EMPLOYMENT OUTLOOK IN

THE MERCHANT MARINE

Job prospects
Duties
Training
Earnings
Working conditions

UNITED STATES DEPARTMENT OF LABOR
Maurice J. Tobin, *Secretary*

BUREAU OF LABOR STATISTICS
Ewan Clague, *Commissioner*

In cooperation with VETERANS ADMINISTRATION

OCCUPATIONAL OUTLOOK SERIES

Bulletin No. 1054

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Letter of Transmittal

UNITED STATES DEPARTMENT OF LABOR,
BUREAU OF LABOR STATISTICS,
Washington, D. C., December 18, 1951.

The SECRETARY OF LABOR:

I have the honor to transmit herewith a report on the employment outlook in merchant marine occupations. This is one of a series of reports based on studies conducted in the Bureau's Occupational Outlook Service for use in vocational counseling of veterans, young people in schools, and others interested in choosing a field of work. These reports describe the Nation's needs for trained workers in each major industry and occupation under the defense mobilization program. The study was financed largely by the Veterans Administration, and the report was orginally published as a Veterans Administration pamphlet for use in vocational rehabilitation and education activities.

The study was prepared by Eugene P. Spector under the supervision of Raymond D. Larson. The Bureau wishes to express its deep appreciation to the following organizations who provided valuable information or read and commented upon all or part of the manuscript:

American Radio Association—CIO.
CIO Maritime Committee.
Economic Cooperation Administration.
Military Sea Transportation Service—Department of Defense.
National Federation of American Shipping, Inc.
National Marine Engineers' Beneficial Association—CIO.
National Maritime Union of America—CIO.
National Organization of Masters, Mates, and Pilots of America—AFL.
National Shipping Authority—Department of Commerce.
Pacific Coast Marine Firemen, Oilers, Watertenders and Wipers Association—Ind.
Radio Officers Union of the Commercial Telegraphers Union—AFL.
Sailors' Union of the Pacific—AFL.
Seafarers' International Union of North America—AFL.
United States Coast Guard—Treasury Department.
United States Maritime Administration—Department of Commerce.

EWAN CLAGUE, *Commissioner.*

Hon. MAURICE J. TOBIN,
Secretary of Labor.

Contents

APPENDIXES

TABLES

CHARTS

Employment Outlook in the Merchant Marine

Introduction

Since the Nation's earliest days, almost every American boy has at least toyed with the idea of following the sea. The call of the sea was especially powerful during Colonial times, when the oceans were the main highways to adventure and fortune and the sole link with the civilized world. Then there were no airplanes, railroads, or automobiles to compete for the interest of adventuresome boys.

The exploits of such naval heroes as John Paul Jones and John Barry, the success of privateers and traders, and later such novels as "Moby Dick" and "Two Years Before the Mast" helped to fire the imagination of American youth. Energetic boys of 12 and 15 went to sea as foremast hands to learn to become skilled mariners and traders. A few became captains at 18 and with their share of the ship's profits progressed to positions as shipowners and wealthy merchants.

The crews of those pioneer generations lived hard lives aboard sailing ships. Pay was meager and living quarters were cramped, wet, cold, and poorly ventilated. The food was invariably bad, the voyages extremely long, and discipline severe. But the crews accepted these miserable conditions, because they looked forward to shares and bonuses at the end of profitable voyages. Many lads acquired comfortable fortunes before they reached 20. Little wonder that American youth flocked to sea to take advantage of the chance for wealth in preference to hacking a farm out of the wilderness.

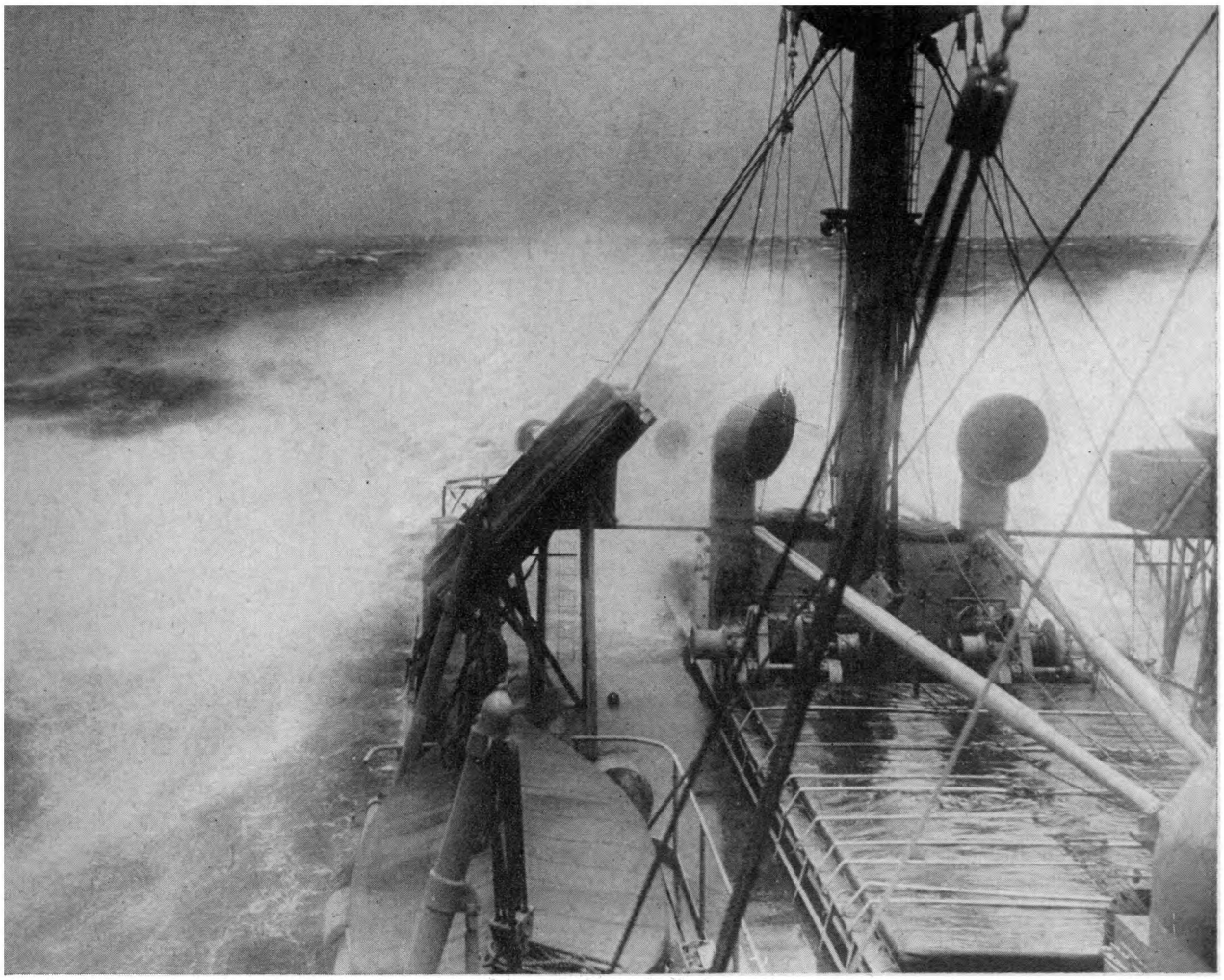
The transition from sail to steam in the latter part of the nineteenth century changed this picture radically. Although living conditions for sailors remained rough, the period of great profits for seamen ended when ships started charging fixed fees for carrying cargo. More and more young men turned to the free farm lands of the West for the opportunities they once sought at sea. It became hard to hire men of any description for merchant ships, and there was a sharp decline in the quality and efficiency of American seamen. Some shipowners resorted to unscrupulous methods to man ships. "Crimps" roved the waterfronts getting men drunk or drugged in order to "shanghai," or kidnap them to man ships.

Fortunately, these conditions no longer exist. Today seamen have shorter voyages, greatly improved living conditions, and receive wages comparing favorably with those in other industries.

The Merchant Marine Industry

The American merchant marine is a vital link in the Nation's transportation system. It moves our raw materials and products not only in foreign commerce but also, to a lesser extent, in domestic trade. In time of war it becomes an indispensable aid to our Armed Forces. The term "merchant marine" in this report refers to vessels of 1,000 gross tons or over engaged in ocean transportation. It does not cover transportation on the Great Lakes and other inland waterways which is different in many respects.

There were about 1,980 vessels in the active American merchant marine on October 1, 1951. About two-thirds of them were privately owned. Government-owned ships were operated by the Military Sea Transportation Service with civilian crews or by private steamship companies as general agents or under charter arrangements with



Merchant vessel plunging through heavy sea.

the Government. Most of the Government ships and about 70 percent of those privately owned were engaged mainly in foreign trade. (See chart 1.) However, in 1951 only about one-third of the Nation's ocean-borne trade was carried in ships flying the American flag.

Merchant seamen work on three types of vessels—dry-cargo, tankers, and combination passenger and dry-cargo ships. But a majority of them work on dry-cargo ships, which accounted for about 67 percent of the fleet in 1951 as compared with 27 percent which were tankers and 6 percent which were combination cargo. Dry-cargo ships carry a wide variety of goods including such bulk items as ores, coal, grain, and such manufactured items as machinery and trucks. Tankers, comprising the largest proportion of the ships in domestic trade, primarily transport petroleum and petroleum products, although they occasionally carry molasses, vegetable oils, and other liquids. Combination dry-cargo and passenger vessels specialize in carrying passengers, mail, and freight with high value in relation to bulk. In wartime they are used primarily as troop transports, whereas dry-cargo ships carry supplies to overseas troops.

Merchant seamen work on ships operating in and out of 70 ports in the United States but more than half of the Nation's shipping activity is carried on in 16 deep-sea ports along the Atlantic, Gulf, and Pacific coasts. The port of New York handles the greatest volume of trade. Other

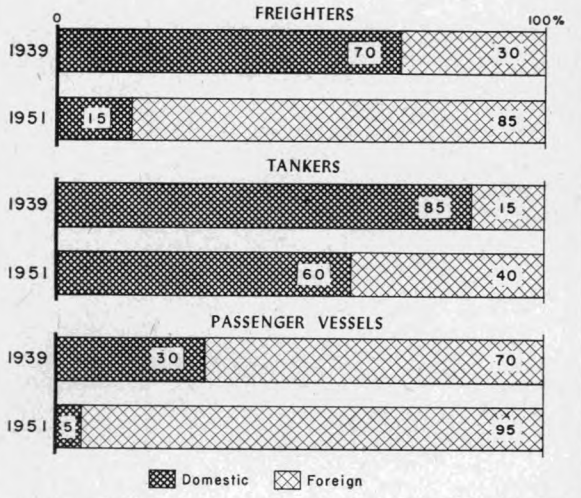
important Atlantic ports are Philadelphia, Baltimore, Boston, Norfolk, Charleston, and Savannah. The Gulf ports handle a substantial volume of cargo, principally petroleum and petroleum products. The chief ports in the Gulf area are Houston, Galveston, New Orleans, Port Arthur, Mobile, and Tampa. On the West Coast the principal ports are those in the San Francisco Bay area, the San Pedro-Wilmington-Los Angeles area, and the Seattle and Portland areas in the north.

American ship operators must compete for business in a highly competitive world market. They are at a disadvantage because of their high operating costs compared with those of foreign ships. Labor costs, which make up a large portion of total expenses, are more than twice as great on United States vessels as they are on those of her chief competitors. Mass-production techniques, enabling many other American industries to pay higher wages than are paid by their foreign competitors, cannot be used in the operation of a merchant vessel. American ship operators are, therefore, in a disadvantageous competitive position. When there is a heavy demand for shipping space, as in 1951, freight rates are high enough to allow profitable operations despite the cost disadvantage. A drop in rates, however, would make it difficult for American operators to meet foreign competition.

CHART 1.

70% OF FLEET IN FOREIGN TRADE

Percentage Distribution of Privately Owned Fleet on a Tonnage Basis, by Types of Trade



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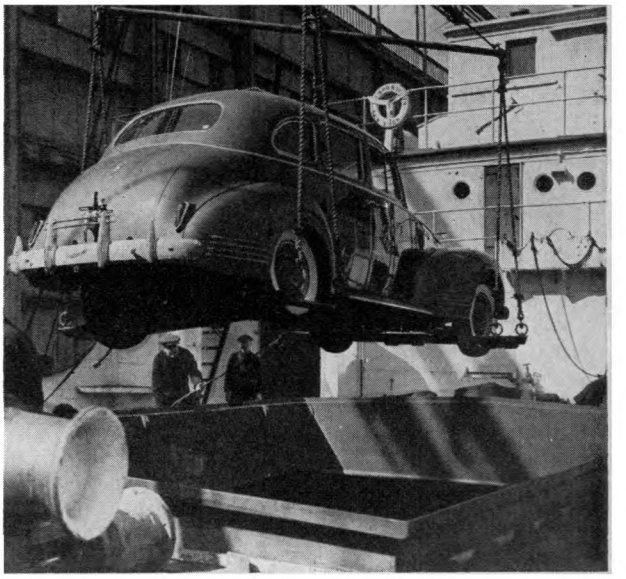
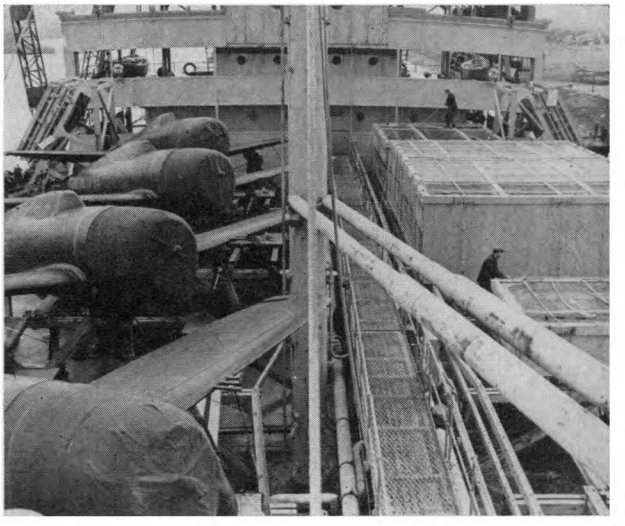
Source: National Federation of American Shipping, Inc.

