indeed, soldiers serving in the United States accounted for 76.6 percent of the venereal disease infections in the entire Army during the war.⁵⁹

Lacking any effective antibiotic to combat the disease, the American military sought to gain control of the debilitating disease through “a combination of education, repression of prostitution, medical treatment of the infected, and rigorous case finding and contact tracing.”⁶⁰ With World War II looming on the horizon, the United States military, not wanting to repeat its disastrous wartime experience with venereal disease, reinstated the anti-venereal disease measures that had evolved during World War I. Consequently, Portsmouth’s experience with prostitution and venereal disease during World War II heavily reflects the local military’s ambitious prosecution of two carry over tactics from the previous war, the repression of prostitution and rigorous contact tracing,

Prostitution was not a new problem for Portsmouth. The industry had thrived along the notorious Water Street brothel district between 1897 and 1912 when a combination of increased activity at the shipyard and frequent visits by fishing boat crews flooded downtown Portsmouth with young sailors. Some claim that the city was compelled by local organizations, apparently inspired by progressive movement, to close down the district.⁶¹ However, local historian Ray Brighton attributes the closing of the Water Street brothels to “the Navy’s threat to ship all its liberty parties to Boston.”

⁵⁹ *Ibid*, 115.

⁶⁰ *Ibid*, 162.

⁶¹ Kimberly E. Crisp, “Water Street Remembered.” History Honors Thesis, University of New Hampshire, 1996, 78

According to Brighton, "It was only after the Navy marched a liberty party through Congress and old Vaughn Street town to the railroad station on Deer Street [to catch a train to Boston]"⁶² that local leaders got religion and cleaned up Water Street.

Efforts to eradicate the city's shady past include the renaming of Water Street to Marcy Street about 1925 and the purchase of most of the properties by the Prescott sisters that led to the eventual establishment of the riverfront park that bears their name today.⁶³ By the time World War II rolled around, the city's red-light history was a distant memory. Wartime operations at the shipyard would rekindle those memories and bring a renewal of the Navy's pressure on city officials to rid the city of prostitutes.

Medical officers at the navy yard attributed increased VD rates to widespread prostitution in Portsmouth. Portsmouth's civic leaders, on the other hand, were reluctant to acknowledge the presence of prostitutes, but quick to redefine the problem as local adolescent girls eager to entertain servicemen. The Portsmouth Health and Welfare Survey of 1943 devoted considerable space to Portsmouth's "Girl Problem." The problem was believed to be centered on unsupervised "opportunities for unaccompanied women and girls to meet servicemen on leave."⁶⁴ Meeting opportunities were reportedly found "on the street as casual meetings or pickups, at beer parlors or taverns or juke joints."⁶⁵

⁶² Ray Brighton, *The Prescott Story* (New Castle, N.H.: Portsmouth Marine Society, 1982), 59.

⁶³ Kimberly E. Crisp, "Water Street Remembered." History Honors Thesis, University of New Hampshire, 1996, 2-3.

⁶⁴ "Survey of Health and Welfare in the Portsmouth Defense Area," 50. Thayer Cumings Library and Archives, Strawberry Banke Museum, Portsmouth, N.H., MS 96, Box 2, Folder 1, "State Council of Defense, Local Committees: Portsmouth."

⁶⁵ *Ibid.*

While the girl problem sounds a lot like a prostitution problem, the report was quick to add:

With respect to prostitution, there are no known “houses” existing in Portsmouth. It was rumored that of late, in several scattered areas throughout the city, women have allowed seduction. This matter is under investigation. The chief problem with respect to sexual promiscuity seems to be with the younger girls of teen ages, i.e. those who may be termed amateurs, whose general attitude seems to be that they are working for the cause and are providing entertainment for the servicemen. This is rather a serious problem, and it needs to be checked – for if allowed to continue undoubtedly will lead many of these girls to become professional prostitutes.⁶⁶

The truth probably fell somewhere between the U. S. Navy’s hard stand on prostitution and the locally defined “girl problem.” Portsmouth demographics had taken a definite turn towards the younger set, during the early stages of the war, and increased numbers of adolescent girls were probably available and interested in the sudden abundance of young servicemen. The *New York Times* article of 5 October 1942 addressed the problem of adolescent girls roaming the streets of Portsmouth:

For the problem of Portsmouth’s adolescent girls had become grave. Every night the dimmed-out streets are filled with men from all branches of the armed forces, as well as yard workers. Within a year Mrs. Dorothy Bovard, who represents the Travelers Aid Society here, noted twenty-five cases of girls “chasing service men to camps” and having to be brought home.⁶⁷

This account suggests a far less serious problem than the rampant prostitution reported by the military later in the war. Therein probably lays the answer to the dichotomy of views between the military and city officials. The evidence suggests that Portsmouth had a “girl problem” early in the war that grew into a more serious prostitution problem later in the war. The evidence also suggests that the extent of hard line professionals practicing in

⁶⁶ *Ibid.*, 51.

⁶⁷ Milton Bracker, “Portsmouth Tries to Adjust Life to an Influx of Men and Money.” *The New York Times*, 5 October 1942, 10.

Portsmouth was a far less serious problem than existed outside the gates of other shipyards.

Then again the answer may not be that simple. The debate over Portsmouth's girl problem versus a prostitution problem was by no means unique. Similar debates took place in hundreds of communities across the United States during the war. As the result of aggressive military prosecution, Allan M. Brandt wrote,

More than seven hundred cities and towns closed their red-light districts during the course of the war. Not since World War I had prostitution been so vigorously prosecuted in the United States. Despite the incarceration of thousands of prostitutes, it soon became clear that that this could not in itself solve the venereal disease problem. . . Increasingly army physicians reported that prostitutes constituted only a minority of the soldiers' sexual contacts. . . .The military soon turned its attention to the "promiscuous" girl. Women of loose morals, eager to support the war effort, were determined to be the primary locus of the infection. . . .The harlot with the painted face had stepped aside for the girl-next-door.⁶⁸

In light of the evidence from the national scene, Portsmouth city officials may have been more accurate in the assessment of the problem than officials at the navy yard who were rattling their sabers to force the expulsion of harlots with painted faces from the local drinking establishments.

While the extent of prostitution in Portsmouth may have been debatable, there is no doubt that the navy yard boom had promoted increased socialization and night-life in Portsmouth that contributed to increased VD rates at both the navy yard and the Portsmouth Hospital. There is also no doubt that the combination of young sailors and marines, beer, and local teenage girls was an explosive mixture that caused headaches for the local police. Reportedly, the curfew that required all children who were under sixteen

⁶⁸ Allan M. Brandt, *No Magic Bullet*, 167-168..

years of age to be off the streets after 9:00pm was not enforced.⁶⁹ In December 1942, local restaurant owners complained of servicemen's brawls that destroyed tables, chairs, crockery, and fixtures almost nightly.⁷⁰ The shipyard increased Shore Patrol officers in response to the request of city officials and also declared trouble spots "out of bounds" for enlisted men.⁷¹ One local restaurant owner, Andrew Jarvis, was quoted as saying that he would rather have all navy men and marines barred from his premises than suffer losses as he had been doing in the recent past.⁷² Portsmouth had been transformed from a quiet seacoast tourist town to a "sailor town" and some had difficulty making the adjustment.

In the interest of balanced and fair reporting, Eileen Dondero Foley, a young woman residing in Portsmouth during the early years of the war, saw another side of Portsmouth social life. Eileen remembered that dances were routinely held almost every night of the week at one of several locations where young women could meet and mingle with servicemen. The dance sites included the USO Club on Congress Street, the shipyard, and Camp Langdon.⁷³ According to Foley, the dances were extremely popular

⁶⁹ "A Survey of Health and Welfare in the Portsmouth Defense Area, August 1943," 52. Thayer Cumings Library and Archives, Strawberry Banke Museum, Portsmouth, N.H., MS 96, Box 2, Folder 1, "State Council of Defense, Local Committees: Portsmouth."

⁷⁰ *Portsmouth Herald*, 8 Dec 1942, "Hewitt to Seek Aid of Yard Officials on Disorders Here," 1.

⁷¹ *Portsmouth Herald*, 11 Dec 1942, "Navy Bars Enlisted Men from Some Spots," 1.

⁷² *Ibid.*

⁷³ According to the Portsmouth Health and Welfare Survey (1943), the Portsmouth Recreational Committee scheduled the dances at the USO on Thursday evenings, the American Legion on Wednesdays and Fridays, a favorite local restaurant on Saturday nights, and at Camp Langdon once a week. See page 49 of the survey. No mention is made of the dances at the shipyard, but Eileen Foley distinctly remembered going to dances on the yard. Camp Langdon was located in New Castle between the town and the Wentworth Hotel. Thayer Cumings Library and Archives, Strawberry Banke Museum, Portsmouth, N.H., MS 96, Box 2, Folder 1, "State Council of Defense, Local Committees: Portsmouth."

and well attended. She and her friends often attended more than one dance a week, as the dances were scheduled so as not to interfere with each other. In addition, the military provided convenient bus service from the downtown USO to the dances on the military bases. The dances were chaperoned and curfews were observed.⁷⁴

The social scene that Eileen Foley remembers was much more innocent and wholesome than the sailor bar reports that frequently made the front page of the local newspaper. When asked about the bar scene and Portsmouth's prostitute problem, Foley confirmed that side of the Portsmouth social scene, "Oh yes. They were there. They lined the bridge waiting for the boys to leave the shipyard."⁷⁵ The shady side of Portsmouth's social life, populated by young women of questionable reputation, was balanced to some extent by an active group of young women like Eileen Dondero Foley, who worked hard during the day, and socialized with servicemen under more structured and supervised social settings in the evenings.

However, it was the rowdy bar scene and not the popular USO dances that made the pages of the local newspaper. According to a *Portsmouth Herald* editorial of 19 March 1943, the Portsmouth Police department had been totally ineffective in controlling acts of vandalism perpetrated upon the city's business establishments. The *Herald* reported that, "Almost nightly, merchants suffer loses due to broken glass, destroyed signs, and from acts of indecency." The grossly understaffed Portsmouth Police department had only eighteen patrolmen, when national standards required thirty-five for a city the size of Portsmouth. With civic pressure mounting to gain control of the

⁷⁴ Oral interview with Eileen Foley, 30 August 2006, at her home in Portsmouth, N.H.

⁷⁵ *Ibid.*

situation, and unable to hire more policemen because of the manpower shortage, the Police Department requested more military police, from the shipyard, to patrol Portsmouth's streets between 6:00 pm and 2:00 am.⁷⁶ One of the more troubling consequences of the increased industrial activity at the yard was increased drunkenness and vandalism on the streets of Portsmouth.

One might question how the relatively small population of enlisted men at the Portsmouth Navy Yard could cause such havoc. For a starter, the number of enlisted men at the yard peaked at about 1,300 in late 1942 and early 1943, including several hundred Marines. As the war went on, many of the submarine sailors at the yard\ were veterans of war patrols who had returned to the yard to put the next submarine in commission. Likewise, the Marines who guarded the yard were often assigned to the shipyard after having experienced combat. Thus, many were battle tested young men looking to take full advantage of their respite at Portsmouth before going back to war. Battle tested submarine sailors and Marines, mixing at the same local bars with Army enlisted men stationed in the area, occasionally made for an explosive mixture.⁷⁷

Seeking to call a "spade a spade,"⁷⁸ the 14 May 1943 *Portsmouth Herald* editorial drew attention to Portsmouth's teenage problem, but likened it to the problems experienced at other important defense areas and armed services centers. In particular, the editorial took some satisfaction in knowing that Portsmouth's problem was not as bad as the teen age problem at Portland, Maine where, "The police blotter coldly reports the fact

⁷⁶ *Portsmouth Herald*, 5 Apr 1943, "Army, Navy Asked to Aid Police Here," 1.

⁷⁷ According to William Tebo, only beer was legal and, supposedly, available at the local bars.

⁷⁸ *Portsmouth Herald*, 14 May 1943, "Spade's a Spade," 4.

that 14, 15, and 16 year old girls are openly soliciting and that they are just average cases among the more than 100 teenage girls arrested in six months.”⁷⁹ Reading local newspaper reports between December 1942 and June 1943, it is obvious that the city of Portsmouth was suffering growing pains in its new role as a navy town, and that city officials were overly complacent and comfortable with the belief that things were not as bad as some believed.

After the summer of 1943, the press had very little to say the rest of the year about Portsmouth’s girl problem, vandalism perpetrated by military enlisted men, prostitution, or venereal disease. It is somewhat revealing of the community’s state of denial that the *Portsmouth Herald’s* end-of-the-year list of twenty resolutions for 1944 contained several about postwar planning, but did not mention anything about eliminating vice and restoring order to the city. One would like to think that, during the previous six months, these issues had been brought under control or eliminated, but that was clearly not the case. The VD rate at the shipyard continued to climb to new heights and the navy continued to put pressure on city officials to clean up the town.