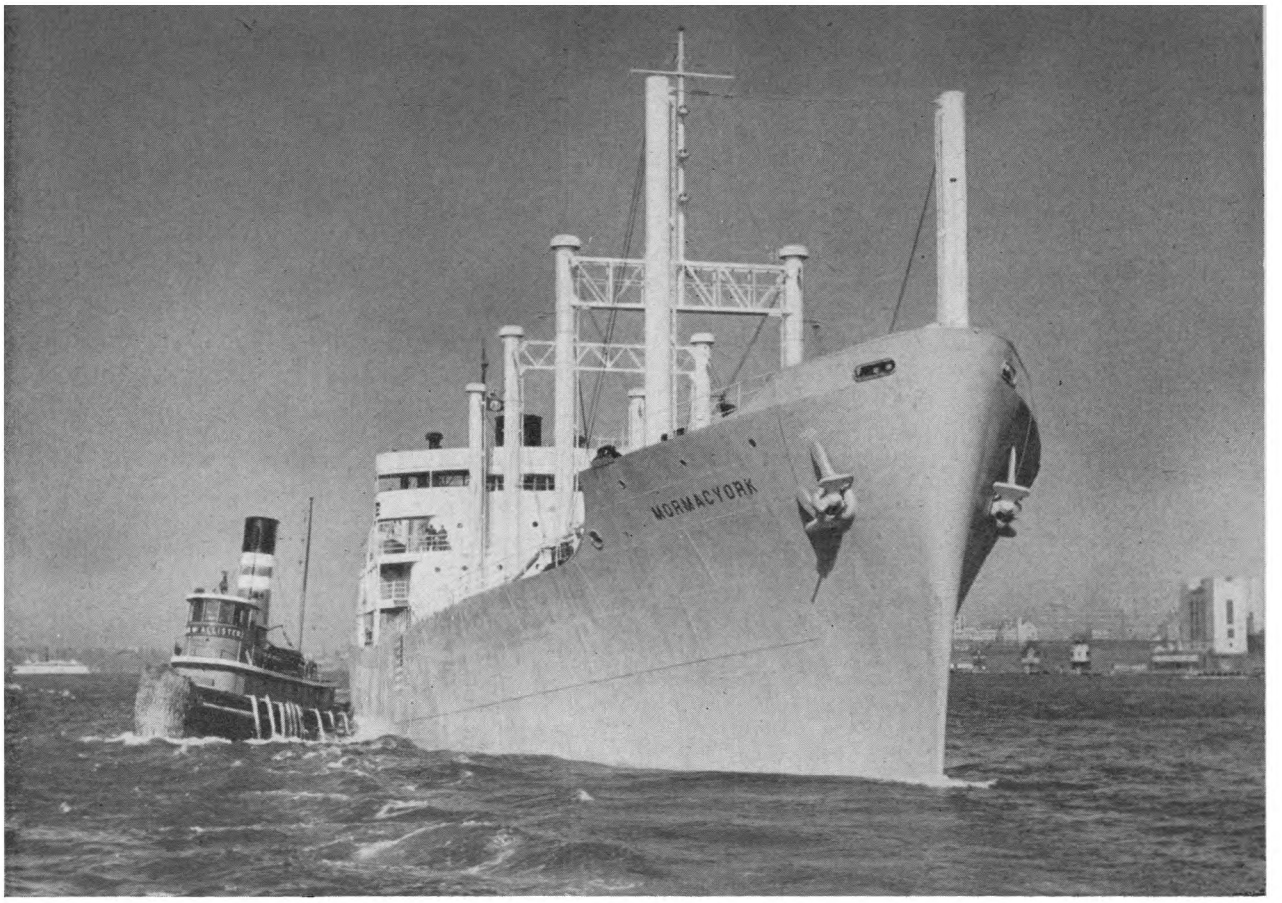


Automobile being loaded aboard a ship bound for South America.

Under the Merchant Marine Act of 1936 the Federal Government provides financial aid to American flag operators on essential foreign trade routes to offset lower foreign costs in ship construction and operation. In 1951, 262 ships, or 20 percent of the privately owned American merchant marine, received such aid.

Tanker with deckload of planes and parts.





C–3 cargo ship being towed to dock.

The act sets forth the maritime policy of the United States in these words:

> It is necessary for the national defense and development of its foreign and domestic commerce that the United States shall have a merchant marine (*a*) sufficient to carry its domestic water-borne commerce and a substantial portion of the water-borne export and import foreign commerce of the United States and to provide shipping service on all routes essential for maintaining the flow of such domestic and foreign water-borne commerce at all times, (*b*) capable of serving as a naval and military auxiliary in time of war or national emergency, (*c*) owned and operated under the United States flag by citizens of the United States insofar as may be practicable, and (*d*) composed of the best-equipped, safest, and most suitable types of vessels constructed in the United States and manned with a trained and efficient citizen personnel. It is hereby declared to be the policy of the United States to foster the development and encourage the maintenance of such a merchant marine.

Few industries are as directly affected by actions of the Federal Government. Government policies regarding subsidies, foreign aid, ship sales, charters, transfers of ships to foreign registry, and tariffs, all sharply affect the level of employment in the merchant marine.

Employment Outlook

Employment in the merchant marine has fluctuated widely over the years. These ups and downs have been caused by war and national defense needs as well as by world political and economic conditions.

Before the Civil War, shipping generally was a profitable business, and the industry grew rapidly. Foreign trade ship tonnage grew from 124,000 gross tons in 1789 to 2,379,000 gross tons by 1860. Thereafter, rising costs in building and manning ships in this country, compared with the costs in foreign countries, made it difficult for the shipping

industry to prosper. Foreign trade tonnage carried in 1910 was one-third of the 1860 tonnage, and United States ships carried 10 percent of our foreign trade in 1910 compared to 75 percent in 1860.

When the United States entered World War I in 1917 the American merchant marine was totally inadequate to carry the required troops and supplies to Europe. The Government ordered hundreds of ships, and from 1917 to 1921 American shipyards turned out about 11½-million gross tons of deep-sea shipping, almost eight times as much as in the preceding 5 years. To man the new ships coming off the ways, thousands of merchant seamen were hired. When peace came most of the emergency ships were left to rot or were sold as scrap, and employment dropped sharply.

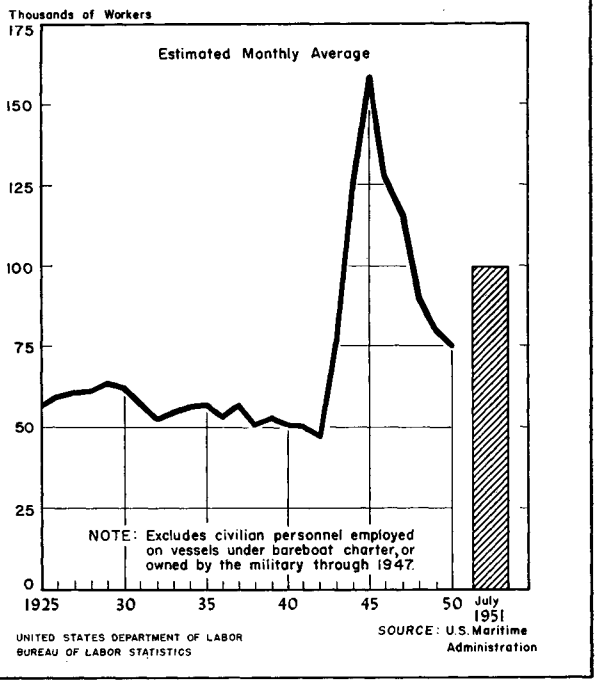
Chart 2 shows the rise in employment during the prosperous 1920's. The number of seamen at work dropped sharply during the depression, from 63,825 in 1929 to 52,600 in 1932. Thereafter employment began to rise slowly until 1937, when international developments caused world trade to decline. World War II revived the ailing industry, and average monthly employment soared to a record high of 158,755 in 1945. This expansion in employment was accomplished only with great difficulties in a period characterized by general manpower shortages.

To handle the job of providing ships and men, the War Shipping Administration was established. The first emergency step in providing the needed manpower for the merchant marine was to bring back into the industry ex-merchant seamen not vitally needed ashore. A Nation-wide registration of seamen was undertaken, with the aid of the United States Employment Service in September 1942. This was followed by a direct personal recruitment program. To help the recruitment program, Public Law 87, passed by Congress in mid-1943, guaranteed seniority and reemployment rights in their shore jobs to men who went back to sea. The War Shipping Administration reported that in all nearly 100,000 men with previous sea experience working ashore were recruited into the wartime merchant marine.

Despite this program many more men were needed to man the thousands of new ships as they came off the ways. The War Shipping Administration expanded the maritime training program begun in 1938. From 1938 to December 1, 1945, the training program graduated and made available to the merchant marine more than 250,000

CHART 2.

MERCHANT MARINE EMPLOYMENT RISES TO MEET DEFENSE NEEDS



seamen to help man the merchant fleet which reached a peak of 5,500 ships. In order to retain in the industry the men recruited and trained, the Selective Service System delegated to the War Shipping Administration authority to certify active seamen to their local draft boards for occupational deferments.

At the end of the war the fleet was far too large for peacetime needs and many of the ships were retired to reserve anchorages. (See chart 3.) Employment dropped sharply and many seamen returned to their old jobs ashore or remained unemployed "on the beach." Employment remained above the prewar level, however. In the fall of 1949 shipping activity fell off and many more seamen were thrown out of work.

The outbreak of hostilities in Korea on June 25, 1950, marked a turning point for the shipping industry. Ships were needed to transport troops and supplies to the Korean fighting fronts, to bolster our European defense, and to help our allies stockpile strategic materials. In addition

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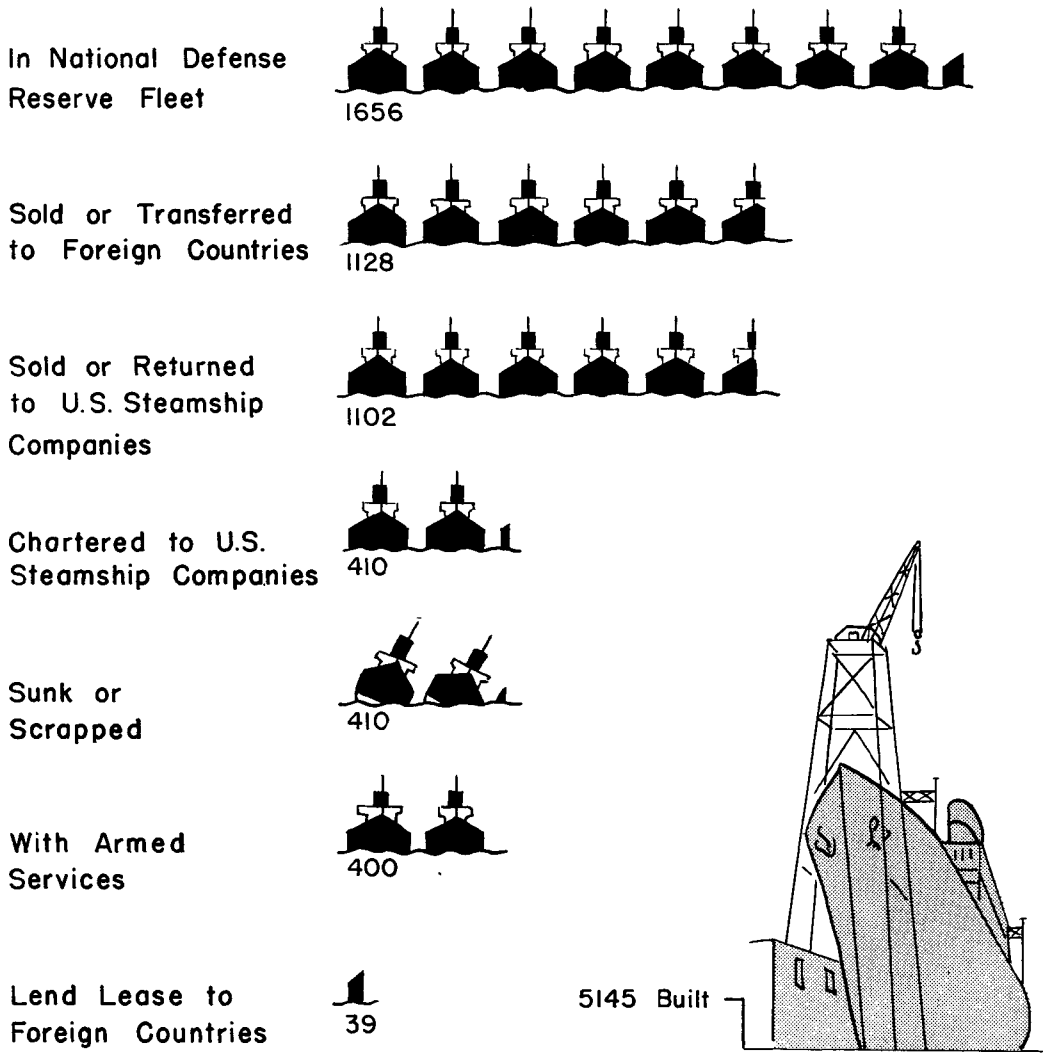
CHART 3.

WHAT HAPPENED TO OUR WAR BUILT MERCHANT FLEET?

August 1951



SOURCE: National Federation of American Shipping, Inc.

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to direct military requirements arising from the war in Korea a large volume of coal, grain, and foodstuffs also began to move to Europe in the latter part of 1950. Employment climbed to more than 100,000 by August 1951. The large reserve force of seamen that existed in June 1950 had almost disappeared and there were recurring shortages of radio operators; engineers, particularly those with high pressure experience; able seamen; experienced engine room men such as oilers, firemen, water tenders, and electricians; and stewards. These shortages caused sailing delays and some vessels had to sail short-handed.

The immediate employment outlook for seamen is very bright. Employment is likely to increase at a slow rate for the next few years, and a large number of job openings will arise from turn-over, as men leave the sea for other kinds of work. The demand for shipping is likely to remain high. The Mutual Security Administration is carrying on a heavy coal shipment program to Europe and in early 1952 grain shipments are expected to increase substantially. At the same time the military requirements for a European build-up will strengthen the industry's position. Heavy Government spending for defense, stockpiling of strategic materials, and foreign aid will mean a high level of international trade. If the present tempo of the limited mobilization program continues, shipping requirements throughout the world probably will call for the addition of vessels, making the total fleet about 2,200 ships by the end of 1952. This would probably represent the peak of maritime expansion under current mobilization plans.

Over the long run, the number of workers employed aboard oceangoing ships will tend to decrease, unless the Nation decides to maintain the merchant fleet at about its present size. Many nations are engaged in heavy shipbuilding programs which will add considerable numbers of ships to the world merchant fleet. This will result in more intensive world-wide shipping competition for available cargo, which will be only partly offset by increases in world trade. Rates will drop and the cost disadvantages under which American ships operate will cause many American ships to be again laid up. Employment can be expected to decline substantially from the 1951 level, especially if there is a drop in our foreign aid and military shipments. A third World War, of course, would change the outlook. It would create such a tremendous demand for ships and men that there would be a serious shortage of merchant seamen.

Labor Turn-Over

The nature of seafaring life encourages frequent change of jobs and causes many men to seek other ways of making a living. Ocean voyages are generally long and confining so that seamen customarily take time off between trips for relaxation ashore. Others leave the sea for short periods of time because of illness or for personal or business reasons. Many tire of sea life and its frequent spells of unemployment and quit the industry for shore employment. A study of the United States merchant marine during the year July 1945–June 1946 showed that an estimated total of 383,000 persons were employed for at least part of the year, well over twice the average monthly employment of 161,000 persons. (See table 1.)

To replace men who temporarily or permanently leave the industry there must be an adequate

TABLE 1.—*Duration of employment of merchant seamen, July 1945–June 1946*

Employment status [1]	Number employed during the year	Average number of months worked
Total	382,700	5.5
Regularly employed	125,800	7.9
Irregularly employed	53,800	3.4
Withdrawals [2]	141,200	4.4
New entrants	61,900	5.1

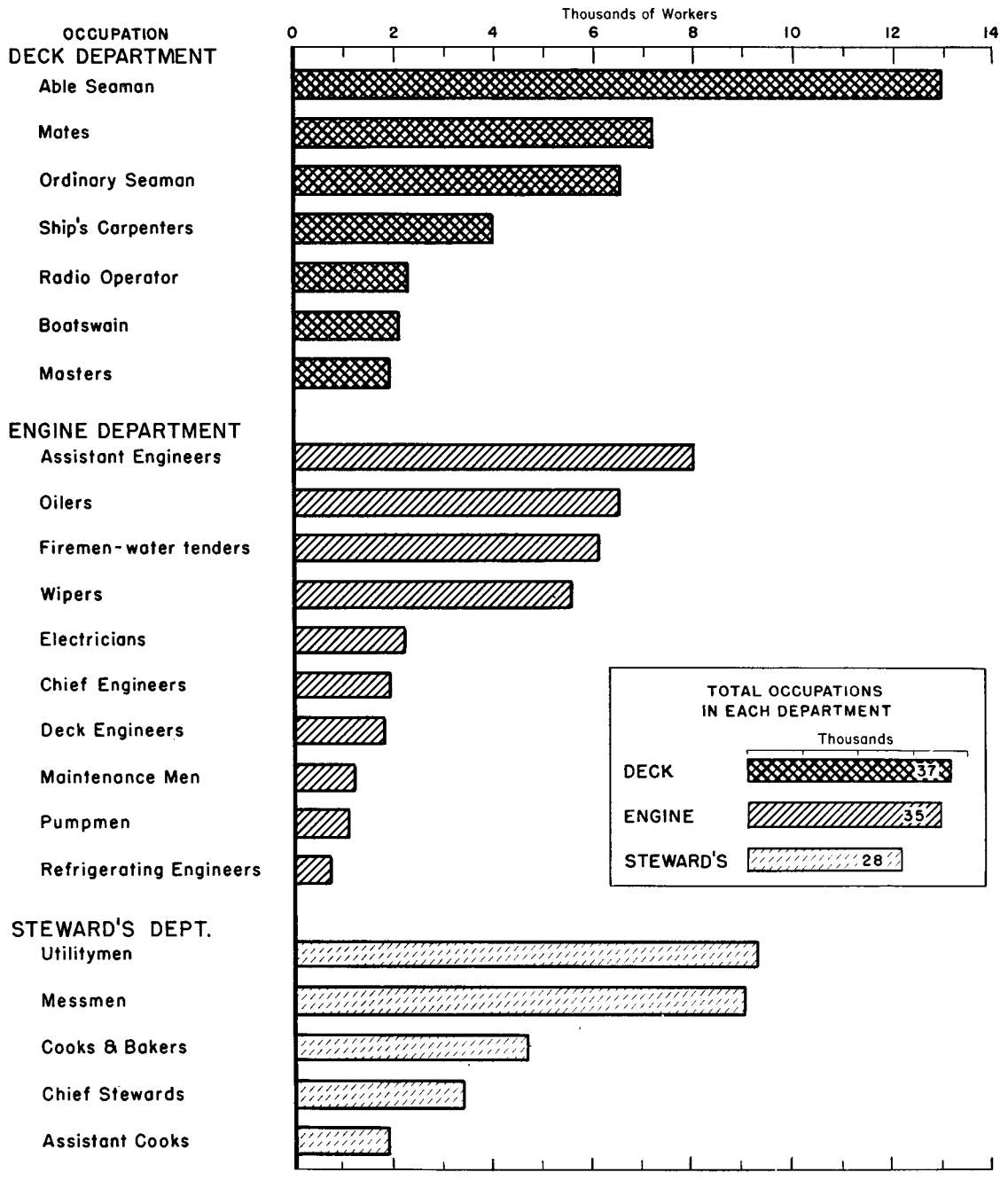
[1] Regularly employed seamen were those employed before and after the period studied and at some time during the year.
Irregularly employed seamen were those employed at some time during the year but not employed before or after the period studied.
Withdrawals—Seamen employed before and during the period studied but not afterward.
New entrants—Seamen not employed before the period studied but employed at some time during the year and afterward.
[2] The sharp drop in employment in the postwar period accounts for the large number of withdrawals. In a period of rising employment, entrants outnumber withdrawals, and in a period of stable employment, entrants and withdrawals nearly balance.

Source: *Stability of Employment in the American Merchant Marine*, Herman M. Sturm, Unpublished Thesis, American University, 1949.

CHART 4.

EMPLOYMENT IN PRINCIPAL DEEP-SEA OCCUPATIONS

JULY 1951



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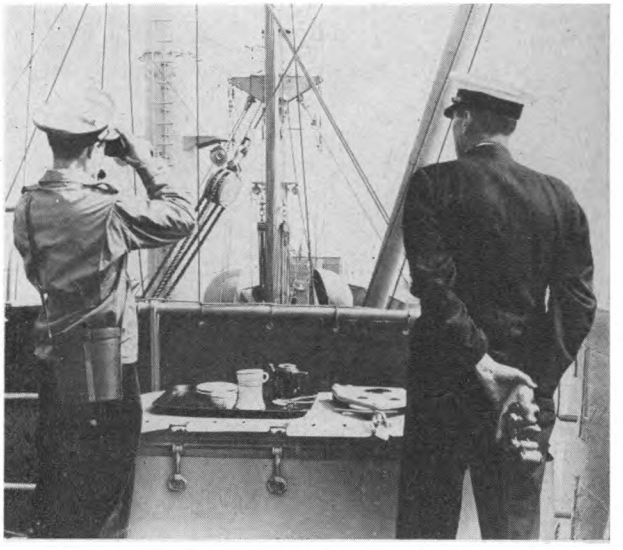
reserve of seamen. The size of this reserve is estimated at roughly 25 to 30 percent of the number of men employed in the industry. Actually this reserve force varies from time to time. In a period of depressed shipping activity the reserve force is generally larger than 30 percent because of the large number of men looking for work. When maritime activity expands and absorbs these unemployed seamen, the reserve force falls below the 25 percent mark. Today, the reserve force is inadequate to man the active fleet promptly and fully.

Jobs at Sea

About 100,000 men were working in the American merchant marine in August 1951. About two-thirds of them were in professional, managerial, or skilled jobs. Masters, mates, engineers, able and ordinary seamen, qualified members of the engine department, stewards, and cooks are only some of the occupational groups found aboard ship. Chart 4 shows how many workers were in each major seagoing occupation. Omitted from the chart are occupations such as bartender and musician, found only aboard luxury passenger liners. Also excluded are longshoremen, who load and unload ships in port, and clerical and administrative occupations on shore. Many of these occupations are discussed in the *Occupational Outlook Handbook*.[1]

Every dry-cargo, tanker, and passenger vessel afloat has a *captain* or *master* who is directly responsible for the safety of the ship, its cargo, and passengers. From his vantage point on the bridge of the ship high above the deck he directs the operation of his vessel. He must see that the ship is well run, trips are made on schedule, and all reports are properly made out. In time of danger when the vessel is blanketed by fog or buffeted by storms he personally takes charge of the ship from the bridge and issues instructions to the ship's officers and crew. Ordinarily, officers called "mates" run the ship under his close supervision.

The number of men in the crew varies with the size and type of vessel. Cargo vessels and tankers have crews ranging from 36 to 55 men; passenger vessels may have as many as 680 crewmen aboard. Chart 5 shows the typical crew aboard one of the dry-cargo vessels which make up the bulk of our merchant fleet. Each ship is organized into departments. The deck department navigates the ship and maintains hull and deck equipment; the engine department operates and maintains the machinery that propels the ship; and the steward's department performs the household duties involved in making a home for the crew and passengers while they are at sea.



Master and watch officer on the bridge of a Liberty ship.

Deck Department

A ship at sea operates around the clock and men must be on deck at all times to navigate the vessel. This is accomplished through a 3-watch system. Each watch period is 4 hours long and crewmen assigned to watch duty stand 2 watches daily. They are directed by one of the ship's officers acting for the captain. The *chief mate* usually takes the 4 to 8 watch, the *second mate* the 12 to 4 watch, and the *third mate* the 8 to 12 watch. The watch officer from his position on the bridge is responsible for the ship's navigation during his period on duty. On taking over a watch he must familiarize himself with the master's standing orders as to such things as the ship's speed and course. He must

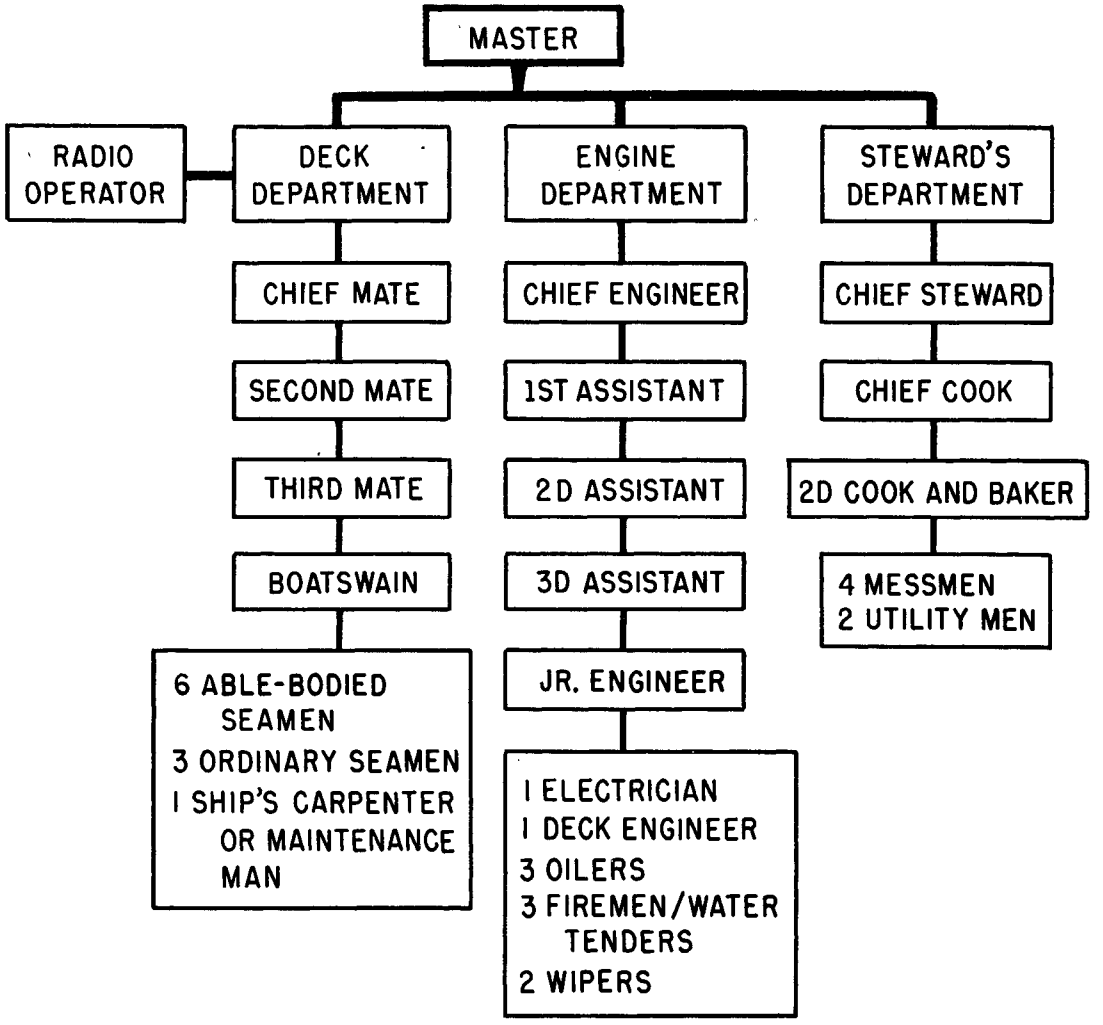
[1] Occupational Outlook Handbook, U. S. Department of Labor, Bureau of Labor Statistics, Bulletin No. 998, 1951 edition prepared in cooperation with the Veterans Administration. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Price $3.

maintain the speed and course set by the master; plot the ship's position at frequent intervals; post lookouts if needed; record his 4-hour tour of duty in the ship's "log" or record of the voyage; and immediately notify the master of any unusual occurrence.

At sea there are no rails or highways to help guide a vessel to its destination. Each officer must be a competent navigator able to set and follow a course across the trackless seas. Early each morning and evening the ship's officers use an instrument called a "sextant" to fix the ship's position by the stars. During the day they take sun line readings to check on the course set.

CHART 5.

TYPICAL CREW OF A DRY-CARGO SHIP



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Besides acting as watch officer each deck officer has other duties to perform. The chief mate assists the master in assigning duties to the crew, lays out daytime work for the deck crew, and sees that the deck department is kept clean and orderly. He also plans and carries out the loading and unloading of cargo and assists the master in taking the ship in and out of port. The second mate is by custom designated as the navigating officer. He sees that the ship is provided with the necessary navigation charts and he is responsible for the care and maintenance of all navigating equipment. He must daily check a

Officer at sea "shooting" the sun.