Shipyard officials presented the New Hampshire Board of Health with quantifiable evidence that identified the sites in Portsmouth that were sources of venereal disease. Armed with that information, federal health officials formed the Portsmouth Social Protection committee that, in turn, exerted pressure on city officials to take action against known sites of prostitution. For example, the navy advised the State Board of Health in May 1944 that 24 of the 97 cases of VD reported in Portsmouth in 1943 had

⁷⁹ *Ibid.*

been acquired through contacts at the Dolphin Hotel.⁸⁰ Eight additional cases during the first quarter of 1944 had also been traced to the same hotel. The next highest figure for any particular site in Portsmouth for 1943 was five cases.⁸¹ With almost five times the VD rate of any other Portsmouth establishment, the Dolphin Hotel apparently did a good business – whatever that business was.

The report of the Portsmouth Social Protection Committee to the mayor, published on the front page of the 14 July 1944 *Portsmouth Herald*, sounded a call for action to resolve the city's widespread venereal disease problem. Yet, like other newspaper accounts, the word "prostitute" did not appear in the report. Instead, the article reported that "vice conditions" needed to be corrected to prevent the spread of "social diseases," "transient girls" were to be kept away from "exposure places," and taxi drivers were to cease acting as "producers." In the only instance where the words "venereal disease" appeared, the report noted that, "Ninety-seven of 200 cases of venereal disease in New Hampshire are attributed to Portsmouth." Even more damning, the report observed that "Portsmouth is known as an open city; city officials not interested." The committee's report to Mayor Dale concluded:

That you as mayor, [should] through proper channels bring pressure to bear upon the law enforcement force which would make it possible to correct the *deplorable* conditions in the community which has been brought to our attention by the navy department, Federal Security Agency, and other social agencies.⁸²

⁸⁰ For those familiar with downtown Portsmouth, the Dolphin Hotel was located at the site presently occupied by the Metro Restaurant just off Market Square.

⁸¹ *Portsmouth Herald*, 1 Jun 1944, "Navy; Police Fight Vice; Find Dolphin Hotel Chief Venereal Infection Source," 1.

⁸² *Portsmouth Herald*, 14 Jun 1944, "Mayor Promises Action Here on Vice Conditions," 1 (emphasis added).

A previously annoying, but tolerable, situation described as Portsmouth's "girl problem" had become a deplorable and intolerable blight on the city that needed immediate correction. Portsmouth's beleaguered and grossly understaffed police force took issue with the committee's accusations that they had been lax in the performance of their duties. However, the department subsequently redoubled its efforts to rid the city of the conditions reported.⁸³

Six months after the increased campaign against vice and venereal disease, Cecelia T. McGovern, associate social protection representative of the Community War services, reported that conditions in Portsmouth had improved considerably. According to McGovern, the venereal disease control officer of the First Naval District had indicated that "due to the alertness of the local police and increased vigilance on their part, Portsmouth has not been named as the source of venereal disease as often as it was previous to the formation of the committee last spring."⁸⁴ In a backhanded compliment, Portsmouth had been praised with faint damnation for its relative progress in controlling venereal disease. While the city was apparently less often identified as a source of venereal disease, the VD rate amongst shipyard sailors and marines continued to climb from 68.56 per thousand in 1944 to 104.44 per thousand in 1945.⁸⁵ Enlisted men were still managing to become infected with VD somewhere in or around the city of Portsmouth.

⁸³ *Portsmouth Herald*, 22 Jun 1944, "Police Board Denies Laxity in Vice Fight," 1.

⁸⁴ *Portsmouth Herald*, 20 Oct 1944, "City's Venereal Disease Record Shows Improvement, Report Says," 1.

⁸⁵ See Table 14 in the Medical section of this chapter.

Having identified the victims of venereal disease as enlisted men, it is important to highlight the double standard of the times noted by Alan M. Brandt:

The word “promiscuous” was firmly anchored to “girl” – a promiscuous man was, by definition, an oxymoron. Women in this view, were the keepers of sexual mores . . . “They” infected the soldiers. In this view, venereal disease could only be transmitted in one direction.⁸⁶

Brandt suggests that navy yard officials may have misidentified the victims and that, perhaps, infected enlisted men were spreading the disease to previously uninfected local girls. While the sources of the disease may have been varied, many, and debatable, the increased rate of disease towards the end of the war was a fact.

Venereal disease was still an issue in the city, in March 1946, when operators of nineteen Portsmouth restaurants, taverns, and hotels were summoned to city hall for a meeting with Mayor Dondero and a dozen representatives from the military and state who were once again concerned about the venereal disease rate in Portsmouth.⁸⁷ The Dolphin Hotel and Restaurant, on probation since the Navy’s efforts in the summer of 1944 to clean up the city, was placed off limits for military personnel at this time. It appears that the only times that the subject of venereal disease received attention from local leaders was when the military officials demanded action to control the spread of the disease. Except for those occasions, the press and city officials chose to avoid the subject. Out of sight out of mind seems to have been the city’s modus operandi for dealing with the issue.

While the campaign against VD was showing slow and debatable progress, the city also continued to be plagued with drunk and disorderly sailors on liberty in

⁸⁶ Alan M. Brandt, *The Magic Bullet*, 168.

⁸⁷ *Portsmouth Herald*, 19 Mar 1946, “Army, Navy Press Fight Against Disease Here,” 1.

downtown Portsmouth. On 18 January 1945, it took all nine police officers on the night shift to break up a brawl on Congress Street, between navy yard sailors, at 1:30 in the morning. The fight had started in a local diner and spilled over into the street. Seven sailors involved in the brawl were arrested for drunk and disorderly conduct and, incredibly, two other sailors were arrested for drunkenness when they stormed the police station in an attempt to liberate their comrades.⁸⁸ It was not an easy job to be a Portsmouth policeman on the night shift during the war.

Postwar Worries

One of the biggest problems that mobilization brought to Portsmouth was the fear of what the inevitable postwar recession might bring. Fresh in the minds of many were the conditions that developed quickly after World War I. James Tucker, the head of the local Chamber of Commerce remembered “Committees of Portsmouth citizens rushing to Washington for relief after the armistice had been declared and practically all work discontinued at the local navy yard.”⁸⁹ He also recalled “how servicemen sold pencils and peddled apples on the streets,” and, if humanly possible, he wanted to avoid similar conditions after the current war.

The *Portsmouth Herald* had raised the initial alarm with Franklin E. Jordan’s series of articles in the summer of 1941 but, once the war swung into full gear, other issues pushed postwar concerns to the background for a few years. By mid-1943, the progress of the war was such that people became confident of ultimate victory and local concerns began to compete with global issues for attention once again.

⁸⁸ *Portsmouth Herald*, 18 Jan 1945, “Arrest, Fine Yard Sailors After Brawl,” 1.

⁸⁹ *Portsmouth Herald*, 8 Jul 1943, “Portsmouth Hopes to Keep Yard Booming After Victory,” 1.

In July 1943, the Portsmouth Chamber of Commerce launched a campaign to keep the yard booming after the war through a gradual tapering of submarine construction, the return of all farmed-out work to the shipyard, and the use, by private industry, of whatever yard facilities the government did not plan to use.⁹⁰ A commitment to these objectives was obtained from local government and business leaders, Congressmen, and shipyard officials at a conference in late July.

The *Portsmouth Herald's* editorial platform, which had changed from a strong neutrality position to a win-the-war position in March of 1941, changed again in late November 1943 to reflect confidence in victory. This time the first plank of the platform required "Complete Victory Over the Axis with No Appeasement" and the second plank pointed towards "A Just and Lasting Peace Enforced by a Truly United Nations." The third plank, "A Postwar Prosperity Plan for Greater Portsmouth," highlighted the Chamber of Commerce's campaign for postwar prosperity and helped to focus community attention on issues needed to guarantee that prosperity. Thus, six months before D-day, and well before the conclusion of the war, local leaders were targeting their own deliverance plan for Portsmouth and the Seacoast area. In late 1943, when naval officials were trying to gain the city's attention to solve a prostitution problem, the city's top priority was its future.

The *Portsmouth Herald's* managing editor, Franklin E. Jordan, who had raised the initial concerns about postwar Portsmouth in the summer of 1941, updated those concerns in a fifteen part series of articles in March 1944. This time Jordan was even more emphatic in his belief that the city's future was inexorably tied to the shipyard's fate. Jordan wrote, "Our navy yard is Portsmouth - whether we like it or not," and

⁹⁰ *Ibid.*

repeatedly stressed that, "Portsmouth's future fate will be determined by its dependence on the navy yard." The message was clear: Portsmouth's new found prosperity would be short lived if the economic engine across the river slowed or shut down.⁹¹

Noting the importance of the shipyard monies that were being pumped into the local economies, Jordan wrote, "Our navy yard provides incomes for almost four out of every five families and, indirectly, about one of every three service workers."⁹² Jordan emphasized that, unlike many communities that had converted peacetime industries to war industries, Portsmouth had no prewar industrial base to resurrect after the war. According to Jordan, "The city has practically no converted factories of machinery. This [income on which the city depends] comes from work done on government land, in government buildings, with government machinery, all designed to produce articles of war." So then, Jordan asked, what happens when the navy yard returns to peacetime production and employment levels? Where do the excess employees go and how does the community compensate for the lost incomes?

Jordan decided the area's most valuable asset in 1944 was a large skilled workforce. This was in stark contrast to the prewar situation, when industry had shunned the area because of a lack of skilled workers. The federal training programs had created thousands of welders, pipe fitters, mechanics, and other craftsmen. The challenge was, first, to maintain as much work as possible at the yard after the war and, second, to create other opportunities for the soon-to-be excess of skilled workers. It was to these ends that the local Chamber of Commerce, city officials, and Congressman dedicated their efforts in late 1944.

⁹¹ *Portsmouth Herald*, 21 Mar 1944, "Portsmouth and Peace," 1.

⁹² *Ibid.*

The concerns of Franklin Jordan and the Chamber of Commerce began to be realized in July 1944, when Assistant Secretary of the Navy Ralph A. Bard advised Commandant Withers that recent successes in the Pacific had reduced the need for large numbers of submarines and, consequently, a considerable number of submarines would be canceled from the current building program.⁹³ Without providing numbers, Bard said that Portsmouth Navy Yard's workload would be reduced accordingly. Portsmouth and the other submarine building shipyards had become victims of their own success. Having produced the tremendous numbers of submarines that had contributed significantly to winning the war in the Pacific, the Japanese Navy and shipping had been forced into a smaller area, in turn reducing the need for United States submarines. Instead of more submarines, the Navy urgently needed aircraft carriers, cruisers, amphibious assault ships, cargo carriers, tankers, and other weapons of war to carry the fight to the Japanese homeland.

Faced with the first official notice of shipyard cutback, the Portsmouth Chamber of Commerce published a study that reiterated its position of a year earlier, calling for the continuance of the maximum possible workload at the shipyard after the war.⁹⁴ The awkward and lengthy title of the study summarized the community's fears, "Can the One Step Which Might Separate a 'Boom-Town' from a 'Bust-Town' be Avoided or Must Portsmouth do an Economic Back-somersault." The one step, of course, was continued high navy yard employment. Boom-town or Bust-town? That was the question that was

⁹³ *Portsmouth Herald*, 31 Jul 1944, "Navy Slashes Sub Construction Next Year at Portsmouth Yard; Pacific Success Cause Cutback; No Discharges Seen," 1.

⁹⁴ *Portsmouth Herald*, 4 Aug 1944, "James Tucker Outlines Five Point Reconversion Plan for City before Rotarians," 1.

on Jordan's mind, in the summer of 1941, when he wrote of Portsmouth's greatest problem, and that continued to be chief concern of the Chamber of Commerce in 1944.

Another Portsmouth Chamber of Commerce study, of a similar nature, entitled "The U.S. Navy Yard: Portsmouth's One Big Industry" documented local population and economic changes that had occurred during the war and also argued the need for continued strong navy yard employment after the war. Citing a total of 12,981 New Hampshire residents employed at the shipyard, and assuming an average family size of four people, the Chamber of Commerce concluded that about 52,000 New Hampshire residents were dependent on a shipyard paycheck.⁹⁵ The Chamber's assumption of a family size of four may be high, considering the probability of multiple family members working at the yard, but there is no avoiding the conclusion that the local economy was heavily dependent on the shipyard.