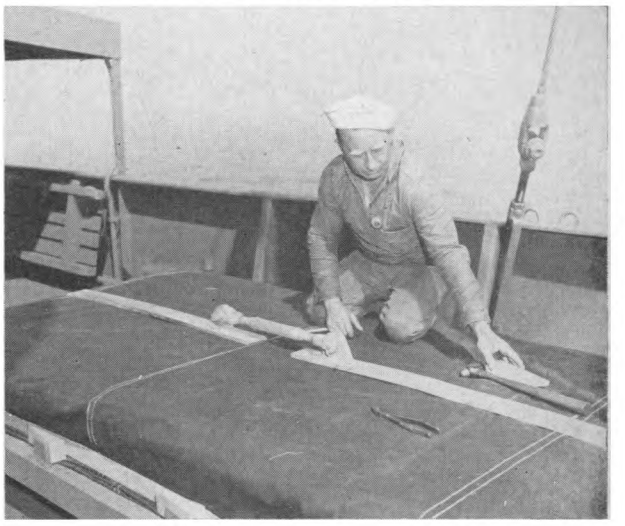
very accurate clock called the "chronometer" with radio time. He also checks the gyrocompass (an instrument not affected by the earth's magnetism) against the magnetic compass. If the gyrocompass breaks down he must make necessary emergency repairs. The third mate is responsible for the care and the maintenance of the bridge and the chart house. He also must make periodic checks of the ship's lifeboats and other lifesaving equipment to be sure they are ready for use in case of fire or shipwreck. The safety of the crew and passengers in time of danger depends on how well the third mate does this job.

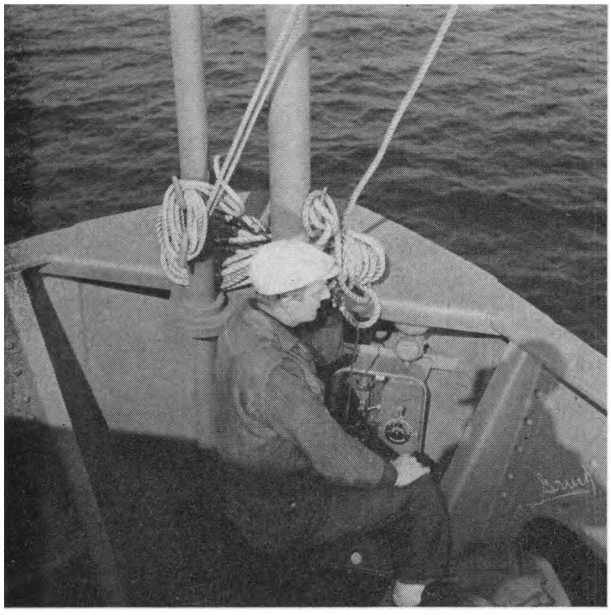
Radio operator receiving a message.

While at sea a ship's only contact with the world is through its radio officer. A passenger ship usually carries three operators; the average cargo vessel employs only one. The radio officer operates and adjusts the ship's radio-transmitting and -receiving equipment. He sends and receives messages by voice or international Morse code and copies messages received, and delivers them to the chief mate or the master. He also regularly receives and records time signals, weather reports, position reports, and other navigation and technical data. The radio operator must also be able to make emergency radio repairs.

Some ships have a purser, who acts as the ship's clerk. He does the bookkeeping aboard ship such as keeping accounts for the captain, main-

Ship's carpenter "battening down" a hatch.



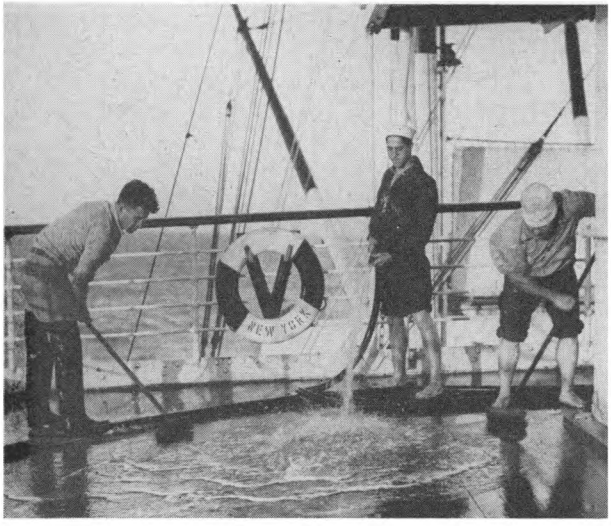


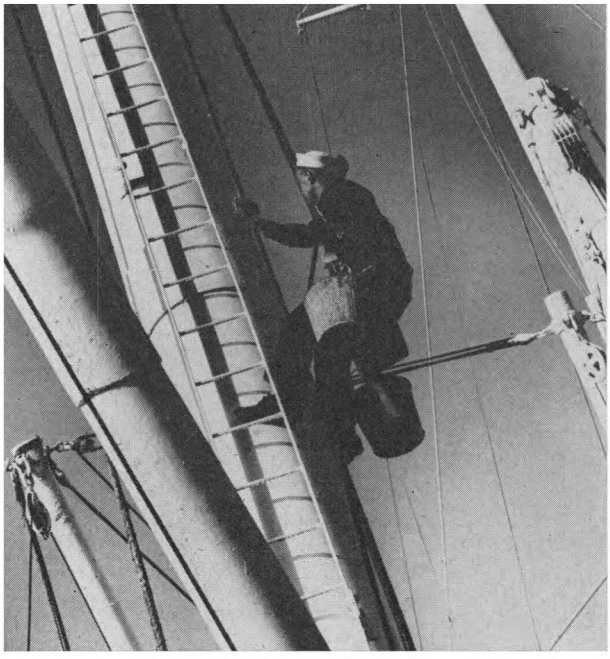
Able seaman on bow lookout.

taining payroll records of each worker aboard ship, and keeping track of the hours worked and overtime earned. While at sea, he prepares many of the ship's papers such as entry and clearance papers and manifests (a list or invoice of a ship's cargo) for cargo taken aboard in a foreign port. The purser does the typing for the deck, engine, and steward's departments, typing such papers as the ship's log, the engine-room log, and various supply requisitions. In addition, some pursers also attend to minor medical needs of the crew by performing first aid and giving shots and pills for minor ailments. In that case they may be called purser-pharmacist mates.

The unlicensed deck crew consists of a *boatswain*, one or two *maintenance carpenters*, and a group of *able seamen*, and *ordinary seamen*. The *boatswain* is a foreman in charge of the deck crew, who relays the officers' orders and is responsible for their execution. He assists the chief mate in laying out day work for crew members not assigned to watch duty and directs such maintenance tasks as cleaning decks, polishing metalwork, cleaning lifeboats, the chipping, scraping, and painting of iron and woodwork, overhauling canvas work, and splicing wire cable and rope. When the ship docks or anchors, he supervises the deck crew in handling lines and hawsers (the ropes used for mooring).

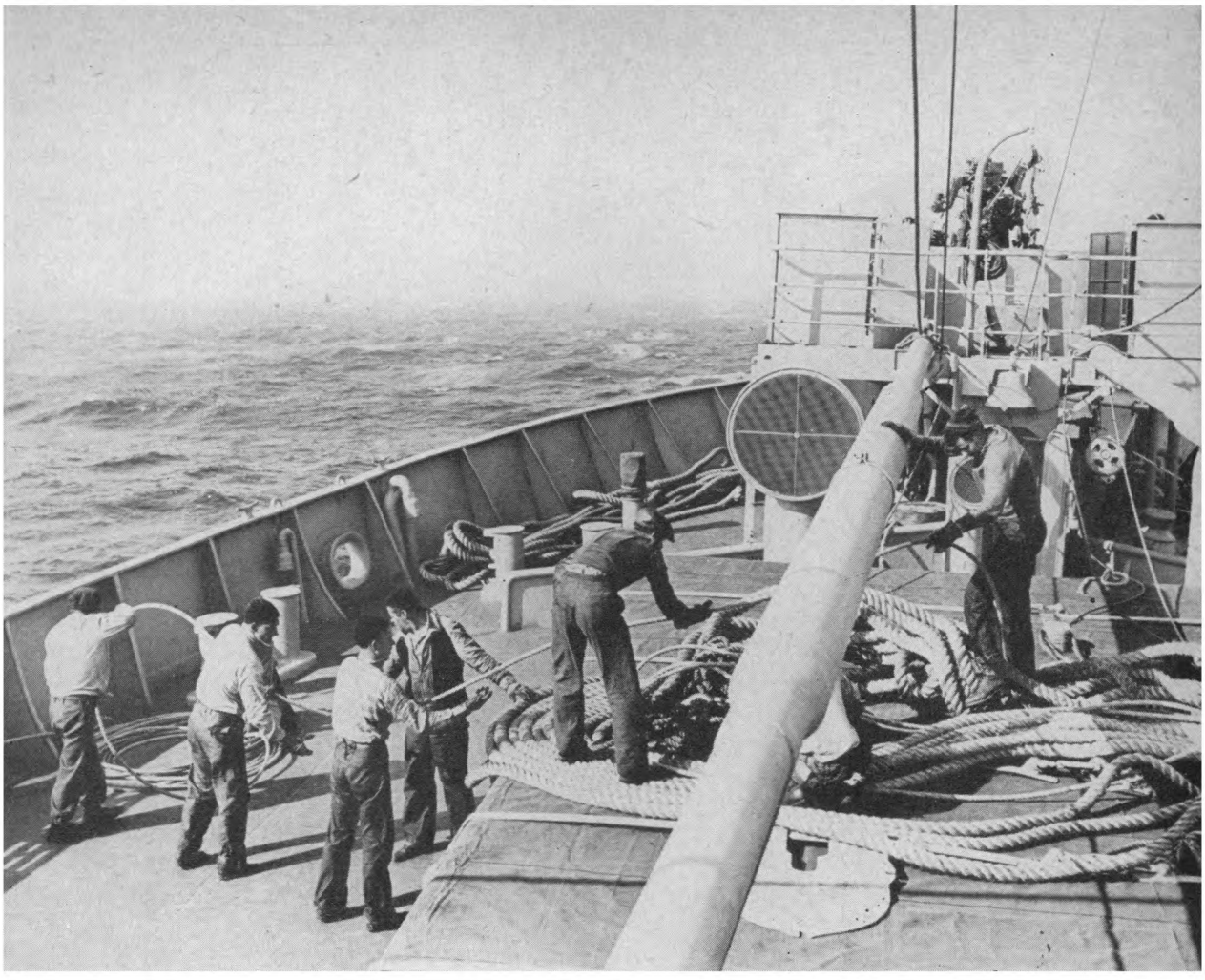
Morning watch washing down the decks.





Seaman in boatswain's chair wiping down the mast.

The larger dry-cargo ships often carry more than one *ship's carpenter*. The job varies somewhat from ship to ship but the following duties are typical: repairing or rebuilding of spars and booms; "battening down," or making the hatches (which cover the storage spaces in the ship's hold) secure; building and repairing lockers, shelves, tables, and other interior woodwork; making and recording soundings of the "bilge" (compartments



Crewmen stowing hawsers on deck.

in the bottom of the hull); standing by and operating the windlass which hoists and drops the anchor, and sealing the hawsepipes when anchor and chain are not in use.

Freighters usually carry six able-bodied seamen, called "AB's," who comprise the largest occupational group aboard ship. Two AB's are assigned to every watch; they act as helmsmen to steer the ship and as lookouts at night or whenever visibility is poor, reporting objects sighted in the sea to the watch officer. When no lookout is needed, two able seamen take 2-hour turns at the wheel. During the day one of the AB's is generally assigned to the boatswain to perform general deck maintenance work, such as washing the deck, chipping paint, painting wood and metal fixtures, splicing wire and rope, and overhauling the lifeboats to keep them seaworthy. AB's must also participate in periodic boat drills, know how to take depth soundings in unfamiliar or shallow water, and be able to perform other regular and emergency duties as required in the deck service of a merchant vessel.

Ordinary seamen are the beginners in the deck department. Most cargo vessels carry three ordinary seamen. One is assigned to each watch to "spell" (relieve) the helmsman and the lookout, carry messages, run errands, and bring coffee to the other members of the watch. During the day ordinary seamen are assigned to general deck maintenance work, such as scrubbing decks, coiling and splicing rope, chipping rust, and painting. To keep ships seaworthy, exposed parts must be painted frequently.

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Engine Department

This department is run by a *chief engineer* who has complete charge of all engines, boilers, electrical equipment, refrigeration equipment, sanitary equipment, deck machinery, and steam connections aboard ship. He supervises the handling of the main engines and auxiliary equipment while the vessel is under way and is responsible for taking on enough fuel for the voyage plus an ample reserve for emergencies.

The engine-room crew also operates on a three-watch system. The chief engineer assigns each of his three assistant engineers, who are licensed officers, to a watch period during which the watch officer is responsible for the operation of the ship's engines and for the supervision of such unlicensed personnel as *oilers*, *firemen*, *water tenders*, and *wipers*. The officers on watch must notify the chief engineer of any unusual occurrences and keep a record or log of equipment performance.

The *first assistant engineer*, in addition to serving as one of the watch officers, is in charge of operating and maintaining power machinery equipment aboard ship. He has direct responsibility for operations in the engine room, such as starting, stopping, and controlling the speed of the main engines, and for the supervision of engine-room personnel. He supervises and inspects lubrication of engines, pumps, electric motors and generators, and other machinery; directs the installation of steam and water pipes and electrical wiring; and with the aid of the chief engineer directs all types of repairs.

The *second assistant engineer*, in addition to his duties as a watch officer, has direct charge of the boilers and boiler-room equipment, such as the water-feed system, pumps, and condensers. He is responsible for the maintenance of proper steam pressure and oil and water temperatures. He oversees the cleaning of boilers, oil burners, and fireboxes, and is usually directly responsible for the operation, supervision, and maintenance of the fireroom.

The *third assistant engineer* supervises the operation and maintenance of ship pumps and engine-room auxiliary engines and stands one of the three engine-room watches.

In addition to the above licensed engine-room officers, some cargo vessels carry unlicensed day engineers who, according to their duties, are *junior engineers*, *refrigerator engineers*, or *deck engineers*.