During the latter half of 1944, New Hampshire's Congressmen were relentless in their efforts to secure work for Portsmouth Navy Yard. Succumbing somewhat to that pressure, Rear Admiral E. L. Cochrane, Chief of the Bureau of Ships, clarified the navy's intention to give Portsmouth and Electric Boat preferential treatment, during the forthcoming curtailment, because they were the "two leading yards on matters of submarine design."⁹⁶ According to Cochrane, the bulk of the cutbacks would be taken from the other four yards building submarines and Portsmouth and Electric Boat would "carry along on a reduced scale into 1947." Senator Russell Tobey reassured the

⁹⁵ Portsmouth Chamber of Commerce letter of 3 July 1944 to Rear Admiral Thomas Withers with enclosure "The U.S. Navy Yard: Portsmouth's One Big Industry." Thayer Cumings Library and Archives, Strawberry Banke Museum, Portsmouth, N.H., MS 96, Box 1, Folder 5, "Business and Industry."

⁹⁶ Quoted in *Portsmouth Herald*, 21 August 1944, "Chamber Told of Plans for Navy Work," 1.

Portsmouth Chamber of Commerce on 29 Aug 1944 that he had extracted a pledge from Assistant Secretary of the Navy Ralph Bard that the preferential treatment, planned for the yard, would include a fair share of the postwar overhaul and repair workload. On 27 October 1944, Rear Admiral E. L. Cochrane, reassured 400 shipyard employees, during an address at the yard, that “A workload of no small proportions is being retained at Portsmouth,” and that the yard would be maintained “as a going submarine design building yard – to be ready to take us into the next period of development.”⁹⁷ Despite the assurances, city officials remained apprehensive about the future.

The apprehension that many held for Portsmouth’s future in 1944 was prevalent in many towns throughout the country. The war had brought industry and prosperity to many areas that now feared for the vacuum that would be left when those wartime industries were shut down. Marc Scott Miller, in his work, *The Irony of Victory: World War II and Lowell, Massachusetts*, notes that “World War II artificially stimulated Lowell’s economy, orienting it towards military rather than civilian and human needs. Continued growth depended, in large part, upon continuing war production.”⁹⁸ Such was the case in hundreds of towns in 1944. As it turned out, Portsmouth fared much better than Lowell, which, after the brief recovery provided by the war, continued its prewar economic decline.

Reminiscent of James Tucker’s memories of how various committees from Portsmouth traveled to Washington immediately after World War I to solicit work for the

⁹⁷ Quoted in *Portsmouth Herald*, 27 Oct 1944, “Adm. Cochrane says Portsmouth Subs Play Major Role in Pacific,” 1.

⁹⁸ Marc Scott Miller. *The Irony of Victory: World War II and Lowell, Massachusetts* (Chicago: University of Illinois Press, 1988), 206.

yard, three representatives from Ranger Lodge 836, International Association of Machinists, traveled to Washington in early December 1944 looking for work for the yard. True to the Navy's elevated priorities for the weapons and equipment needed for the final push to Japan, the committee returned with a guarantee for work for the construction of, not more submarines, but pontoons for advanced bases.⁹⁹ The streamlining of shipyard operations for submarine construction, that had produced thirty-two submarines in 1944, would be of little use in the construction of pontoons. The times were changing.

In August 1945, the yard returned to a five-day, forty hours work week for the first time in five years. At the same time, yard officials discontinued the third (night) shift and announced plans to return to one shift operations as soon as possible.¹⁰⁰ Signs of drastic employment reductions were everywhere. Late 1945 and early 1946 were filled with frequent rumors and fears about employment reductions at the yard, followed quickly by reassurances from the Navy and Congressmen that Portsmouth Navy Yard would be treated fairly with regard to reductions in employment. None were denying reductions, but all were claiming that the reductions would be as gradual as possible. The Chamber of Commerce report, at the close of 1945, claimed satisfaction to date with the community's efforts to control the reduction in workforce at the yard:

Because of the continuing efforts which the Chamber of Commerce inaugurated in July 1943 to soften this economic blow [employment reductions at the navy yard] and because of like efforts by organized labor at the yard, the local community has not yet suffered severely in a business way. Work has been tapered off, arrangements are being made eventually to return

⁹⁹ *Portsmouth Herald*, 12 December 1944, "Union Gets Wash. Agreement of Future Work at Navy Yard." 1.

¹⁰⁰ *Portsmouth Periscope*, 27 August 1945, 1.

farmout work manufacturing processes to the yard . . . new types of work have been found to help take up the slack and more repair work has been sent to Portsmouth.¹⁰¹

This expressed satisfaction would wane in the coming months when reductions in employment were much greater than expected.

The ultimate goal of the Chamber of Commerce was to rally public, Congressional, and, hopefully, federal support for maximum postwar employment at the yard. The Chamber believed that the federal government, having brought the boom, was responsible for the prevention of the much feared bust:

A further factor is that the Federal Government, having expanded the population and productive powers of Portsmouth, Kittery, and the environs, bears a direct and unavoidable responsibility to see that when contraction occurs, the least possible dislocation of life and services is experienced. Housing projects without tenants, expensive sewer and water services built to meet the war emergency but no longer needed in peacetime, and a large group of unemployed, should not be left as burdens upon the community.¹⁰²

The analysis of how the relationship, between the federal government and the community, played out in the postwar years is a study unto itself that is well beyond the scope of this dissertation. Suffice it to say that Portsmouth Navy Yard and the city of Portsmouth have enjoyed a very successful partnership since 1945.

Politics

In discussing wartime political changes in California, Roger W. Lotcin makes the observation that women made little progress in gaining political office during the war. He finds this a little surprising because “With so many males absent and absentee-voting

¹⁰¹ *Portsmouth Herald*, 8 Jan 1946, “Chamber Official Reports ’45 Activities to Members,” 1.

¹⁰² “Survey of Health and Welfare in the Portsmouth Defense Area,” 123. Cumings Library and Archives, Strawberry Banke Museum, Portsmouth, N.H., MS 96, Box 2, Folder 1, “State Council of Defense, Local Committees: Portsmouth..”

turnouts light, women were certainly the potential majority of the electorate.”¹⁰³ He suggests that the reason may be because “there was no labor shortage in politics as there was in the labor force.”¹⁰⁴ Jacqueline R. Braitman answers that, while women made very little electoral progress during the war [in California], they advanced in other, less visible, political spheres instead.¹⁰⁵

Unlike California women, Portsmouth women did make significant electoral progress during the war. This progress was highlighted by the precedent setting election of Mary Dondero as mayor of Portsmouth in November 1944. Dondero was the first female mayor of Portsmouth and the first woman elected to the position of mayor in the state of New Hampshire. After having been elected by seven votes in 1944, she was reelected to a second term in November 1945 by the largest plurality in the history of the city, and then defeated by one vote in 1946.

It was a time of great political turmoil as the Republicans’ long-standing grip on the city’s politics was challenged by the progressive ideology of the Democrats and Mary Dondero. The *Portsmouth Herald*, a strong Dondero supporter at the time, enthusiastically reported her reelection in 1945:

Mayor wins all Five Wards to Rout GOP. . . Mayor Mary C. Dondero, first woman chief executive in the history of the City of Portsmouth, yesterday won an overwhelming victory in her quest for a second term. . . In doing so

¹⁰³ Roger W. Lotchin, “The Historians’ War or The Home Front’s War?: Some Thoughts for Western Historians,” *The Western Historical Quarterly* Journal vol. 26, No.2 (Summer 1995), 191.

¹⁰⁴ Roger W. Lotchin. “California Cities and the Hurricane of Change: World War II in the San Francisco, Los Angeles, and San Diego Metropolitan Areas,” *Pacific Historical Review* 63 (August 1994), 414-416.

¹⁰⁵ Jacqueline R. Braitman, “Partisans in Overalls: New Perspectives on Women and Politics in Wartime California.” *The Way We Really Were: The Golden State in the Second Great War*. Roger W. Lotchin, ed. (Chicago: University of Illinois Press, 2000), 215-235.

she won a 2,494-vote victory over the same Republican opponent whom she barely nosed out by seven votes a year ago.¹⁰⁶

Similarly, the *Portsmouth Herald's* editorial on 7 November 1945 hailed Dondero's reelection as a changing of the guard:

An aroused Portsmouth citizenry showed its confidence in Mayor Dondero's integrity and administration and repudiated the tactics of the Republican machine by reelecting her by an overwhelming majority and, with the same vote, riding the Republicans out of town on the well known rail.¹⁰⁷

The *Herald's* obvious delight with Dondero's reelection was not just a partisan reaction to a Democratic victory. The paper had repeatedly expressed discontent with FDR's New Deal politics¹⁰⁸ and had endorsed Republican Governor Dewey over FDR in the last presidential election. The newspaper's endorsement of the new mayor had more to do with her honest and open style of government than the fact that she was a Democrat. Of course, the *Herald* did not know, at the time, that the Republicans would ride the same rail back into town the next year,

How much did events at the shipyard have to do with the transformation of Portsmouth city government in 1944? One can argue that the large influx of workers and military personnel stressed city services as never before and made the incumbent Republican administrations more vulnerable than they had ever been in the past. The *Herald* repeatedly criticized the Republican incumbents for slow, secretive, and bureaucratic practices when dealing with the challenges presented the city during the war years. Dilapidated housing, a perceived inadequate police force, and a community water

¹⁰⁶ *Portsmouth Herald*, 7 Nov 1945, "Mayor Carries all Five Wards to Rout GOP," 1.

¹⁰⁷ *Portsmouth Herald*, 7 Nov 1945, "A Vote of Confidence and Repudiation," 4.

¹⁰⁸ *Portsmouth Herald*, 4 Nov 1945, "Had Enough – More Than Enough?," 4.

shortage were just a few of those challenges. As problems mounted, it seems reasonable to assume that the citizenry would become less tolerant of business-as-usual government and look for a change in leadership.

What about Roger W. Lotchin's argument that many males were absent, absentee-voting turnouts were light, and women were potentially the majority of the electorate? Could Dondero's election have been facilitated by a preponderance of woman voters?

Table 25 suggests that the argument may have merit.

Table 25 - Portsmouth Residents by Sex¹⁰⁹

	1930	1940	1944 (assumes 34.3 % increase and 10% of men in service)
Women	7250	7610	10,197
Men	7211	7245	8,737

The table shows that the number of Portsmouth female residents increased, between 1930 and 1940, until there were 365 more female residents in 1940. Lacking hard data, the constructed figures for 1944 reflect an average 34% increase in population through 1943 and a reduction in the male population by 10% to account for military service. Keeping in mind that the figures represent all residents, and not just voters, it still appears that women would have been a decided majority in the 1944 elections.¹¹⁰ Admittedly, Table

¹⁰⁹ The 1930 and 1940 figures are from "Survey of Health and Welfare in the Portsmouth Defense Area," Table in appendix entitled "Population Sex, 1930 - 1940." As indicated, the 1944 figures assume the 34.3% increase that the survey attributes to the entire area between 1940 and 1943 and a 10% reduction for males to account for military service. "Portsmouth Chamber of Commerce," 3. Thayer Cumings Library and Archives, Strawberry Banke Museum, Portsmouth, N.H., MS 96, Box 2, Folder 1, "State Council of Defense, Local Committees: Portsmouth.."

¹¹⁰ At the risk of extrapolating an estimate from an approximation, one could apply age distribution percentages from Table 19 and conclude that there were about 6600 women and 5700 men of voting age in 1944.

25 does not speak to the number of women registered to vote or the number that actually voted for Dondero. However, the table does suggest a demographic that may have worked to Mary Dondero's advantage in the November 1944 election.

There is another wrinkle to this analysis of female voters. Mary Dondero was enormously popular with mothers because of the attention she showered on sons and daughters leaving for military service. According to Eileen Foley, her mother, as a Councilwoman and later as mayor, presented every person leaving for the service with a carton of cigarettes, a box of chocolate, and writing paper. The presentations took place in the center of town outside Jarvis's Restaurant, after which Mrs. Dondero, waving a large American flag, would lead the assembled group, accompanied by the small high school band, to the train station.¹¹¹ This practice endeared her to many mothers and, unquestionably, garnered her many female votes.

In November 1944, Dondero was one of several Democrats elected in unprecedented numbers to Portsmouth city offices. Elected by only seven votes in November 1944, the refreshingly open style of government practiced by Mary Dondero was obviously well received, as evidenced by her landslide victory in November 1945. Dondero introduced a new era in Portsmouth government, but she very well may not have gotten the seven votes she needed for her initial victory in 1944 had the city not been challenged with wartime issues.¹¹²

¹¹¹ Interview with Eileen Dondero Foley, 30 Aug 2006, at her home in Portsmouth, N.H.

¹¹² When interviewed on 30 August 2006 at her home in Portsmouth, N.H., Eileen Foley, Mary C. Dondero's daughter, attributed her mother's political victory in November 1944 solely to her popularity with the people of Portsmouth. She particularly emphasized the gifts and small parade given each new recruit. Foley recalls that her mother did the same for her in 1944 when she left Portsmouth for the WAC. At any rate, Eileen Foley believed that it was her mother's patriotism, visibility, and popularity that got her elected and not Portsmouth's turmoil as I argue. While I share Foley's assessment of her mother's enormous popularity at the time, the fact that a number of other Democrats were also elected for the first

Another shipyard boomtown, Kirkland, Washington, experienced a Democratic landslide in the 1944 election that the local newspaper, the *East Side Journal*, attributed to newcomers voting for the first time in the state. The paper linked political affiliation with length of residence and social class, implying that the thousands of industrial workers that had been added to the rolls of the local precincts had skewed the vote decidedly in the Democrat's favor.¹¹³ This demographic dynamic may have also contributed to the Democrats' success in the Portsmouth elections in 1944 and 1945.

After winning by the largest plurality ever in 1945, Dondero lost the November 1946 election initially by eight votes and, after several appeals and a recount, lost by one vote to her Republican opponent.¹¹⁴ Partisan politics ran rampant through the city during this period. The Republican stronghold had been shaken, but not ridden out of town on a rail, as the local newspaper had reported a year earlier. Still, Portsmouth politics were never the same after Mary Dondero's election in November 1944. Democrats and women have held important political leadership positions ever since.

As contentious as the political scene was in Portsmouth towards the end of the war, to the credit of both Republicans and Democrats, there were no reported scandals or political graft. There was not the case in other boomtowns where the war brought huge federal contracts, and temptations, to public officials administering those contracts. In

time in November 1944 seems to point to factors, in addition to popularity, that brought Mayor Dondero and the Democrats to power. When interviewed, William Tebo noted that he had missed getting Mary Dondero's going away package because his parents drove him to Concord to catch the train rather than leaving from the Portsmouth train station. Mary Dondero, dedicated to departing servicemen as she was, later delivered the package to Tebo's parents to give to him. Oral interview with William Tebo at the Portsmouth Navy Yard Museum, 3 November 2006.

¹¹³ Lorraine McConaghy, "Wartime Boomtown: Kirkland, Washington, a Small Town during World War II." 43-44.

¹¹⁴ *Portsmouth Herald*, 12 Dec 1946, "Dondero May Continue [State] Senatorial Seat Fight," 1.

Kirkland, Washington, the city treasurer, mayor, attorney, and a councilman were indicted on grand larceny charges involving government contracts and resigned.¹¹⁵ The Portsmouth political scene was mild in comparison. It was filled with hotly contested political elections and infighting, but no criminal activity.

Riding the economic engine of the Portsmouth Navy Yard during the war, Portsmouth and its environs were transformed, in a few years, from an area with a rapidly growing rural and farm population, for the ten years preceding the war, to a prosperous industrial community of 20,000 with many new, and decidedly younger, residents. The newfound prosperity brought growth in purchasing power and retail sales far above that of the rest of the state, which lost ground to the nation. Sociological problems accompanied the great influx of workers, military, and federal monies. Portsmouth, a quiet vacation destination before the war, became a military town with increased vice, a housing shortage, and inadequate services. Over a thousand new housing units were constructed along with new schools, new streets and roads, and tremendous extensions of water and sewer mains, telephone facilities, and other utilities. Having achieved so many gains during the war, the seacoast community was left heavily dependent on continued high shipyard employment to protect those gains after the war. This exceptional dependency has been painfully revisited on numerous occasions since 1945 each time the yard was threatened with workforce reductions or closure. Lastly, the political change to female Democratic leadership at the end of the war, a watershed in Portsmouth politics, has had an equally lasting impact on the city.

¹¹⁵ Lorraine McConaghy, "Wartime Boomtown: Kirkland, Washington, a Small Town during World War II," 45.

CHAPTER IX

TRANSFORMATIONS

“Our navy yard is Portsmouth - whether we like it or not. . . . Portsmouth’s future fate will be determined by its dependence on the navy yard.”¹

**Frank E. Jordan
Portsmouth Herald
21 March 1944**

An overarching theme for this dissertation has been the transformation of Portsmouth Navy Yard and the surrounding communities as the result of the activities at the yard during the war. Also, the futures of both were, to a large extent, determined by that same activity. This chapter summarizes those transformations and important postwar events.

Shipyard

During the war, the shipyard continued to transform itself by expanding its boundaries through the reclamation of wetlands and shoal waters. This practice continued a tradition that extended back to the yard’s establishment in 1800. That tradition would continue unabated for another twenty-five years or so before the potential environmental consequences of such practices would be realized. The significant physical changes that took place at the shipyard during the war are readily apparent by comparing the pre and

¹ *Portsmouth Herald*, 21 Mar 1944, “Portsmouth and Peace,” 1.

postwar maps of the yard in the appendix, Figures A-1 and A-2 respectively. Referral to these maps will be helpful in understanding the summary that follows.

The most obvious change was that the ever expanding shipyard had extended itself about a quarter of a mile into the river towards Strawberry Banke by the acquisition of yet another island, Pumpkin Island, and the surrounding shoal waters. The trapezoidal shaped extension is the new fitting-out pier that added about a half mile of submarine berths. During the war, those berths were filled to capacity with submarines stepping off the building ways at record setting rates. Shortly after the war ended, the berths were kept filled to capacity with captured German submarines, and excess United States submarines, waiting to be overhauled, mothballed, or purchased by foreign countries. The piers would never again be as active as they were during and immediately after the war. However, during the peak years of the Cold War, with the need to overhaul the nation's large nuclear powered submarine fleet, the piers again bristled with activity. Today, the inactive piers stand as moot testimony to the excess capacity at Portsmouth Naval Shipyard due to the extensive build-up during World War II.

The prewar map of the shipyard does not even show Jamaica Island, purchased during the war for an ammunition storage site. The postwar map shows a fully developed Jamaica Island, complete with ammunition storage bunkers and a connecting road that runs over a rather sizeable landfill. That landfill would be included in the infamous Jamaica Island Superfund site. Extending from the base of that landfill out into the back channel is a large peninsula that was not there in 1939, the result of more landfill.² In 1945, the quarters for the Commanding Officer of the Hospital were constructed on this

² According to James Dolph, Portsmouth Naval Shipyard historian, all of the land fill in the vicinity of this peninsula, known locally as Strawberry Point, is considered to be part of the EPA designated Jamaica Island Superfund site. Telephone interview with James Dolph of 26 March 2007.

peninsula. Hospital wards and nurses quarters were built on the landfill immediately to the west of the road leading to the quarters.³ This peninsula, and the surrounding area, would also become one of the more active of the Superfund sites, requiring millions of dollars in clean-up costs. It is a tragically ironic sign of the times that a doctor's living quarters would be constructed on a hazardous waste landfill.

Probably as important as the physical transformations that occurred at the shipyard during the war was a transformation that did not happen. There was, apparently, no more concern for the dangers of industrial pollution at the end of the war than there was at the beginning. After giving brief consideration, before the war, to compliance with state policies for control of sewage discharge into the Piscataqua River, the issue waned in importance once the war began. The shipyard was dumping much more raw sewage and industrial effluents into the river in 1945 than it did in 1939. The shipyard was not alone, as the local communities, with their greatly increased populations, were doing the same.

The physical appearance of the yard changed radically, with the addition of many new buildings and extensions to old buildings, the most significant of which was the upgrading of Building 50 early in the war, the large black structure that dominates the shipyard skyline when viewed from across the river at Prescott Park. This structure housed the building ways that increased from two to five during the war. Also, the building was effectively doubled in size, with an extension to allow for the nearby

³ *Cultural Resources Survey, Portsmouth Naval Shipyard*, United States Department of Defense, Legacy Resource Management Program, April 2003. Prepared by the Louis Berger Group, Inc. for the Engineering Field Activity Northeast Naval Facilities Engineering Command, Table M-1. Portsmouth Naval Shipyard Museum Archives, Kittery, Me.

construction, assembly, and easy transport of submarine sections to the building ways. During the 25 years of submarine construction after 1945, only 23 submarines, 13 diesel and 10 nuclear powered, were built on the building ways. The last was the USS *Sand Lance* (SS660), completed in 1972. After 1945, the yard completed, on average, less than one submarine a year and never more than three submarines in any one year, a far cry from 32 in '44. In the interest of fair reporting, submarines became increasingly complex technological marvels after the war, in comparison to the thirty-two fleet boats that the yard delivered in 1944.⁴ Today Building 50 also stands as a testament to excess capacity at the yard. Material and parts are stored in this building that once launched submarines at record rates during the war.

The wartime construction of the fitting out pier, Dry Dock #1, and the Shipbuilding Basin, had the effect of shifting shipyard operations decidedly westward. Prior to the war, the center of the industrial work in the yard was located near the only dry dock at the time (Dry Dock #2) and the nearby building ways, critical shops, and the old fitting-out piers. During the war, and most certainly after the war, when the building ways saw less and less activity, the industrial heart of the yard moved westward to the new fitting out piers.

The creation of *Squalus* Memorial Park, in the heart of the shipyard, is another important physical transformation that occurred as the result of the war. The *Squalus*, sunk off the Isle of Shoals in May 1939, recovered in October 1939, rebuilt in 1940, and

⁴ The primary technical advancement was nuclear power versus diesel power. Other technical improvements included thicker high strength allotted pressure hull steels, shipboard atmosphere control equipment (carbon dioxide scrubbers, oxygen generators, carbon monoxide scrubbers, and increased use of electronics for communications, navigation, and fire control equipment. Missile tubes, with the associated equipment needed to house, monitor, and fire ballistic missiles with nuclear warheads, added another dimension to the technical complexity of later submarines.

recommissioned as the *Sailfish*, went on to enjoy twelve very successful war patrols in the Pacific. The submarine was credited with the sinking of two Japanese carriers, a light cruiser, two submarines, three destroyers, and more than twenty merchant ships.⁵ The submarine returned to the yard in late 1945 for decommissioning and scrapping. Prior to such a regrettable ending for such a fine ship, New Hampshire Governor Charles Dale⁶ and New Hampshire Senator Russell Tobey wrote Secretary of the Navy James Forrestal and obtained the navy's approval to permanently place the submarine's conning tower and bridge in the center of the yard, as a suitable memorial to the men who lost their lives when the submarine sank, as well as the men who fought her so gallantly during the war.⁷ Today, this memorial serves as the site of the yard's most important gatherings and official ceremonies, during which the conning tower and bridge of the *Squalus* serve as a speaker's platform. On such occasions, one cannot help but be reminded of the remarkable World War II accomplishments of Portsmouth Navy Yard.

Less apparent than the physical transformations were the contributions that Portsmouth Navy Yard made to changes in the U.S. Navy's submarine technical and industrial strategy. If nothing else, the performance of Portsmouth Navy Yard, during the war, validated the policy change that the U.S. Navy had initiated after World War I to gain technical control of submarine construction. Unlike during World War I, when the Navy had little or no technical input to the design of the submarines built by private

⁵ *Portsmouth Herald*, 30 Oct 1945, "Tribute Paid to Gallant USS *Sailfish*," 1.

⁶ Governor Dale attended the triple simultaneous launching on 27 Jan 1944 as the Mayor of Portsmouth.

⁷ *Portsmouth Herald*, 31 December 1945, "Dale, Tobey Act to Get *Sailfish* Conning Tower for Memorial," 1.

industry, the U.S. Navy directed and controlled all technical upgrades during World War II. Not only did the U.S. Navy control submarine design and technology, it was able to feed back wartime experience to the Design Division at Portsmouth Navy Yard and have the desired technical alterations installed on the next order of submarines. Private industry, on the other hand, often resisted technical changes to contracts in the midst of large production orders. Rear Admiral Withers and Portsmouth Navy Yard welcomed those changes.

Dr. Gary Weir argues that the dramatic increase, in both the submarine force and industrial base between 1940 and 1943, “marked the birth of the naval-industrial complex for submarines.”⁸ According to Weir, “In the crucible of the interwar period, naval authorities, plagued by fiscal and technical trials, defined the vessel and the strategy they wished to employ as well as the character of the naval-industrial relationship.”⁹ The Navy then used its dominant position, early in World War II, to form and secure the desired control over submarine technical and production matters. Portsmouth was an integral part of the grand naval strategy that so successfully transformed the future relationship between private industry and the submarine force. That relationship contributed significantly to the successful build-up of the United States nuclear submarine fleet that became such a powerful deterrent to Soviet aggression during the Cold War.

Just as the Navy successfully culminated a policy transformation during the war that had been in progress for thirty years, Portsmouth Navy Yard completed a long-term strategic transformation, from a multi-purpose shipyard to a shipyard specializing in submarine construction. The favored treatment that the shipyard received from the U.S.

⁸ Gary Weir, *Forged in War*, 35.