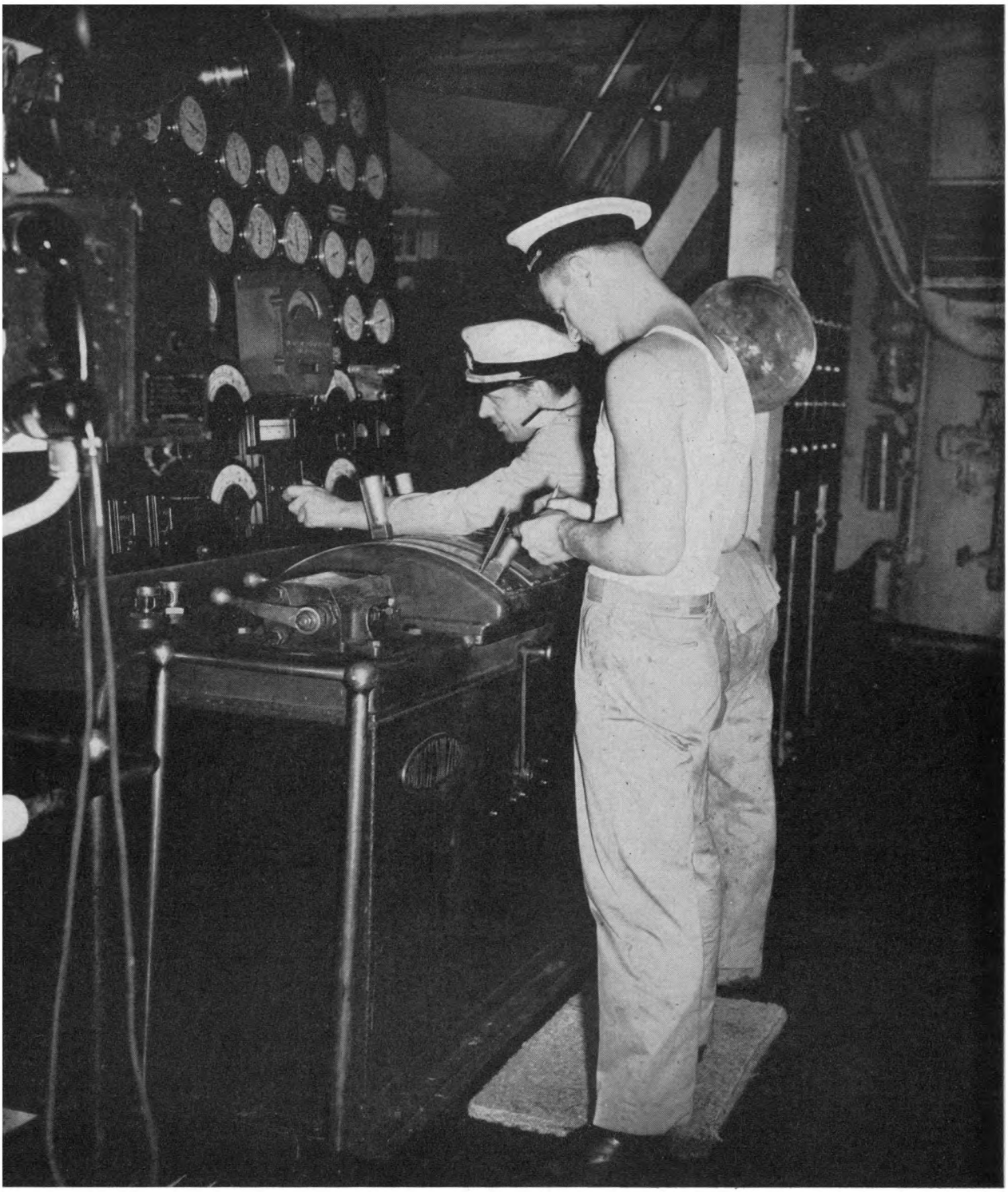
The *junior engineer*, who may or may not be licensed, operates engine-room controls upon signals from the bridge, checks boiler pressure and oil and water temperatures, assists in making all types of repairs, and sometimes stands watch.

The *refrigerator engineer* is found primarily on ships carrying cargo requiring refrigeration. These ships, called "reefers," usually carry three refrigerator engineers, who operate or supervise the operation of electric motors and pumps, or steam boilers and pumps, or ammonia compressors, water filters and coolers, and other refrigerating equipment; record temperatures produced by the machines; and make necessary adjustments to effect desired temperatures. They also repair and keep equipment in good running order.

The *deck engineer* repairs and keeps in working order machinery installed on the deck of the ship, such as mooring and cargo winches, which are like elaborate windlasses or reels. When deck machinery breaks down, he determines the causes of faulty operation, takes the machinery apart, and replaces the defective parts. He also adjusts new installations, using machinist's hand tools; reassembles machinery, using hoists and rollers; and sometimes repairs the ship's plumbing system.

The engine department may carry a *ship's electrician* who keeps the ship's electrical equipment in good repair and operating condition. He tests defective electrical systems and units to determine the location or cause of defect and restores them to good working order; makes small or emergency repairs on generators and motors; arranges emergency conversions of electric power or driving units when necessary to keep equipment operating until major repairs can be made; and repairs such electrical fixtures and equipment as controllers, switchboxes, distribution panels, and circuit breakers.

Tankers usually carry two *pumpmen* who tend and maintain one or more power-driven pumps to pump liquid cargoes, such as oil or molasses, into or out of the tanks. The pumpmen arrange and connect suction and discharge pipelines and hose, and operate valves as required; start the pumps and stand by while the pumps are working in

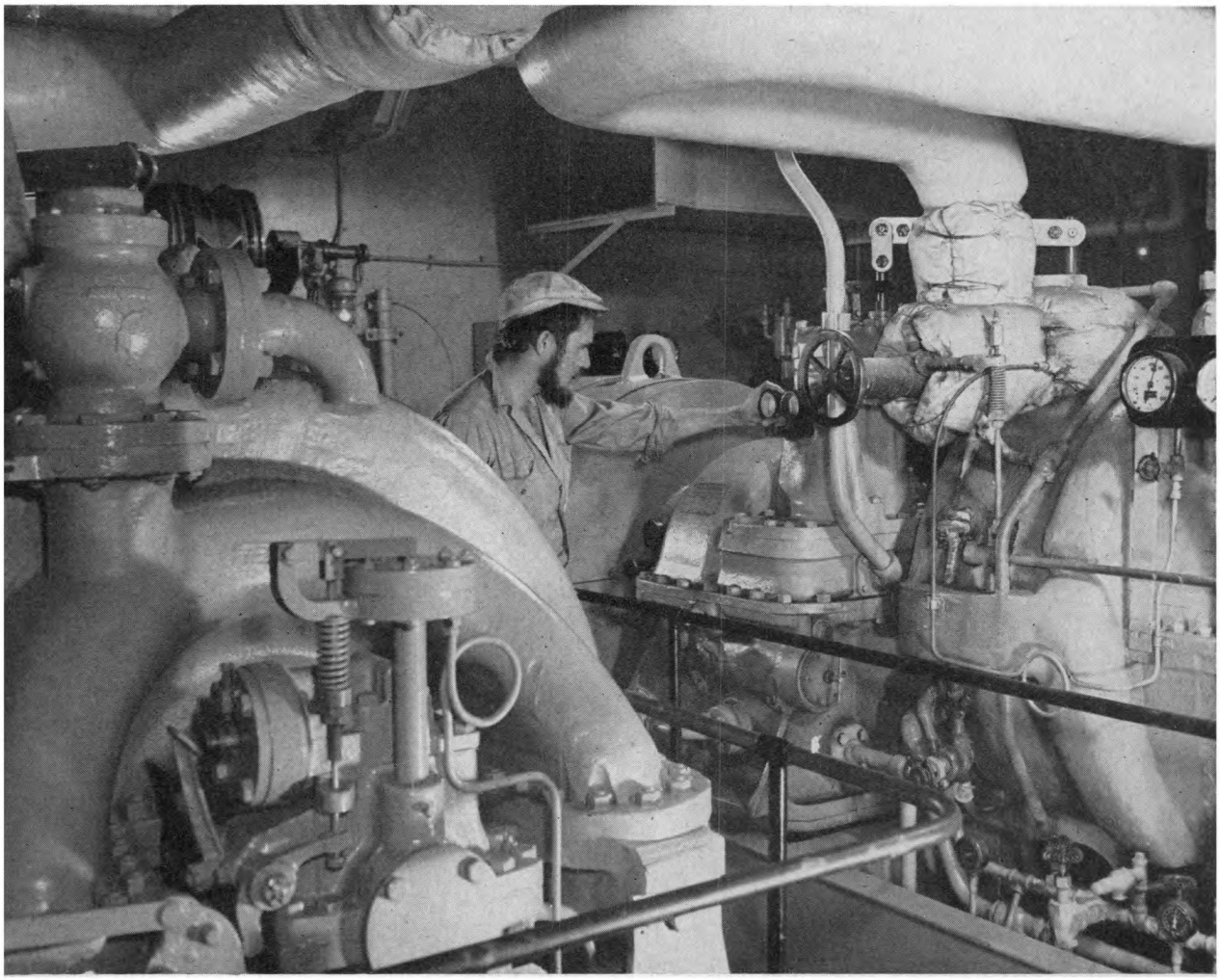


Officers at the engine control panel of a merchant ship.

order to increase or decrease the force of pumping as conditions warrant; and clean, lubricate, and adjust pumps. Pumpmen must keep a close watch on the temperatures of cargo and equipment to keep the cargo below dangerous flash and fire points while the pumps are in operation, and must be thoroughly familiar with fire-extinguishing equipment and fire-fighting procedures.

The unlicensed engine room "gang" consists of *oilers*, *water tenders*, *firemen*, and *wipers*. Cargo ships usually employ three oilers, one on each watch, who lubricate the moving parts or wearing surfaces of mechanical equipment. They make regular rounds of ship machinery, checking oil pressures and oil flow, and inspect for overheating; supply proper grade of oil or grease to all ship machinery; and help the engineer in charge to overhaul and repair main and auxiliary engines. Three *water tenders*, also, are assigned to each watch. They check and regulate the amount of water in the boilers; inspect gages attached to the boilers of the water-feeding system to bring water to desired safe levels; note readings of steam pressure gages to determine the need for increasing or diminishing boiler fires; regulate fuel-oil valves as necessary to keep steam pressure constant; and direct firemen as to when they must change and clean burner nozzles. They also check the operation of evaporators and condensers and test boiler water for salt content.

Oiler checking ship's generator.



Cargo vessels employ also a *fireman* on each of the three watches. They fuel the boilers to keep specified steam pressures in the boilers; clean oil-burning equipment; shut down boiler oil burners that are clogged with carbon or otherwise operating inefficiently; remove the burners and replace them, after using hand tools to remove carbon or other obstructions from them; and clean strainers used to filter dirt from oil before use in the burners. Many vessels combine the two jobs of fireman and water tender.

The beginning job in the engine department is that of *wiper*. Most cargo vessels carry two wipers, who clean machinery in the engine room, using cloths and cotton waste and chemical solvents as necessary. They assist in keeping the engine room clean by wiping up spilled fuel, oil, or lubricants, washing paint, and polishing metal fixtures. Wipers help dismantle and repair machinery under the direction of the engineer in charge and assist in such general engine-room maintenance work as chipping or scaling boilers, or making fuel- or water-line connections.

Steward's Department

A *chief steward* heads the steward's department and supervises the operation and maintenance of the living and eating quarters of officers, crew, and passengers. He has charge of, directs, and supervises all the department's personnel, orders and purchases food supplies, inspects and stores supplies, and generally supervises the preparation and serving of meals and the care and upkeep of living quarters.

The *chief cook* and *assistant cooks* prepare the meals aboard ship. The *chief cook* helps the steward plan the meals, draws pantry supplies from the storeroom, draws meat from the ice box, and butchers and cuts meat for cooking. He cooks meats and sauces and dishes up food for serving at meals. He also supervises the other galley (ship's kitchen) workers and is responsible for keeping the galley clean and orderly.

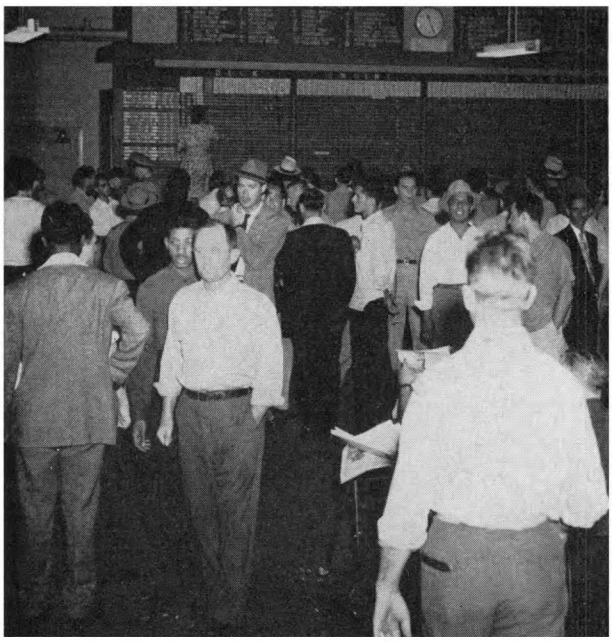
Cooks preparing "chow" in ship's galley.

The *second cook* assists the chief cook in preparing meals and also is the ship's *baker*. He bakes breads, rolls, biscuits, and pastries; cooks breakfast; prepares and cooks vegetables for other meals and helps dish up cooked foods; prepares desserts; and helps to keep the galley equipment clean and orderly.

Six *utility men* and *messmen* make up the remainder of the crew in the steward's department. These are beginning jobs requiring little skill. Generally, *utility men* carry food supplies from the storeroom and ice boxes; peel, cut, and otherwise prepare vegetables; wash cooking utensils; scour galley equipment; and scrub decks; whereas *messmen* set tables, serve meals, clean off tables, wash dishes, and care for living quarters.

How To Get a Job on a Ship

The usual way for an inexperienced man to get a job on a ship is to apply for work at a central hiring hall in one of the chief ports of the country. These hiring halls are operated by unions (see p. 24) which generally require that applicants for jobs be union members. On registering at the hiring



Seamen awaiting employment in union hiring hall.

hall, the job seeker is given a "shipping card" on which is stamped a number and the date he registered. Shipping companies send job orders to a dispatcher in the hiring hall, where the names of the ships and the jobs available are announced and posted. The applicant longest out of work is entitled to first job preference on a job for which he is qualified if he is present during the hiring hours. If he is absent when a job is called, he misses out on that job but does not lose his first place on the list for subsequent jobs until he has missed out on or turned down three job offers.