⁹ *Ibid.*

Navy between 1920 and 1940 led to the development of a strong design team and many orders for new submarines prior to, and during, World War II. The shipyard capitalized on that favored treatment and, by the time mobilization began to accelerate in the late 1930s, the yard had acquired a reputation for excellence in submarine construction. Capitalizing on that reputation and wartime needs, the yard was able to convince the powers that be in Washington to direct as much new construction work as possible to the yard to the exclusion of almost all other work. With the newly created Bureau of Ships overwhelmed with other responsibilities, Portsmouth, being one of the best performing and highly respected navy yards, was, for the most part, left to manage its own affairs. With the deck stacked in its favor, the yard thrived beyond all expectations. By 1944, Portsmouth Navy Yard had completed its transformation from a developing submarine shipyard, with a mix of miscellaneous work, to the preeminent designer and builder of submarines for the U.S. Navy.

The end of the war quickly brought an end to the ultra-efficient shipyard with processes streamlined for new construction. The yard was quickly transformed back to prewar conditions, with employment levels closer to 6,000 than the peak of 20,469 in 1943. A potpourri of postwar work included orders for submarine repairs and overhauls, the manufacture of miscellaneous pontoons and yard craft, and the work needed to prepare submarines for the mothball fleet, disposal, or sale to foreign nations. More and more, the building of new submarines was pushed to a secondary role. After building 32 *in '44*, the yard built 12 submarines in 1945, 3 in 1946, none in 1947, 1 in 1948, none in 1949, and none in 1950.

By 1950, employment had fallen to a little over 4,000 workers, about the same employment that the yard had in 1939. The shipyard had come full cycle and the ultra efficient shipyard, streamlined for the construction of submarines, receded into the past. The shipyard kept remnants of the mass production techniques it had employed but, for the most part, wartime innovations found less and less application as the workload dropped. The construction of multiple submarines was discontinued in Dry Dock #1 and the Building Basin, the stepping of submarines from berth to berth for specific work items lost its production advantages, and paperwork and record keeping returned in spades. By the 1970s, the yard had acquired a specialty in the repair and overhaul of nuclear submarines that continues until this day. However, that specialty, unlike the repetitious construction of World War II diesel submarines, in no way lends itself to streamlining procedures for mass production.

Community

The great increase in employment and activity at the shipyard, during the war, transformed southern Maine and the seacoast region of New Hampshire from rural and farming communities to a much more densely populated and urbanized area. A tremendous transformation occurred in housing as over a 1,500 new housing units were constructed at the three Federal Government sponsored housing projects. These projects, as urgently needed as they were, met with a certain amount of initial, and continuing, disapproval from local civic leaders because of their hasty and utilitarian construction. Significant infrastructure development included new schools, new streets and roads, and tremendous extensions of water and sewer mains, telephone facilities, and other utilities. Urbanized and industrialized, Portsmouth was a radically changed city in 1945, as

compared to the “prosperous New England port, steeped in history and thriving as a summer resort,” that the New York Times reporter had described in October 1942.

The state of New Hampshire was also transformed as the result of activity at the yard during the war. While the local seacoast region of New Hampshire experienced a 20.9% increase in population during the war, the state of New Hampshire experienced a significant decrease in the overall state population of 6.6 %. The center of New Hampshire’s population, commerce, and manufacturing shifted dramatically towards Portsmouth. Towards the end of the war, the effective annual purchasing income of Portsmouth residents was slightly greater than the average in the United States, and considerably higher than the average of the state of New Hampshire, as the state’s center of prosperity also gravitated towards Portsmouth.

The Portsmouth area was also transformed from an area that was shunned for manufacturing development prior to the war, because of a lack of skilled workers, to an area attractive to manufacturers because of an abundance of skilled workers. The extensive, federally funded, and locally administered, training programs needed to supply the shipyard with trained employees during the war, created an excess of skilled workers and training facilities when both were in much less demand after the war. In 1945, with the war winding down, the city of Portsmouth struck a deal with the state whereby the city agreed to rent the Morley Company building, which housed the federal vocational school, in return for the state establishing one of the first state trade schools.¹⁰ The city and state took advantage of the machinery and equipment in the federal vocational school that was already under the control of the state board of education, to launch the state trade

¹⁰ *Portsmouth Herald*, 21 Jul 1945, “Portsmouth is Chosen site for Trade School,” 1.

school system that evolved into the New Hampshire Technical Colleges. Thus, the city insured a steady supply of skilled workers for the future.

Women were transformed from housewives to become valuable employees of the shipyard shops and community, during the war years. They gradually, but steadily, progressed from helpers and clerks to machinists, welders, and trained supervisors. Many of the women employees of the shipyard returned to their housewife duties after the war, as was the custom across the nation. From a peak of 19,000,000 working women in the United States during the war, the total in January 1946 had dropped to 15,630,000.¹¹ The number of Portsmouth Navy Yard female employees also dropped precipitously after the war, but women had definitely made their mark and proved their worth. The local transformation of women to the workplace may have been put on hold at the end of the war, but it returned even stronger twenty years later.

The transformation that Mary Dondero brought about in the Portsmouth city government was more immediate and permanent. Dondero's election in November 1944 as the first female mayor of Portsmouth, and the first ever in the state of New Hampshire, ousted the city's traditional male dominated, conservative, Republican government and set in motion a change in Portsmouth politics that saw women and Democrats fill influential positions in city government for much of the next half century.

At the start of Dondero's second term, in January 1946, her 26 year old daughter, Eileen Dondero, was elected by the city council to serve as city clerk, the first female city clerk in the history of the city. Eileen Dondero, a painter's helper at the shipyard during the war, has been a strong and loyal supporter of the yard ever since. She went on to

¹¹ *Portsmouth Herald*, 4 Mar 1946, "Rosie the Riveter Swaps Her Coveralls for an Apron," 1.

serve 18 years as the mayor of Portsmouth, 1968 to 1972 and again from 1984 to 1998. Her election in 1984 marked the beginning of twenty-two continuous years during which women held the position of mayor in the city of Portsmouth. Since 1944, Portsmouth has been largely a progressive Democratic city with women filling many important political offices. Much of the credit for that transformation is due to Mary Dondero and Eileen Dondero Foley, both of whom maintained strong ties to the yard during their political careers as the result of being employed there during the war.

Other Transformations

Three other transformations deserve mention to complete the picture of events at Portsmouth Navy Yard during the war. These include a sudden and unfortunate career crisis for Rear Admiral Withers in the summer of 1945, the further consolidation of responsibilities in the Bureau of Ships for management of navy yard affairs in late 1945, and the EPA studies of the shipyard that resulted in Superfund status in 1994.

Rear Admiral Withers enhanced his well established, prewar reputation even more with the outstanding performance of Portsmouth Navy Yard under his command during the war. However, despite a distinguished naval career of almost forty years and an illustrious record at Portsmouth, his tour of duty and his career ended on a sour note in June 1945, when the Naval Inspector General found Withers to be derelict in the performance of his duties involving the handling of surrendered German submarines and prisoners of war.

Four German submarines, U-805, U-873, U-1228, and U- 234 had been escorted to Portsmouth Navy Yard by U.S. destroyers between 15 and 19 May 1945 for

observation, selective stripping, and processing of prisoners in accordance with guidance from the Chief of Naval Operations, in strict accordance with the Geneva Convention. It soon became apparent that irregularities had occurred during the interrogation of German prisoners and, on 24 May 1945, Commandant Withers appointed Captain Armand M. Morgan to head a Board of Investigation “to inquire into and report upon the handling of German prisoners of war” including “the alleged extensive looting of personal baggage of these prisoners while at the Naval Prison, Portsmouth N.H., during the period 16 May 1945 to 21 May 1945.”¹² The investigation was quickly elevated to the Naval Inspector General’s office and Commandant Withers became one of the accused rather than the senior investigating officer.

In a classic case of the Commanding Officer being held responsible for the actions of his subordinates, the investigation of the Naval Inspector General found Withers ultimately responsible for the looting of the surrendered German submarines and the robbing and maltreatment of German prisoners of war:

That the Commandant of the Navy Yard, Portsmouth, Rear Admiral Withers, U.S Navy, was derelict in his performance of duty in that he failed to recognize and accept his command responsibility to issue clear, concise instructions to his subordinates with regard to receiving, securing, safeguarding, and stripping U-boats surrendered in the Navy Yard, Portsmouth, New Hampshire, and to safeguard the persons and property, both private and public, of German prisoners who were in his custody. He further failed to take effective action when violations of the Chief of Naval Operations’ order and the Geneva Convention were brought to his attention.¹³

¹² Commandant Portsmouth Navy Yard Rear Admiral T. Withers memo of 24 May 1945 to Captain Armand M. Morgan, USN, Subject: Board of Investigation to inquire into and report upon the handling of German prisoners of war. NARA Waltham, RG 181, Portsmouth Naval Base 1930-1950, Box 14, Folder A17 “Boards of Investigation 1925 to 1946.”

¹³ www.uboatarchive.net/U-873NIGReport.htm. Report of the Naval Inspector General Regarding Irregularities Connected with the Handling of Surrendered German Submarines, Serial : 01783 of 19 June 1945, 2.

Appropriate administrative or disciplinary action was recommended for Rear Admiral Thomas Withers, Captain Clifford H. Roper, three Marine Corps Officers attached to the Naval Prison, two Medical Officers, and one civilian of the Office of Naval Intelligence, Mr. Jack Henry Alberti.

Three hundred and eighty three pages of testimony led to the conclusion that U-805 had been looted by sailors and marines, U-boat liquors were “breached,” German prisoners were robbed of Swiss francs, wrist watches, uniform ribbons and decorations, and other personal effects. In addition, Mr. Alberti, dressed as a Lieutenant Commander, USN, had interrogated the Commanding Officer of U-873, Captain-Lieutenant Fritz Steinhoff, in a humiliating manner by having an enlisted man slap him to obtain information. Steinhoff later committed suicide after he had been transported to Boston for confinement pending transfer to a prisoner of war camp. According to a report in the *Portsmouth Herald* of 19 May 1945, “Steinhoff slashed himself with a part of an eyeglass which he shattered in his cell in Charles Street jail.”¹⁴

Just to be clear, the looting was attributed to enlisted marines and sailors assigned to the advance boarding parties and not to any Industrial Department personnel. In fact, the report of the Naval Inspector General found “That the Industrial Division of the Navy Yard, Portsmouth performed in a satisfactory manner the receiving, safeguarding, and stripping of the U-boats after the boats were turned over to them for that purpose.”¹⁵

There was no press coverage of the investigation at Portsmouth Navy Yard in

¹⁴ *Portsmouth Herald*, 19 May 1945, “U-234 Brings Air Force Gen. Ulrich and 2 Dead Japs,” 1.

¹⁵ www.uboatarchive.net/U-873NIGReport.htm. Report of the Naval Inspector General Regarding Irregularities Connected with the Handling of Surrendered German Submarines, Serial : 01783 of 19 June 1945, 3.

1945.¹⁶ Perhaps, like the presence of British submarines at the yard in the summer of 1941, the press had been asked by navy officials to refrain from reporting a controversial event at the shipyard. Whatever the reason for the lack of coverage, it is difficult to imagine that today's press would not exploit a similar news event.

The Inspector General's report was especially critical of the officers who had accommodated and allowed Mr Alberti to abuse prisoners. The report found:

That the supine attitude of the Commanding Officer of the Naval Prison, Colonel Rossell, USMC, and of Lieutenant Commander Hatton, USNR, Office of Naval Intelligence, in permitting Mr. Alberti to conduct himself in the manner which he did, with the German prisoners of War, is most reprehensible.¹⁷

In the United States Navy, the Commanding Officer is ultimately held responsible, when his ship goes aground, for whatever reason, and usually pays the price with an abbreviated career. Rear Admiral Withers' command had gone aground, with the maltreatment of the German prisoners, and Withers bore the responsibility. His career, which began in 1906, could hardly be termed abbreviated, but it was essentially over in June 1945 when he was found to be derelict in his performance of his duties.

Rear Admiral Withers remained as commandant until he was relieved by Rear Admiral J.H. Brown on 15 November 1945.¹⁸ Withers' problems continued in the fall of

¹⁶ A careful review of the *Portsmouth Herald* during the entire year of 1945 found no mention of the investigation at the Portsmouth Navy Yard. Furthermore, extensive research into Portsmouth Navy Yard files at NARA Waltham, Ma., NARA at College Park, and the other sources cited under the bibliography of this study revealed nothing about the investigation. A routine internet search for "Withers" produced the "Report of the Naval Inspector General Regarding Irregularities Connected with the Handling of Surrendered German Submarines."

¹⁷ www.uboatarchive.net/U-873NIGReport.htm. "Report of the Naval Inspector General Regarding Irregularities Connected with the Handling of Surrendered German Submarines," Serial : 01783 of 19 June 1945, 4.

¹⁸ Portsmouth Naval Base Order No. 20-45 of 15 November 1945. NARA Waltham, RG 181, Portsmouth Naval Base General Correspondence, Box 9, Folder A7-1 "Notices Navy Yard and Naval Base Jan 1 1945 - to 1950."

1945 as he spent considerable time in the Portsmouth Naval Yard hospital in ill health. In October 1945, the *Portsmouth Herald* noted that Captain Sidney E. Dudley was the acting commandant because “Rear Admiral Withers is presently in the Portsmouth Naval Hospital where he is recovering from a long illness.”¹⁹ The article added that Withers “will undoubtedly remain in that capacity [in the hospital] until Admiral Brown arrives.”²⁰ There was no celebratory change of command ceremony as is typical for such occasions. Withers retired on 15 November 1945 while in the Portsmouth Naval Hospital and faded from the shipyard scene with far less recognition than he should have gotten for his remarkable tour of duty at Portsmouth Navy Yard.

Withers continued to be confined to the Portsmouth Naval Hospital “suffering from a serious illness’ until January 1946 when he was transferred to the Brooklyn Naval Hospital and then to the West Coast where he was “hospitalized much of the time” until his death on 25 June 1953.²¹ The last years of this submarine hero and shipyard commander extraordinaire were filled with far more angst and misery than deserved.

A central theme of this study is that navy yards, to a large extent, were left to manage their own affairs during the war, because the newly created Bureau of Ships was overwhelmed with other responsibilities, and that Portsmouth Navy Yard thrived in this entrepreneurial environment. The establishment of the Bureau of Ships, in June 1941, to replace the competing Bureau of Engineering and the Bureau of Construction and Repair, clarified many navy yard organizational and administrative issues. However, other

¹⁹ *Portsmouth Herald*, 16 Oct 1945, “John L. Brown Assigned Here,” 1.

²⁰ *Ibid.*

²¹ *Portsmouth Herald*, 27 Jun 1953, “Rear Adm. Withers, Ex-Yard Head, Dies in California,” 1.

agencies and bureaus continued to direct various fragments of operations at navy yards. In addition to the Bureau of Ships, the offices of the Secretary of the Navy, Chief of Naval Operations, Bureau of Ordnance, Bureau of Supplies and Accounts, Bureau of Medicine and Surgery and others issued directions to navy yards during the war. As late as December 1944, Secretary of the Navy James Forrestal, who continued to be frustrated with the inefficient administration of the navy yards, wrote, "What I want is some man whose sole job is to examine the functions, to compare operations and handle difficulties [at navy yards.] We should have one man to go to."²²

With the war winding down in the summer of 1945, a move developed to improve the overall operating efficiency of navy yards by further clarifying organizational responsibilities and putting one man in charge, as Secretary James Forrestal had directed. A Survey Conducted by the Industrial Survey Division in the Office of the Secretary of the Navy in July 1945 concluded that:

The attainment of greater and enduring improvements in the operating efficiency of the Navy Yards and Naval Drydocks will be materially facilitated by a realignment and clarification of the organization and administration of these establishments . . . by concentrating full authority and responsibility for Departmental administration of these establishments in a single agency of the Navy Department.²³

By the end of 1945, a full scale reorganization of navy yard administration and management was in progress, that ultimately resulted in increased responsibilities for the Bureau of Ships, and a reorganization of navy yards that gave the commandant full

²² Organization Planning and Procedures ltr of 13 July 1945 to Assistant Secretary of the Navy Ralph A. Bard. NARA College Park, RG 19, Bureau of Ships General Correspondence 1940-45, Box 785, Folder NY1/A3.

²³ "Review of the Organization and Administration of Navy Yards and Drydocks," A Survey Conducted by the Industrial Survey Division in the Office of the Secretary of the Navy dated 13 July 1945. NARA College Park, Record Group 38, Chief of Naval Operations General Correspondence, Box 1182, Folder NY/A3-1.

responsibility for all operations at his navy yard. Name changes accompanied the reorganization; commandants became commanding officers and navy yards became naval shipyards. In December 1945, Portsmouth Navy Yard became Portsmouth Naval Shipyard,²⁴ the title it holds today.

The extensive dumping of industrial waste for landfills, and the sewage discharge to the Piscataqua River, continued long after the war. These and other sites became the subjects of exhaustive EPA investigations in the 1980s that led to the shipyard being included on the National Priorities List (NPL) for Superfund projects effective 31 May 1994.²⁵

As required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), an initial assessment of Portsmouth Naval Shipyard was completed in June 1983. CERCLA (Superfund) is an EPA national program to identify and assess past hazardous waste disposal sites posing a potential threat to human health or the environment. The initial assessment of Portsmouth Shipyard examined four sites and concluded, "while none of the sites poses an immediate threat, . . . one site warrants further investigation . . . to assess potential long-term impacts."²⁶ That site was the Jamaica Island Landfill that had been used for disposal of potentially toxic and hazardous

²⁴ Secretary of the Navy James Forrestal ALNAVSTA #38 of 5 Dec 1945. NARA College Park, RG 24, Bureau of Naval Personnel General Correspondence 1941-45, Box 1601, Folder NY.

²⁵ *Ibid.*

²⁶ Initial Assessment Study of Portsmouth Naval Shipyard Portsmouth, New Hampshire, NESA 13-032, Naval Energy and Environmental Support Activity, Port Hueneme, California 93043, June 1983, iii.

materials.²⁷ The study also recommended that two mercury burial sites be marked and not disturbed. The last site, an industrial waste discharge to the Piscataqua River that was discontinued in 1975, was recommended for additional sampling during the next dredging activity at the shipyard. Further investigations during the 1980s culminated in the designation of the shipyard as a Superfund project.

The initially identified Jamaica Landfill was reported to be the most contaminated site on the shipyard. This 25 acre landfill served as the shipyard's dump from 1945 to 1975. However, as shown in this study, the Jamaica Island Landfill and the filling of the back channel started before the end of the war. It is estimated that 50 acres of the 287 acre shipyard were designated as Superfund sites. Reclamation projects have included the removal of seven underground storage tanks (1994), removal of mercury vaults from Jamaica Island (1997 and 2000), stabilizing contaminated shore lines, and capping contaminated soils (1999). The remedy for the Jamaica Landfill involved the construction of a saltwater marsh (2002) and the capping of excavated debris (2003).²⁸ The U.S. Navy, by May 2005, had spent \$48.6 million cleaning up the yard and it was estimated that another \$35 million would be needed to complete the job.²⁹ Portsmouth Navy Yard's long time practice of recovering lowlands through industrial dumping had come to a disruptive and costly conclusion.

²⁷ *Ibid.*

²⁸ <http://yosemite.epa.gov/r1/nplpad.nsf>. U.S. Environmental Protection Agency Waste Site, Cleanup & Reuse in New England.

²⁹ <http://www.nhpr.org/node/8782>. New Hampshire Public Radio Commentary, "Contamination A Big Problem at the Shipyard," by Rebecca Kaufman, 13 My 2005.

Rather late in the war, on 17 February 1945, USS *Redfish* limped up the Piscataqua River towards Portsmouth Navy Yard, completing a transit from halfway around the world. *Redfish* had been damaged two months earlier by Japanese destroyers, after sinking the carrier *Unryu* in the East China Sea. The crew of the *Redfish*, one of the three submarines launched simultaneously on 27 January 1944 and subsequently completed on 12 April 1944, never expected to be back at Portsmouth so soon. After transiting back to Pearl Harbor from the East China Sea, the crew had been told that the submarine would have to go back to Portsmouth for repairs because Pearl Harbor and all the West Coast yards were full. Torpedoman Second Class Dan MacIsaac, who was on deck with the line handlers as the submarine steamed up the river, could not have been more pleased that his submarine was returning to Portsmouth.³⁰

MacIsaac had been in the Forward Torpedo Room, after sinking the *Unryu*, when three Japanese destroyers exploded seven depth charges off the starboard bow of the submerged *Redfish*. No one onboard was closer to the explosions. MacIsaac was thrown to the forward end of the compartment where he lay in the bilge, unconscious, for a few minutes. The explosions cracked the pressure hull and damaged piping, torpedo tubes, and other equipment in the room. MacIsaac awoke to the sound of rushing water, realizing that he and his shipmates had to quickly isolate the leaks, as best they could, if the submarine was to be saved. Using wrenches, rags, and whatever was available, MacIsaac and his mates stopped the leaks as the *Redfish* laid on the bottom of the East China Sea for four hours to escape detection and avoid further attacks.

³⁰ Interview with Dan MacIsaac , 9 Nov 2006, at Portsmouth Naval Shipyard Museum. The *Redfish* events that follow are all from the interview and Roscoe, *United States Submarine Operations in World War II*, 407.

As soon as MacIsaac and his mates had gained control of the flooding, the Commanding Officer, Commander L.D. McGregor, came forward from the conning tower to assess the damage. Today, over sixty years later, MacIsaac remembers the Captain's exact words to him and his shipmates, "You can thank God that you were in a Portsmouth boat." Such was Portsmouth's reputation in the submarine fleet. *Redfish* was coming home for repairs but MacIsaac, Commander McGregor, and the rest of the crew were coming home to say "Thank you" to the men and women who had built their fine ship.

The submarine was greeted at the pier by shipyard officials, and hundreds of workers, eager to inspect their workmanship. MacIsaac, who was responsible for the Torpedo Room, where most of the damage had occurred, remembers worker after worker inspecting damaged pipes, tubes, and equipment to see if they could, or should, have done something differently. As MacIsaac pointed out the damage and told the story of the attack, the workers empathized with the crew and delighted in the fact that their work had held up to such a pounding and enabled the submarine and crew to survive. MacIsaac, who had gained considerable respect for Portsmouth workmanship while his submarine was being built, was convinced, more than ever, that the men and women at Portsmouth Navy Yard were an unusually dedicated and talented workforce.

The *Redfish* completed repairs in May 1945 and made the long transit back to the Pacific to resume war patrols until the end of the war. A few months after the *Redfish* steamed back out of Portsmouth Harbor, the submarine action in the Pacific began to wind down and more and more submarines found their way back to Portsmouth. The submarine traffic in the Piscataqua River was heavy in late 1945 and the first half of

1946, as an average of eight submarines a month arrived at the yard for work of some description.³¹

By the summer of 1946, the shipyard was inundated with submarines and immersed in a potpourri of miscellaneous work assignments. Many of the submarines had returned to the shipyard to be scrapped, prepared for sale to foreign nations, or moth-balled.³² Orders for the construction of new submarines had stopped. The shipyard's finely tuned operation, which had pushed *Redfish* and seventy-eight other submarines to war in record numbers, had come to a sudden and grinding halt. Priorities had changed, from construction of submarines to the disposal of submarines, and a remarkable period of submarine construction had come to a close for Portsmouth Navy Yard.

³¹ "U.S. Naval Shipyard, Portsmouth, N.H. Schedule of Ship Repair, Alteration, and Decommissioning" of 21 Jan 1946, NARA, Waltham, Record Group 181, Portsmouth Naval Base General Correspondence, 1930-1950, Box 18, Folder 3-7, "Docking – General."

³² Portsmouth Navy Yard was considered and rejected as a site for berthing of vessels out of commission (a moth-balled fleet). A Memo to the Commandant from R.D. Spalding of the U.S. Coast and Geodetic Service dated 13 Oct 1944, Subject: Hydrographic conditions at the Navy Yard and in Great Bay Area in connection with berthing of vessels out of commission, concluded that a large portion of the waterfront space at the shipyard is developed, but unavailable or unsuitable for berthing medium-draft vessels in quantity. Excessive tides and currents and winter ice conditions were also cited as undesirable elements for long-term berthing of ships or submarines. The only feasible alternative was to develop and dredge the more sheltered and protected back channel for berthing – a costly proposition. This U.S. Coast and Geodetic Survey presented costs for this option that included locations for "48 submarines, 2 tenders and certain minor craft." The proposal went no further and the East Coast submarine moth-balled submarine fleet was ultimately located at Philadelphia Navy Yard. The survey referred to is held at NARA, Waltham, Record Group 181, Portsmouth Naval Base General Correspondence, 1930-1950, Box 18, Folder 3-7, "Docking – General."

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William C. Tebo, Apprentice Program and electrical shop employee during World War II, 3 November 2006 at the Portsmouth Naval Shipyard Museum.

Eileen Dondero Foley, Paint Shop employee during World War II, 30 August 2006 at her home in Portsmouth, NH.

Dan MacIsaac, crew member of USS *Redfish* during World War II, 9 November 2006 at the Portsmouth Naval Shipyard Museum.