The worker receiving a job gets an assignment slip, which he presents to the shipping company. The company usually reserves the right to reject an applicant whom it considers unqualified or unacceptable for any valid reason. A rejected job seeker must then report back to the dispatcher to await another assignment.

Requirements, Training, and Advancement

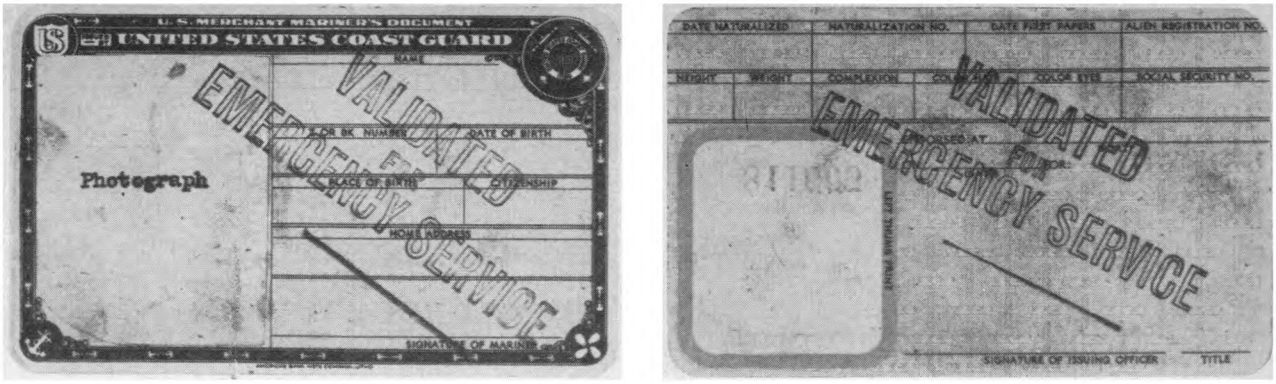
Unlicensed Crewmen

Requirements

Every person going to sea for the first time in a job or "rating" that does not require a license must obtain a merchant mariner's document from a Marine Inspection Office of the United States Coast Guard. He must present satisfactory proof that he has a job offer as a member of the crew of a United States merchant vessel. After a security check, the Marine Inspection Office will give the newcomer a merchant mariner's document endorsed by the Coast Guard for his particular entry rating. This document is a pocket-size plastic card which can be carried in the wallet, and is used as a certificate of service and identification. On one side it identifies the holder, and on the other side it lists the ratings for which he is qualified. He may hold any of the jobs aboard ship for which he has secured Coast Guard endorsement. The Coast Guard will, upon application and without a professional examination, endorse a merchant mariner's document for any of the following entry ratings: ordinary seaman in the deck department; wiper in the engine department; and messman or utility man in the steward's department. For the work in the steward's department where food is handled, the applicant must also produce a certificate from a medical officer of the United States Public Health Service, or other reputable physician, stating that he is free from communicable disease.

After the 1-year minimum required period of service, the ordinary seaman may apply to the Coast Guard for a limited endorsement to his merchant mariner's document as able seaman. After 3 years he may secure an unlimited endorsement as able seaman. The requirements for an AB (able-bodied seaman) certificate or endorsement are summarized in appendix I. An applicant must be at least 19 years of age, be in good physical condition, and pass an examination designed to test his knowledge of seamanship and his ability to carry out effectively all the duties that may be required of an able seaman, including those of lifeboat man. Once the seaman's papers are endorsed as able seaman he may serve in any unlicensed rating in the deck department.

After a minimum period of 6 months' service, a wiper may have his merchant mariner's document endorsed as "qualified Member of the Engine Department," or "QMED," and for a more skilled



Front Back

Reproduction of validated Merchant Mariner's Document.

job, if he can pass the examination and meet the other requirements listed in appendixes I and V. The possible QMED ratings are junior engineer, machinist, refrigerator engineer, deck engineer, pumpman, boilermaker, electrician, water tender, fireman, and oiler. When an applicant qualifies for all these ratings, his papers will state "QMED—Any Rating."

Training Opportunities and Advancement

Inexperienced men get their initial training aboard ship. After 6 months' sea service in an entry job they may apply to the United States Maritime Administration for training designed to help them advance in their work and to bring them up-to-date with new developments in the industry. For unlicensed deck personnel there is a 4-week course in practical seamanship and a 6-week course in "deck pre-license." Unlicensed engine personnel are offered 4-week courses in machine-shop practice, marine refrigeration, marine engineering, and "engine pre-license," and an 8-week course in marine electricity. Steward's department personnel may take 4-week courses in cooking, baking, butchering, and chief steward training. Any merchant seaman may attend a 5-day course in lifeboat training. The above courses are conducted at the United States Maritime Service Training Stations at Sheepshead Bay, in Brooklyn, N. Y., and at Alameda, Calif.

All unlicensed personnel are furnished quarters and subsistence while attending school. For further information concerning these training courses, write to or apply at one of the following United States Maritime Service enrolling offices:

1. 19 Trinity Place, New York 6, N. Y., *or*
2. Room 105–6 Customs House, 555 Battery Street, San Francisco 4, Calif., *or*
3. 642 Federal Building, 600 South Street, New Orleans 7, La.

Thousands of American sailors take advantage of the educational and technical training offered through the correspondence courses of the Maritime Service Institute at a cost of $3 a course. These courses give the beginner a chance to acquire the technical information needed for a certificate while he is at sea getting the necessary practical experience. For complete information, write the United States Maritime Service Institute, Sheepshead Bay, Brooklyn 29, N. Y., and ask for their *Catalog of Modern Correspondence Courses.*

Seamen in the deck department advance along well-defined lines of promotion. When the ordinary seaman has met the legal qualifications for an AB ticket, he applies for that rating and takes the required examinations. If successful he gets his AB ticket and can then bid for an AB job. To become a boatswain, a man must have ability to handle men as well as have an unlimited AB ticket. A seaman having skill with tools may advance to the position of ship's carpenter.

In the engine department a wiper may advance to any one of many jobs, provided legal qualifications are met. The usual line of advancement is from wiper to fireman or water tender and then to oiler. From there the next step is to a rating as deck engineer, refrigerator engineer, junior engineer, or electrician. In the steward's department, advancement is from messman or utility-

man to assistant cook to chief cook, and finally to steward.

Licensed Officers

Requirements

To be eligible to serve as a deck, engine, or radio officer aboard a merchant vessel, a seaman must hold a license issued by the Coast Guard. He must pass a physical and comprehensive written examination designed to test his knowledge of the work for which he is seeking a license. For a deck license the applicant should have a knowledge of navigation, cargo handling, and the operations of the deck department in all its phases. For a license as master or mate at least 20/40 vision in one eye and 20/70 in the other are required. For an engineer's license a seaman must pass a written examination covering a wide knowledge of marine steam, Diesel engines, and marine boilers. He must have vision of at least 20/50 in one eye and at least 20/70 in the other, correctable to 20/30 in one eye and 20/50 in the other. The requirements for the Coast Guard licenses are summarized in appendixes II, III, and IV.

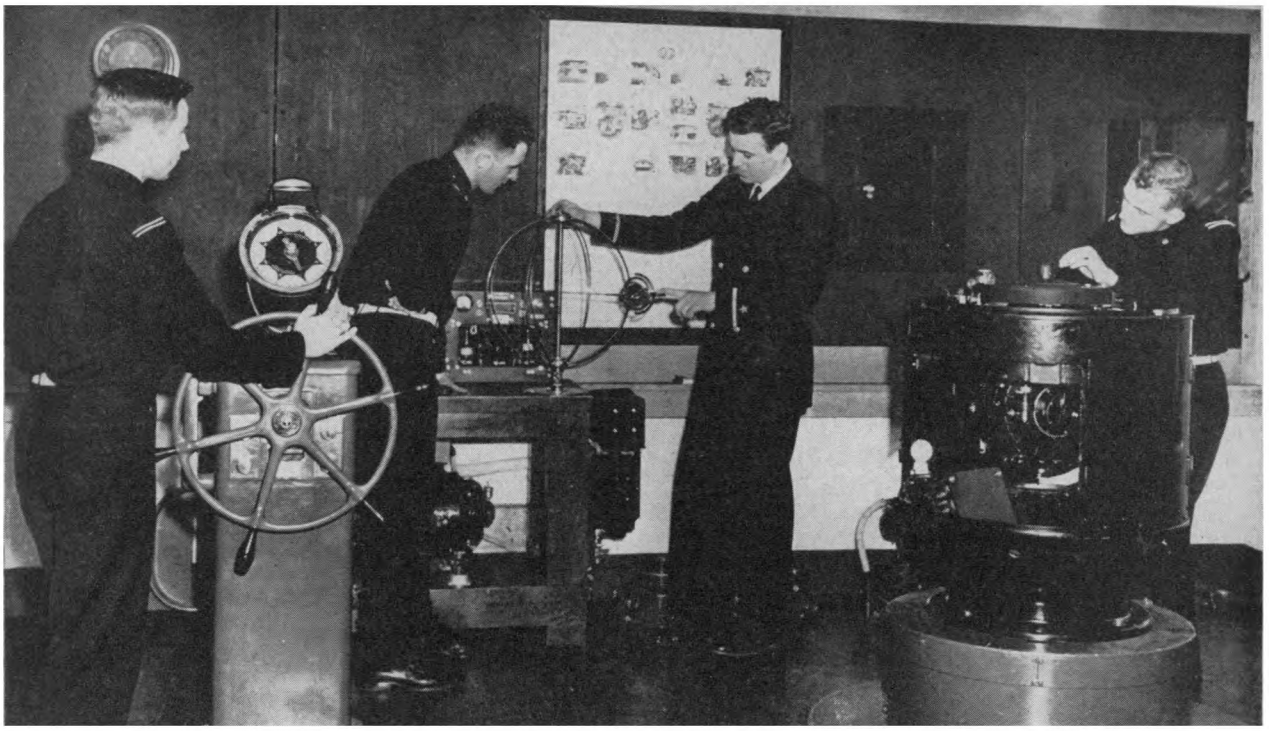
For a Coast Guard license as radio operator one must be at least 19 years of age. He must have, either with or without glasses, at least 20/30 vision in one eye and at least 20/50 in the other, but without glasses he must have a minimum vision of 20/50 in one eye and at least 20/70 in the other. In addition, he must hold a valid first- or second-class radiotelegraph operator's license issued by the Federal Communications Commission. The FCC requires that applicants pass written examinations on such subjects as laws regulating communications at sea; radio and telegraph operating practices; technical, legal, and other matters relating to the operation of all classes of radiotelegraph stations; message traffic routing and accounting, and radio navigational aids. The applicant must also pass a code test in both the transmitting and receiving of the international Morse code for 1 minute without error. For a second-class license the speed requirements are 16 code groups per minute; for a first-class license 20 code groups per minute and 25 words per minute in uncoded language. For a license to serve on a cargo vessel as the sole radio operator aboard, the Coast Guard requires also 6 months' radio experience at sea. A ship's radio officer may have his license endorsed as a ship radar technician by passing a written examination on specialized theory, installation, servicing, and maintenance of ship radar equipment.

Anyone who has served for 3 years in the deck or engine department can apply for either a third mate's license or for a third assistant engineer's license. However, 3 years of experience alone does not usually enable a crew member to pass the Coast Guard examinations for license as deck or engine officers. A seaman who wishes to become an officer should supplement his shipboard experience with courses of study such as those given by the United States Maritime Administration.

Training Opportunities and Advancement

Another way to become a licensed officer is by graduating from the United States Merchant Marine Academy, or from one of four State academies, from the Coast Guard Academy, or from the United States Naval Academy. The Merchant Marine Academy at Kings Point, Long Island, was established by the Maritime Commission to insure an adequate supply of well-trained officers for the American Merchant Marine. The academy gives a 4-year course of study which includes college academic courses, along with practical sea experience as "cadet midshipmen." On graduation the cadet receives a license as third mate or third assistant engineer, a commission as ensign in the United States Maritime Service and the United States Naval Reserve (inactive), and a degree of bachelor of science. The Government pays the cadets $65 per month, out of which they are required to buy their uniforms, textbooks, and other specified equipment.

Admission is through a Nation-wide competitive examination, usually given in April and November. Applicants must be at least 16 years of age and under 21. Discharged veterans and men with 1 year of sea service are granted an age waiver to 24, and 5 points are automatically added to their test scores. Successful candidates between the ages of 19 and 26 subject to induction into the Armed Forces are deferred from the draft as long as they are cadet midshipmen in the United States Merchant Marine Cadet Corps.



Cadet midshipmen learning to master navigation instruments.

But they must agree to serve in the Navy as ensigns for at least 2 years after graduation from the Academy if called to active duty. However, if the graduated student goes to sea, it is unlikely that he will be called for military duty. Veterans are not required to agree to answer a call to active duty. For application forms and detailed information, write to the United States Merchant Marine Cadet Corps, Office of Maritime Training, United States Maritime Administration, Washington 25, D. C.

In addition, the following State maritime academies qualify students for deck or engineer officer's license:

1. California Maritime Academy, Vallejo, Solano County, Calif.
2. Main Maritime Academy, Castine, Maine.
3. Massachusetts Maritime Academy, 100 Nashua Street, Boston, Mass.
4. New York State Maritime Academy, Fort Schuyler, New York, N. Y.

These schools operate training ships which make annual training cruises to foreign shores and give such courses as:

Deck department—navigation, trigonometry, seamanship, ship construction, elements of marine engineering, maritime law, cargo handling, and foreign trade.

Engineering department—physics, mechanical drawing, steam engineering, electrical engineering, gas and Diesel engineering, thermodynamics, and ship construction.

The Maritime Administration's training stations at Alameda and Brooklyn also offer a number of training courses to licensed personnel to upgrade them or prepare them for specialist ratings. Deck officers who have a valid license as third mate, or higher, and who have completed 6 months' sea service in the last 12 months are eligible for any of the following 4-week courses: Deck upgrade, advanced navigation, and advanced seamanship. The latter two courses are offered at Alameda as a combined 6-week course. Also offered are courses of instruction in the operation of Loran and other radar navigation instruments.

Engine officers who hold a valid license as third assistant engineer, or higher, and who meet the 6 months' service requirement are eligible for the following 4-week courses: Engine upgrade, machine-shop practice, marine refrigeration, and high-pressure turbine. An 8-week course in marine

electricity is also offered to those engine officers having 12 months' sea service during the preceding 2-year period.