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APPENDICES

APPENDIX A

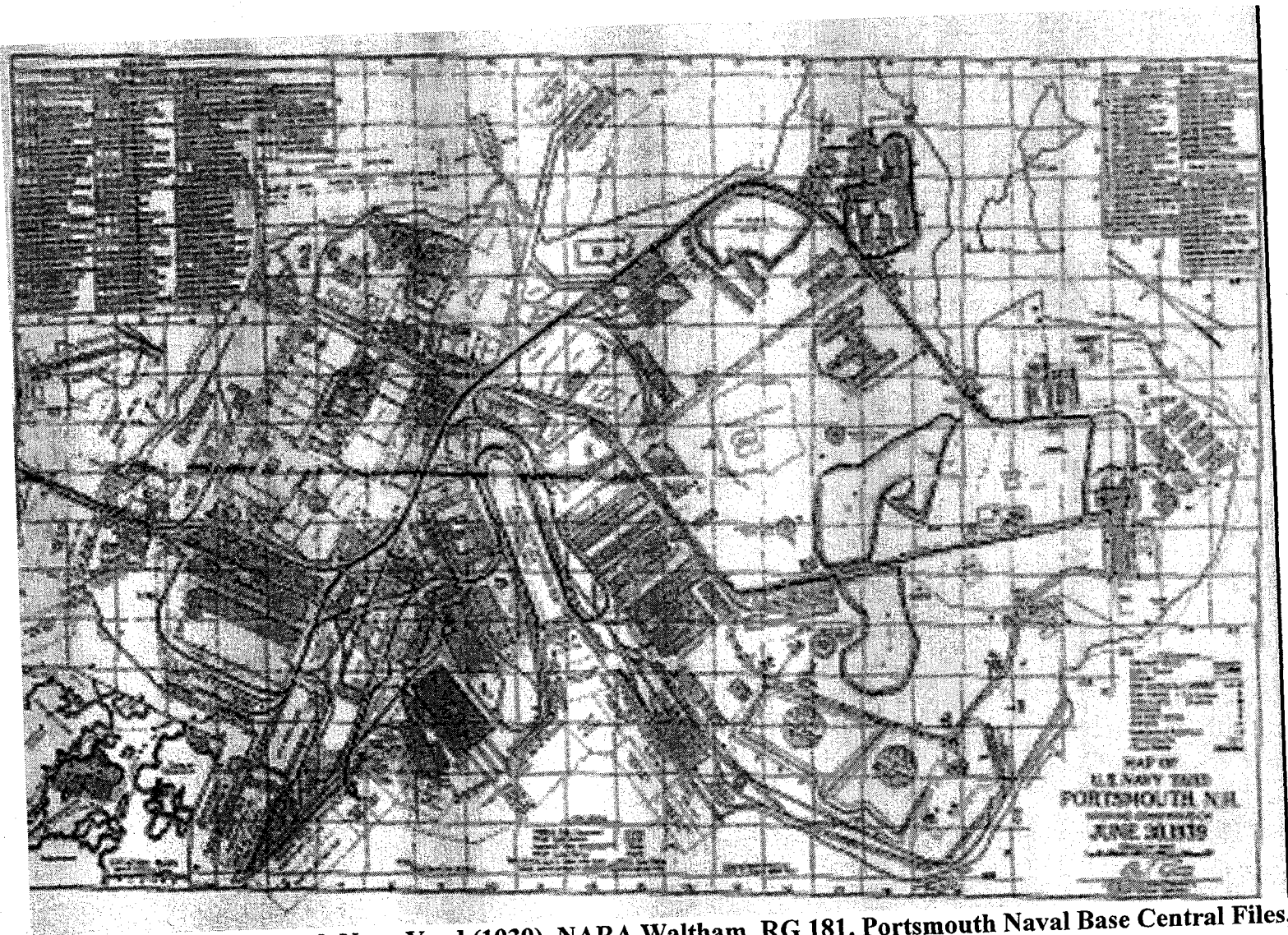


Figure A-1: Portsmouth Navy Yard (1939). NARA Waltham, RG 181, Portsmouth Naval Base Central Files, Box 20, Folder EE1, "President's Visit 1940."

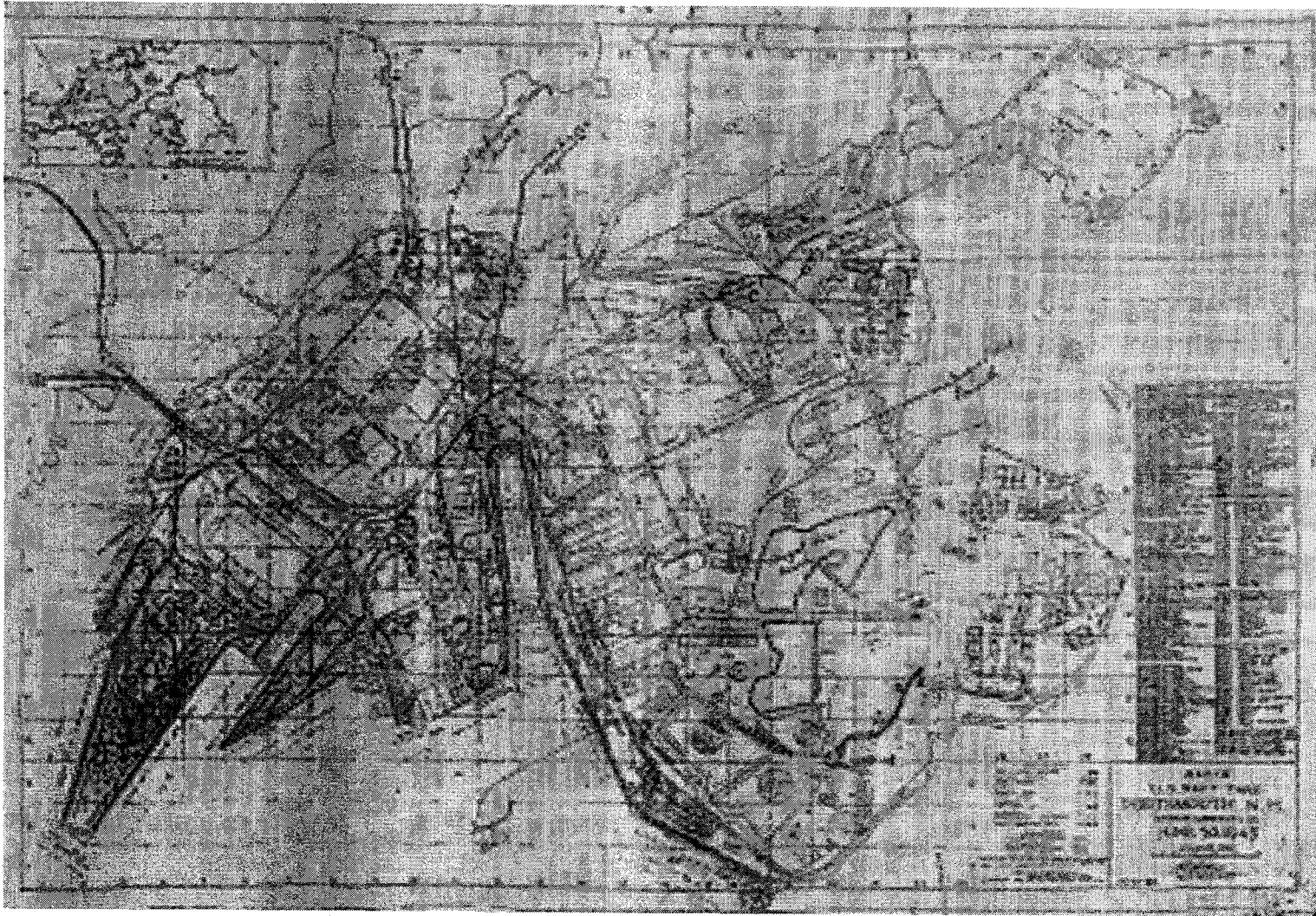


Figure A-2: Portsmouth Navy Yard (1945). NARA Waltham, RG 181, Portsmouth Naval Base Central Files, Box 20, Folder A1/Y1, "Portsmouth (1943-49)."

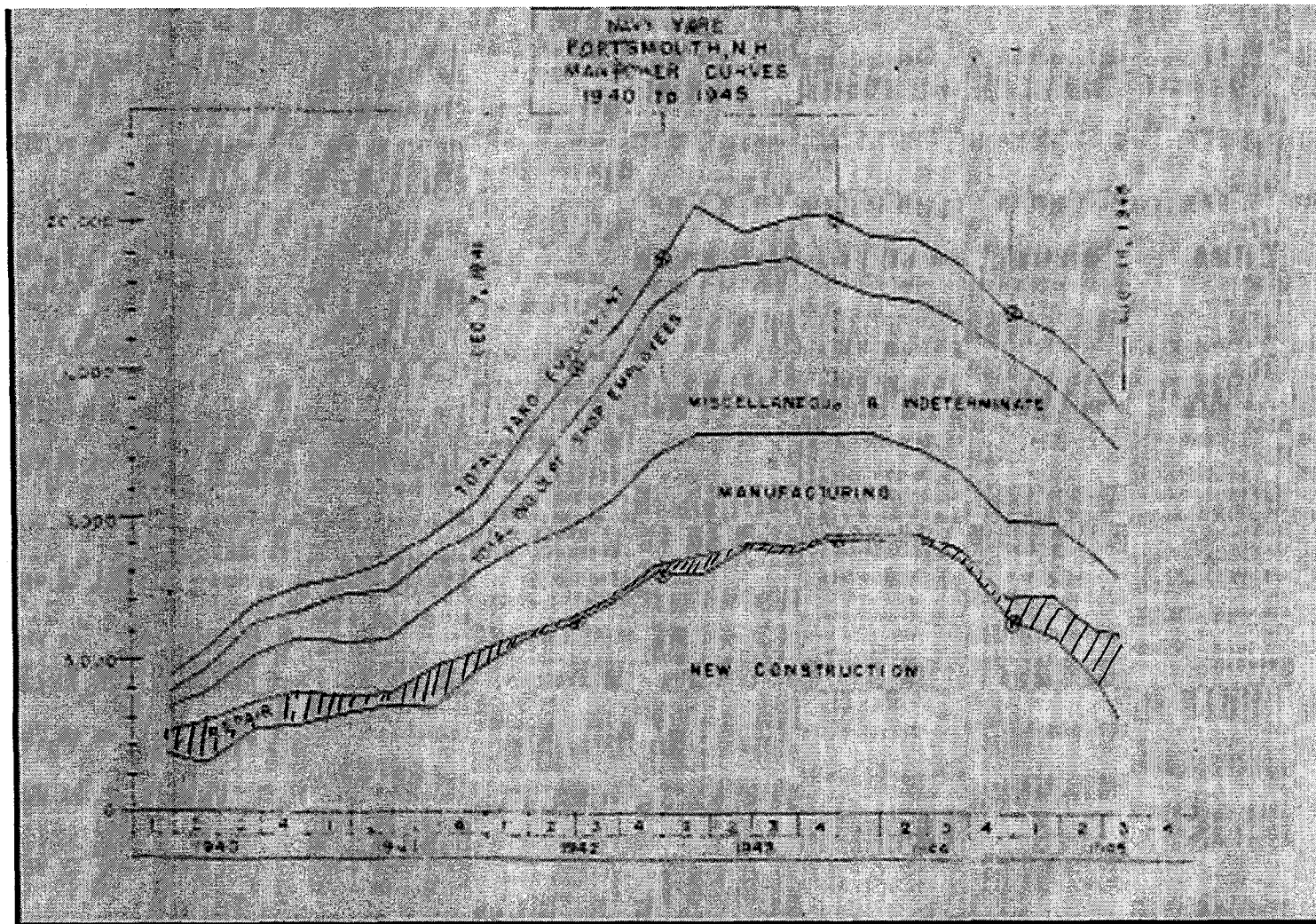


Figure A-3: Portsmouth Navy Yard Manpower Curves by Work Category, 1940-45. *Portsmouth Navy Yard during World War II Administrative History*. Chapter 1: New Construction and Repair, c. Production Graphs.

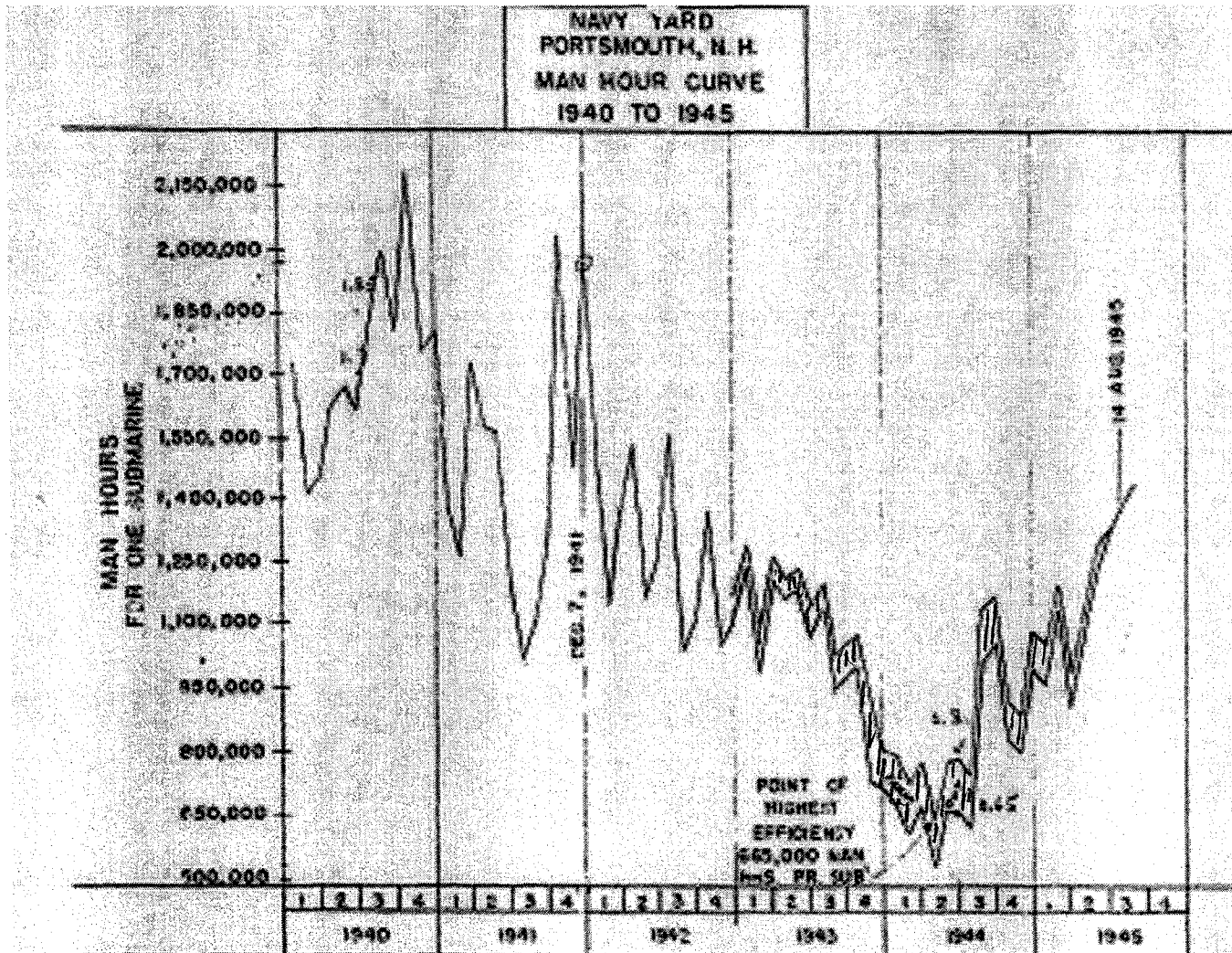
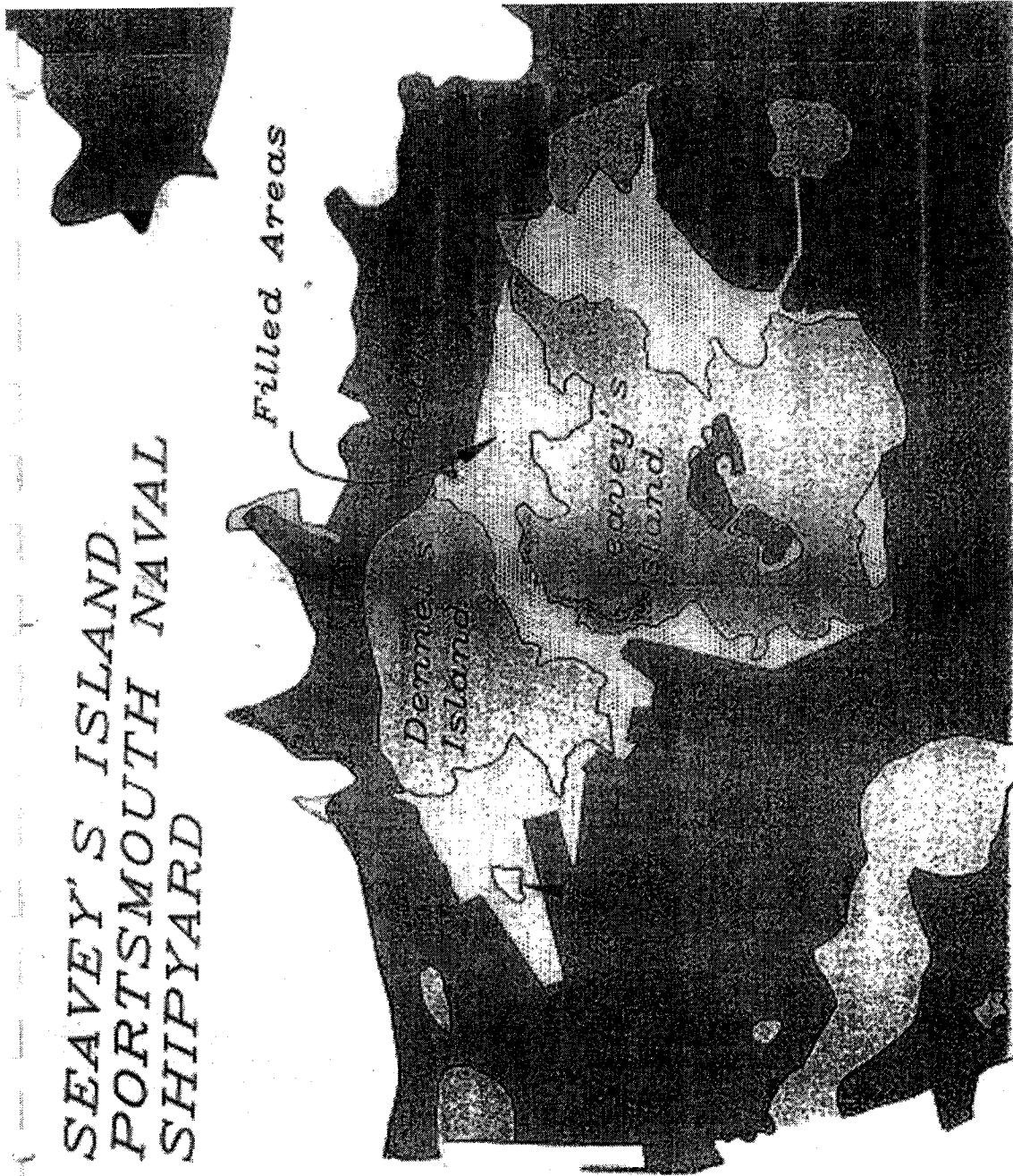
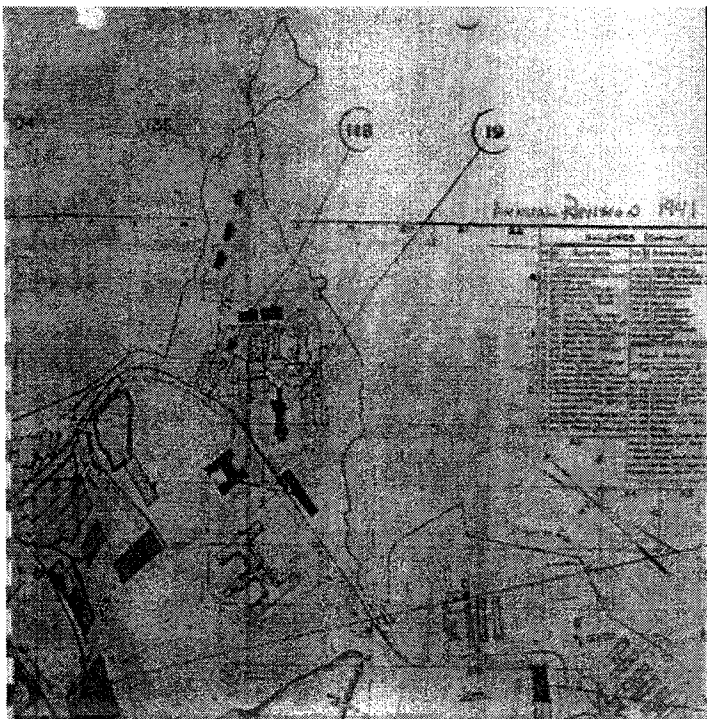


Figure A-4: Portsmouth Navy Yard Manhours per Submarine, 1940-45. *Portsmouth Navy Yard during World War II Administrative History*. Chapter 1: New Construction and Repair, c. Production Graphs.

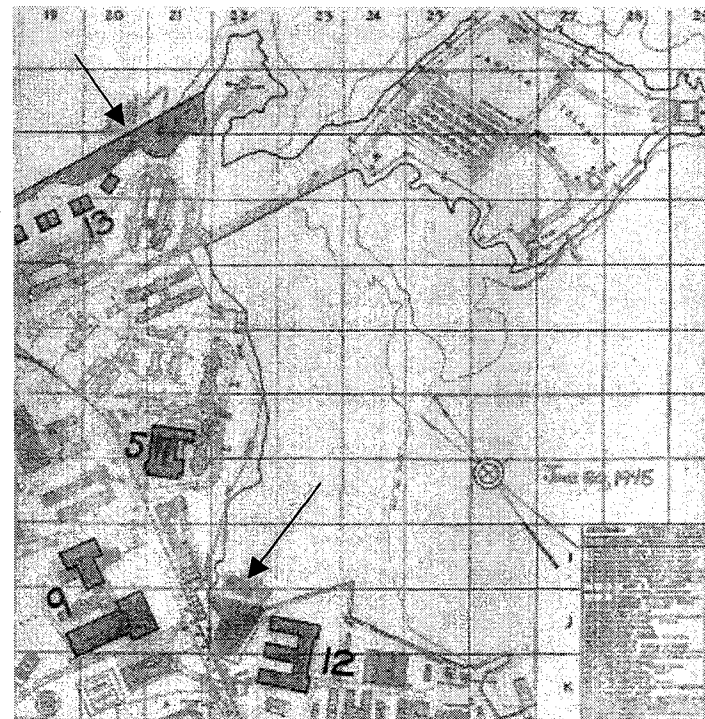


State of New Hampshire v. State of Maine, Lodging in Support of Motion for Leave to File Complaint, Map No. 45, 145. Supporting Evidence for Testimony Given to the House Judiciary Committee on 26 May 1990 to Introduce H. CON. RES. 337 Regarding the New Hampshire / Maine Border Dispute, Map No. 45, Seavey's Island, Portsmouth Naval Shipyard, 179.

Figure A-5: Portsmouth Navy Yard Showing Original Islands with Fill. Source cited above.



**Figure A-7: PNY w/o Jamaica Island (1941).
NARA Waltham, RG 181, Portsmouth Naval Base
Central Files, RG 181, Box 1, Folder A1/N1 – “Plans,
Projects, Policies.”**



**Figure A-8: PNY with Jamaica Island (1945) and Fill
NARA Waltham, RG 181, Portsmouth Naval Base
Central Files, RG 181, Box 1, Folder A1/N1 – “Plans,
Projects, Policies, PKG 2.”**

APPENDIX B

University of New Hampshire

Research Conduct and Compliance Services, Office of Sponsored Research
Service Building, 51 College Road, Durham, NH 03824-3585
Fax: 603-862-3564

05-Dec-2006

Watterson, Rodney
History, Horton SSC
186 High Street
Hampton, NH 03842

IRB #: 3827

Study: 32 in '44: A Management & Environmental Study of WWII Submarine Construction
at Portsmouth Navy Yard

Approval Date: 29-Nov-2006

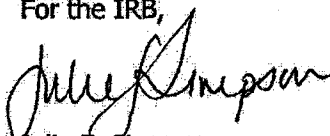
The Institutional Review Board for the Protection of Human Subjects in Research (IRB) has reviewed and approved the protocol for your study as Exempt as described in Title 45, Code of Federal Regulations (CFR), Part 46, Subsection 101(b). Approval is granted to conduct your study as described in your protocol.

Researchers who conduct studies involving human subjects have responsibilities as outlined in the attached document, *Responsibilities of Directors of Research Studies Involving Human Subjects*. (This document is also available at <http://www.unh.edu/osr/compliance/irb.html>.) Please read this document carefully before commencing your work involving human subjects.

Upon completion of your study, please complete the enclosed pink Exempt Study Final Report form and return it to this office along with a report of your findings.

If you have questions or concerns about your study or this approval, please feel free to contact me at 603-862-2003 or Julie.simpson@unh.edu. Please refer to the IRB # above in all correspondence related to this study. The IRB wishes you success with your research.

For the IRB,



Julie F. Simpson
Manager

cc: File
Dorsey, Kurk