The Sheepshead Bay station in Brooklyn, N. Y., offers an 8-week course of instruction in radar and electronics for radio operators. The objective is to train merchant marine radio officers in the maintenance and servicing of radar and other electronic aids to ship operation. To be eligible an applicant must hold a valid FCC license as a second-class radiotelegrapher or higher, a valid United States Coast Guard officer's license, and must have completed 12 months' sea service as a radio operator in the preceding 2 years.

Both Maritime Administration schools furnish quarters and subsistence. Assignments to training courses at Alameda are made through the United States Maritime Service Enrolling Office, Room 105–6 Customs House, 555 Battery Street, San Francisco 4, Calif.; those to courses at the Sheepshead Bay station are made through the United States Maritime Service Enrolling Office, 19 Trinity Place, New York 6, N. Y. A limited number of assignments at both schools can be made through the New Orleans enrolling office, 642 Federal Building, 600 South Street, New Orleans 7, La.

Advancement for deck and engine officers is also along well-defined lines. The deck officer must start as third mate; after a minimum of 1 year's service he is eligible to take a second mate's examination. Another way of qualifying for the examination is through 5 years of service in the deck department, 2 years of which must be spent as a boatswain or quartermaster. The next step forward to the position of chief mate requires at least 1 year of service as second mate or 2 years of service as a watch officer while holding a license as second mate. The chief mate may apply for master's papers after 1 year of service as chief mate, or 2 years of service as second mate while holding a chief mate's license. The qualifications that must be met for each license are summarized in appendixes II and IV.

An officer in the engine department starts as a third assistant engineer. After 1 year of service, he may apply for a second assistant's license. When he meets the qualifications outlined in appendix III, he may get a first assistant's license and finally a chief engineer's license.

Wages, Hours, and Working Conditions

Wages

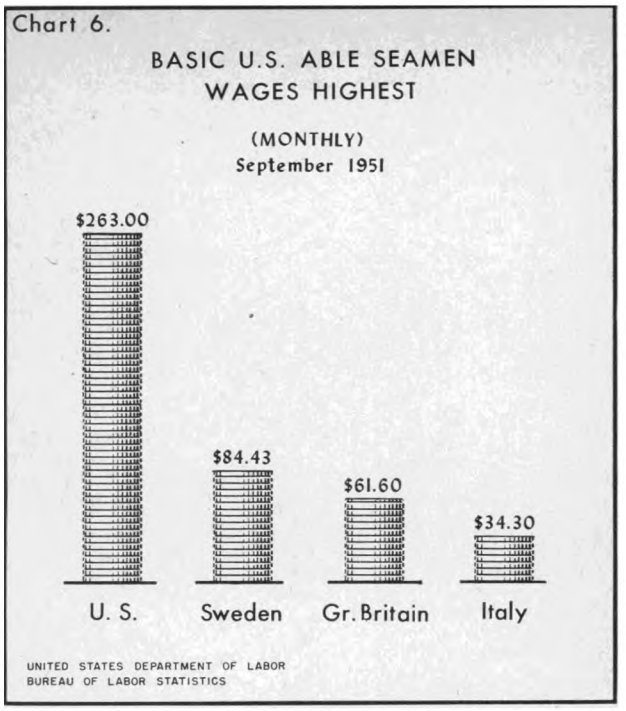
Earnings aboard American flag deep-sea vessels are the highest in the world. Wages vary according to the type and size of vessel. They are highest on multiple-screw passenger vessels of 35,000 tons and over. In late 1951, the starting wage aboard freighters in the deck and steward's departments was approximately $226 per month, plus subsistence, quarters, and medical care while at sea. The entry wage in the engine department was about $260 a month. Table 2 shows typical monthly basic wages paid to unlicensed personnel and licensed officers aboard an average dry-cargo vessel. These basic monthly wages are higher than those in the maritime service of any other nation; they are three to six times those received by most foreign seamen. (See chart 6.)

Basic wages, however, tell only part of the story, because the seaman receives a considerable sum in overtime and premium payments and has other benefits such as medical care and free room and board.

TABLE 2.—*Basic monthly wages aboard dry-cargo vessels, November 1951* [1]

Job title	Monthly wages	Job title	Monthly wages
Deck department		**Engine department**	
Master	$833	Chief engineer	$756
First mate	515	First assistant engineer	515
Second mate	455	Second assistant engineer	455
Third mate	419	Third assistant engineer	419
Radio officer	412	Junior engineer—Day	333
Boatswain	334	Junior engineer—Watch	300
Carpenter	300	Chief electrician	419
Able seaman	263	Assistant electrician	330
Ordinary seaman	226	Reefer engineer	385
		Pumpman	356
Steward's department		Deck engineer	300
		Oiler—Diesel	287
Chief steward	326	Oiler—Steam	263
Chief cook	300	Fireman—water tender	263
Second cook and baker	273	Water tender	263
Assistant cook	260	Fireman	263
Messman	226	Wiper	260
Utilityman	226		

[1] Compiled from files of the Maritime Administration and from union and management publications.



Hours

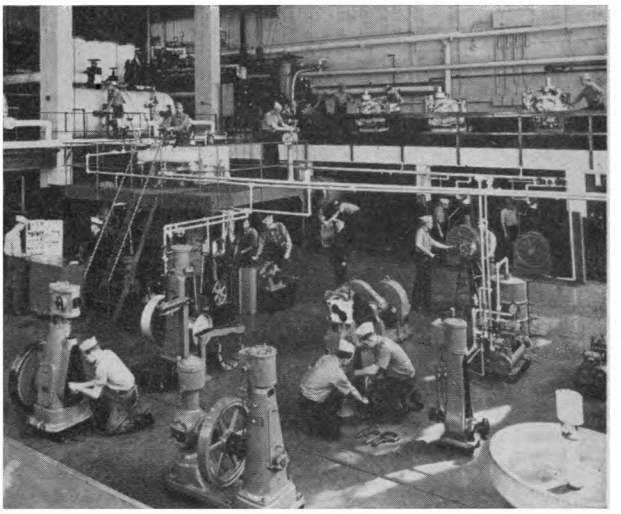
The workweek for seamen is both long and irregular. At sea the daily hours of licensed officers, able and ordinary seamen, firemen, oilers, and water tenders are scheduled according to 3 watches during each 12-hour period. Each watch is 4 hours long and each man stands 2 watches, 7 days a week; overtime pay is received for the seventh day worked.[2]

Nonwatch personnel in the deck and engine departments work 44 hours a week while at sea. Their workday is 8 hours long between 8 a.m. and 5 p.m., Monday through Friday, with 1 hour for lunch; and from 8 a.m. to 12 noon on Saturday. Overtime is paid for all work performed between 5 p.m. and 8 a.m. daily, after 12 noon on Saturday, and on Sundays and holidays.

The steward's department while at sea operates on a 48-hour week with pay for Sundays and holidays at a rate 50 percent more than the weekday rate. The schedule calls for 8 hours of work within a 12-hour period.

When the ship is in port, members of the crew work a 40-hour week, Monday through Friday. The workday is 8 hours long between 8 a. m. and 5 p. m. and overtime is paid for all other work. Most vessels observe the following 9 holidays and pay overtime for work performed on these days: New Year's Day, Washington's Birthday, Lincoln's Birthday, Memorial Day, Independence Day, Labor Day, Armistice Day, Thanksgiving, and Christmas.

Seamen with 1 year of service aboard ship are generally given a 2-week vacation with pay; those with 2 years of service have 4 weeks. Some tanker companies grant a 4-week vacation after 1 year of continuous service and a 5-week vacation after 2 years of continuous service.



Cadet engineers in the steam laboratory at Kings Point.

Living and Working Conditions

Space for living quarters is limited aboard ship. An unlicensed crewman must usually share his quarters with from two to four other men. The ship provides bedding (including a weekly change of sheets and pillow cases) and bath facilities including soap and clean towels. Some vessels issue cots to the crew to enable them to sleep on deck while in tropical climates. Crewmen have their own mess hall, which often doubles as a recreation room where they can spend free time reading, writing letters, playing cards, or listening to the radio. Each officer, as a rule, has a small private room with hot and cold running water, and eats with other officers in a wardroom separate from the mess hall in which unlicensed crewmen eat. His room is kept clean and made up each morning by a mess-

[2] Beginning December 15, 1951, the workweek was dropped to 40 hours and overtime pay is received for additional hours worked.

Crewmen relax in quarters aboard Liberty ship.

Seamen enjoying leisure moment in messroom.

man. Living conditions aboard ship have improved greatly over the last 20 years, but at the best the quarters are cramped and there is little chance for privacy. When a man signs aboard ship he limits his freedom of action for a given period as well as his choice of entertainment, companions, and food. Food on American vessels is generally good, but much depends upon the skill and standards of food planning and preparation which vary from vessel to vessel. The deck hand may face the heat of the tropics or the cold blasts of a wintry sea. The engine-room worker is confined below deck in a noisy and hot engine room, performing work which is often dirty. The messman and utility man do personal service work, often distasteful.

Foreign voyages are long, sometimes lasting 12 months. Even on shorter voyages the seaman is out of touch with home most of the time. This makes it difficult for him to marry, establish a home, and raise a family. After months at sea he often leaves ship for a fling at shore life and must then look for another berth. In bad times jobs are hard to find. On the other hand, coastal and other domestic voyages are relatively short; the seaman is in and out of port quite frequently and usually has regular employment with a particular company.

Ordinarily the duties of seamen are not particularly hazardous, but at sea, there is always a possibility of fire, collision, and sinking. In case of sudden illness, moreover, the seaman can get first-aid treatment only. Despite these drawbacks, for many men the romance and adventure of the sea more than compensate for the hard work and lack of normal family life.

Maritime Unions

Most shipping companies have contracts with maritime labor unions. In the contracts the companies and the unions agree on wages, hours, and working conditions. The following paragraphs briefly describe the jurisdiction, size, and qualifications for membership in some of the more important seafaring unions in 1951.

Many licensed deck and engine officers are members of labor unions. The National Organization of Masters, Mates, and Pilots of America, which dates back to 1887, represents deck officers. It is affiliated with the American Federation of Labor and has a membership of 9,000. This union is open to any licensed deck officer. Dues are $3 per month and there is a minimum $50 initiation fee. Licensed marine engineers are represented mainly by the National Marine Engineers' Beneficial Association, which is affili-

ated with the Congress of Industrial Organization and has a membership of about 12,000. Any licensed marine engineer who is a citizen of the United States and not engaged in the sale of intoxicating liquors is eligible for membership. Dues are $3 per month, and the initiation fee is $50.

The two largest unions representing unlicensed personnel are the National Maritime Union and the Seafarers International Union. They both are industrial-type unions representing unlicensed deck, engine, and steward's department employees. The National Maritime Union, a CIO-affiliated union organized in 1937, is open to "all workmen, directly or indirectly engaged in the maritime industry." Applicants must be approved by a membership committee, serve a 6-month probationary period, pay dues of $4 per month and an initiation fee of $25. The Seafarers International Union or "SIU" represents "bona fide seamen, fishermen, fish cannery workers, and workers in allied maritime trades . . ." and is affiliated with the AFL. It had a membership of about 45,000 in 1950, including some fishermen and cannery workers. Membership is scattered along the Pacific, Gulf, and Atlantic coasts. Members pay a charter fee of $10 on joining and a per capita tax of 20 cents per month in addition to dues of $3 per month. The Sailor's Union of the Pacific is the West Coast branch of the SIU. It is a craft-type union representing about 7,000 seamen, most of them in deck jobs, but on some tankers it represents deck, engine, and steward's department employees. The Pacific Coast Marine Firemen, Oilers, Watertenders and Wipers Association operates on the West Coast and represents many of the unlicensed men in engine rooms and firerooms, the machine shop, and refrigeration plants aboard ship. It is an independent union with a membership of 6,300. Dues are $4.50 per month and the initiation fee is $50.

Ship radio operators are represented by two unions: The CIO's American Radio Association, in which dues are $25 per quarter year and the AFL's Radio Officers' Union of the Commercial Telegraphers Union in which dues are $15 per quarter.

Appendix I

Major Legal Requirements for Specified Deck and Engine Ratings[1]

Type of Requirement	Able Seaman	Lifeboat Man	Qualified Member of the Engine Department
Minimum age:	19		
Certification required:	Merchant mariner's document endorsed as able seaman.	Merchant mariner's document endorsed as lifeboat man or able seaman.	Certificate as qualified member of engine department.
Physical requirements:	Pass a physical examination by an officer of the U. S. Public Health Service. The medical examination is the same as for an original license as a deck officer. (See appendix II.)	No legal requirement.	Pass a physical examination by an officer of the U. S. Public Health Service. The medical examination is the same as for an original license as engineer (see appendix III) except that the exemption regarding monocular vision does not apply.
Service or training requirements:	For unlimited certificate: (1) 3 years' service on deck in vessels of 100 gross tons or over operating on ocean or coastwise routes or on the Great Lakes. (Time spent by an applicant in a course of able seaman's training in an approved school may be accepted as the equivalent of sea service up to a maximum of 1 year.) (2) Satisfactory completion of 18 months' training in an approved seagoing training ship. For limited certificate: holders limited to one-fourth of the number of able seamen required by law to be employed on a vessel. (1) 12 months' service on deck in vessels of 100 gross tons or over operating on ocean or coastwise routes or on the Great Lakes; or (2) Satisfactory completion of a course of training at a U. S. Maritime Service training station of at least 9 months, 6 months of which shall have been served aboard a seagoing vessel.	(1) At least 1 year's service in the deck department, or at least 2 years' service in the other departments of ocean, coastwise, Great Lakes, and other lakes, bays, or sounds vessels; or (2) Graduation from an approved school ship; or (3) Satisfactory completion of basic training by a cadet of the U. S. Merchant Marine Cadet Corps; or (4) Satisfactory completion of 3 years' training at the U. S. Naval or Coast Guard Academies, including two training cruises; or (5) Satisfactory completion of an approved course of training and served aboard a training vessel; or (6) Successful completion of an approved training course, such course to include a minimum of 30 hours' actual lifeboat training, provided that the applicant produces evidence of having served a minimum of 3 months at sea aboard ocean or coastwise vessels.	(a) An applicant for a certificate of service as qualified member of the engine department shall furnish the Coast Guard proof that he possesses one of the following requirements of training or service: (1) 6 months' service at sea in a rating at least equal to that of coal-passer or wiper in the engine department of vessels operating on the high seas or Great Lakes, or on the bays or sounds directly connected with the sea; or (2) Graduation from a school ship approved by and conducted under rules prescribed by the commandant; or (3) Satisfactory completion of a course of training approved by the commandant, and served aboard a training vessel; or (4) Graduation from the U. S. Naval or Coast Guard Academies.
Examination and demonstration of ability:	(a) Before an applicant is certified as able seaman, he shall prove to the satisfaction of the Coast Guard by oral or written examination and by actual demonstration, his knowledge of seamanship, and his ability to carry out effectively all the duties that may be required of an able seaman including those of a lifeboat man. He shall demonstrate that: (1) He has been trained in all the operations connected with the launching of lifeboats and life rafts and the use of oars and sails; (2) He is acquainted with the practical handling of the boats themselves; and	(a) Before a lifeboat man's certificate may be granted, the applicant must prove to the Coast Guard's satisfaction that he has been trained in all the operations connected with launching lifeboats and life rafts and the use of oars and sails; that he is acquainted with the practical handling of the boats themselves; and further, that he is capable of understanding and answering the orders relative to lifeboat service. An oral examination and practical demonstration of ability may be required. (b) The oral examination shall consist of questions regarding:	(a) Applicants for certification as qualified members of the engine department in the rating of oiler, water tender, fireman, deck engineer, refrigerator engineer, junior engineer, electrician, and machinist shall be examined orally or in writing on the subjects listed in appendix V. The applicant's general knowledge of the subjects must be sufficient to satisfy the examiner that he is qualified to perform the duties of the rating for which he makes application.

(3) He is capable of taking command of a boat's crew.

(b) The examination shall consist of questions regarding:

(1) Lifeboats and life rafts, the names of their essential parts, and a description of the required equipment;

(2) The clearing away, swinging out, and lowering of boats and rafts, the handling of boats under oars and sails, including questions relative to the proper handling of a boat in running before a heavy sea, in pulling into a sea, etc.;

(3) The construction and functions of gravity, radial, and quadrantal types of davits;

(4) The applicant's knowledge of nautical terms; boxing the compass, either by degrees or points according to his experience; running lights, passing signals, and fog signals; and distress signals; and

(5) The applicant's knowledge of commands in handling the wheel by obeying orders passed to him as "wheelsman" and knowledge of the use of engine-room telegraph or bell-pull signals.

(c) In the actual demonstration, the applicant shall show his ability by taking command of a boat and directing the operation of clearing away, swinging out, lowering the boat into the water, and acting as coxswain in charge of a boat, under oars. He shall demonstrate his ability to row by actually pulling an oar in the boat. He shall also demonstrate knowledge of the principal knots, bends, splices, and hitches in common use, by actually making them.

(1) The construction of lifeboats and life rafts, the names of their different parts, and a description of the equipment required;

(2) The construction and functions of the gravity, radial, and round-bar types of davits;

(3) Clearing away, swinging out, and lowering boats and rafts;

(4) Handling boats under oars and sails; and

(5) Nautical terms used in connection with launching and handling lifeboats.

(c) The practical examination shall consist of a demonstration of the applicant's ability to carry out the orders incident to launching lifeboats, and the use of the boat's sail, and to row.

[1] The requirements listed are those given in part 12 of the U. S. Coast Guard's "Rules and Regulations for Licensing and Certificating of Merchant Marine Personnel." Additional information may be obtained from the United States Coast Guard, Washington, D. C., or any Coast Guard regional office.

Appendix II

Major Legal Requirements for Deck Licenses on Ocean Vessels[1]

Type of Requirement	Master	Chief Mate	Second Mate	Third Mate
Minimum age:	21	21	21	19
Citizenship:	Must present documentary evidence of United States citizenship.	Same as master.	Same as master.	Same as master.
Physical standards:	(1) All applicants for an original license shall be required to pass a physical examination given by a medical officer of the U. S. Public Health Service. This certificate shall attest to the applicant's acuity of vision, color sense, and general physical condition. (2) Epilepsy, insanity, senility, acute venereal disease or neurosyphilis, badly impaired hearing, or other defect that would render the applicant incompetent to perform the ordinary duties of an officer at sea are causes for certification as incompetent. (3) Applicant must have, either with or without glasses, at least 20/20 vision in one eye and at least 20/40 in the other. Applicants who wear glasses, however, must also be able to pass a test without glasses of at least 20/40 in one eye and at least 20/70 in the other. The color sense will be tested by means of the "Stillings" test, but any applicants who fail this test will be eligible if they can pass the "Williams" lantern test.	Same as master.	Same as master.	Same as master.
Character reference:	Written endorsements of a master and engineer of a vessel on which they have served with the applicant together with one other licensed officer.	Same as master.	Same as master.	Same as master.
Experience requirements:	(1) 1 year's service as chief mate of ocean steam or motor vessels of 1,000 gross tons or over; or (2) 1 year's service as chief mate of coastwise steam or motor vessels of 2,000 gross tons or over; or (3) 2 years' service as second mate of coastwise steam or motor	(1) 1 year's service as second mate of ocean steam or motor vessels of 1,000 gross tons or over; or (2) 1 year's service as second mate of coastwise steam or motor vessels of 2,000 gross tons or over; or	(a) In order to be eligible for an unlimited ocean license, an applicant must have obtained his service on ocean or coastwise vessels of 1,000 gross tons or over. (1) 1 year's service as officer in charge of a deck watch on ocean or coastwise steam or motor vessels	(a) In order to be eligible for an unlimited ocean license, an applicant must have obtained his service on ocean or coastwise vessels of 1,000 gross tons or over. (1) 3 years' service in the deck department of ocean or coastwise steam or motor vessels, 6 months

vessels of 1,000 gross tons or over while holding a license as chief mate of such vessels; or

(4) 2 years' service as second mate of coastwise steam or motor vessels of 2,000 gross tons or over while holding a license as chief mate of such vessels; or

(5) 1 year's service as master of coastwise steam or motor vessels of 2,000 gross tons or over; or

(6) 2 years' service as master of ocean or coastwise sail vessels of 700 gross tons or over, for license as master of freight or towing, steam or motor vessels of not more than 3,000 gross tons; or

(7) 3 years' service as master of steam or motor vessels of 4,000 gross tons or over, except ferry vessels, on the Great Lakes, together with 1 year's service as second mate of ocean steam or motor vessels of 1,000 gross tons or over.

(3) 2 years' service as officer in charge of a deck watch on ocean steam or motor vessels of 1,000 gross tons or over while holding a license as second mate of such vessels; or

(4) 2 years' service as officer in charge of a deck watch on coastwise steam or motor vessels of 2,000 gross tons or over while holding a license as second mate of such vessels; or

(5) 2 years' service as master of Great Lakes or other lakes, bays, or sound steam or motor vessels of 1,000 gross tons or over except ferry vessels, together with 1 year's service as officer in charge of a deck watch on ocean steam or motor vessels of 1,000 gross tons or over, or together with 1 year of such service on coastwise steam or motor vessels of 2,000 tons or over; or

(6) 5 years' service in the deck department of ocean or coastwise sail vessels of 200 gross tons or over, 2 years of such service shall have been as master of such vessels, for license as chief mate of ocean freight or towing vessels of not more than 3,000 gross tons; or

(7) 1 year's service as master of any class of ocean steam or motor vessels of more than 250 gross tons for license as chief mate of ocean freight or towing vessels of not more than 1,500 gross tons.

while holding a license as third mate; or

(2) 6 months' service as second mate of coastwise steam or motor vessels; or

(3) 5 years' service in the deck department of ocean or coastwise steam or motor vessels of 1,000 gross tons or over, 2 years of which shall have been as boatswain or quartermaster while holding a certificate as able seaman; or

(4) 1 year's service as first-class pilot of steam or motor vessels of 4,000 gross tons or over, except ferry vessels, on the Great Lakes, or other lakes, bays, or sounds, together with 6 months' service in the deck department of ocean steam or motor vessels of 1,000 gross tons or over, while holding a license as such first-class pilot; or

(5) 2 years' service as assistant (junior officer of the watch) to the officer in charge of the watch on ocean steam or motor vessels, while holding a license as third mate of such vessels, or

(6) 4 years' service in the deck department of ocean or coastwise sail vessels of 200 gross tons or over, 1 year of such service shall have been as second mate of such sail vessels.

of which shall have been as able seaman, boatswain, or quartermaster while holding a certificate as able seaman; or

(2) 6 months' service as third mate of coastwise steam or motor vessels; or

(3) Graduation from:

(i) the U. S. Merchant Marine Academy (deck);

(ii) the deck class of a State nautical schoolship;

(iii) the U. S. Naval Academy; or

(iv) the U. S. Coast Guard Academy.

(4) Satisfactory completion of the prescribed course (deck) at a U. S. Maritime Service or other Government-operated training school, approved by the commandant, may be accepted as the equivalent of sea service up to a maximum of 4 months, provided the applicant has obtained the additional qualifying experience prior to enrollment; or

(5) 1 year's service as second-class pilot of steam or motor vessels of 4,000 gross tons or over, except ferry vessels on the Great Lakes, or other lakes, bays, or sounds, together with 6 months' service in the deck department of ocean steam or motor vessels of 1,000 gross tons or over, while holding a license as such second-class pilot; or

(6) 3 years' service in the deck department of steam or motor vessels on the Great Lakes, other lakes, bays, or sounds or rivers together with 1 year's service in the deck department of ocean steam or motor vessels, 6 months of which shall have been as able seaman, boatswain, or quartermaster while holding a certificate as able seaman; or

(7) 3 years' service in the deck department of steam or motor vessels of 100 gross tons or over engaged in the ocean or coastwise fisheries, together with 6 months' service as able seaman, boatswain, or quartermaster on ocean steam or motor vessels, while holding a certificate as able seaman.

See footnotes at end of table.

Appendix II—Continued

Major Legal Requirements for Deck Licenses on Ocean Vessels [1]—Continued

Type of Requirement	Master	Chief Mate	Second Mate	Third Mate
Knowledge:	(1) Applicant must secure a certificate from the U. S. Public Health Service that he has passed a satisfactory examination based on the contents of "The Ships' Medicine Chest and First Aid at Sea." (2) Applicant must pass a satisfactory examination as to his knowledge of the subjects listed in appendix IV.	Same as master.	Same as master	Same as master.

[1] The requirements listed are those given in part 10 of the U. S. Coast Guard's "*Rules and Regulations for Licensing and Certificating of Merchant Marine Personnel.*" Additional information may be obtained from the United States Coast Guard, Washington, D. C., or any Coast Guard regional office.

Appendix III

Major Legal Requirements for Engineer Licenses on Ocean Steam Vessels [1]

Type of Requirement	Chief Engineer	First Assistant Engineer	Second Assistant Engineer	Third Assistant Engineer
Minimum age:	21	21	21	19
Citizenship:	Must present documentary evidence of United States citizenship.	Same as chief engineer.	Same as chief engineer.	Same as chief engineer.
Physical standards:	(1) All applicants for an original license shall be required to pass a physical examination given by a medical officer of the United States Public Health Service. This certificate shall attest to the applicant's acuity of vision, color sense, and general physical condition. (2) Epilepsy, insanity, senility, acute venereal disease or neurosyphilis, badly impaired hearing, or other defect that would render the applicant incompetent to perform the ordinary duties of an officer at sea are causes for certification as incompetent.	Same as chief engineer.	Same as chief engineer.	Same as chief engineer.

	(3) Applicants for original engineer's licenses shall be examined only as to their ability to distinguish the colors red, blue, green, and yellow. (4) Applicant must have, either with or without glasses, at least 20/30 vision in one eye and at least 20/50 in the other. The applicant who wears glasses, however, must be able to pass a test without glasses of at least 20/50 in one eye and at least 20/70 in the other. Any applicant possessed of monocular vision and who has lost the sight of one eye since first obtaining his qualified member of the engine department certificate may be permitted to sit for a license if eligible in all other respects. Vision of at least 20/30 without glasses in the remaining eye shall be required in all such cases.			
Character reference:	Written endorsements of a master and engineer of a vessel on which they have served with the applicant together with one other licensed officer.	Same as chief engineer.	Same as chief engineer.	Same as chief engineer.
Experience requirements:	(a) The minimum service required to qualify an applicant for license as chief engineer of steam vessel is: (1) 1 year's service as first assistant engineer of steam vessels; or (2) 2 years' service as second assistant or junior first assistant engineer in charge of a watch on steam vessels while holding a license as first assistant engineer of steam vessels; or (3) While holding a license as chief engineer of motor vessels, either: (i) 6 months' service as observer chief engineer on steam vessels; or (ii) 6 months' service as observer chief engineer on steam vessels; or (iii) 1 year's service as oiler, water tender, or junior engineer of steam vessels.	(a) The minimum service required to qualify an applicant for license as first assistant engineer of steam vessels is: (1) 1 year's service as second assistant engineer of steam vessels; or (2) 2 years' service as third assistant or junior second assistant engineer in charge of a watch on steam vessels, while holding a license as second assistant engineer of steam vessels; or (3) While holding a license as first assistant engineer of motor vessels, either: (i) 6 months' service as second assistant engineer of steam vessels; (ii) 6 months' service as observer first assistant engineer of steam vessels; or (iii) 1 year's service as oiler, water tender, or junior engineer of steam vessels; or (4) 3 years' service as oiler, water tender, or fireman on steam vessels for a license as first assistant	(a) The minimum service required to qualify an applicant for license as second assistant engineer of steam vessels is: (1) 1 year's service as engineer in charge of a watch, while holding a license as third assistant engineer of steam vessels; or (2) 2 years' service as assistant engineer to the engineer in charge of watch, while holding a license as third assistant engineer of steam vessels; or (3) While holding a license as second assistant engineer of motor vessels, either: (i) 6 months' service as observer second assistant engineer on steam vessels; or (ii) 6 months' service as third assistant engineer of steam vessels; (iii) 1 year's service as oiler, water tender, or junior engineer of steam vessels.	(a) The minimum service required to qualify an applicant for license as third assistant engineer of steam vessels is: (1) 3 years' service in the engine department of steam vessels, 2 years and 6 months of which must have been as fireman, oiler, water tender, or other qualified member of the engine department, one-third of the required service may have been on motor vessels; or (2) 3 years' service as an apprentice to the machinist trade engaged in the construction or repair of marine, locomotive, or stationary engines together with 1 year's service in the engine department of steam vessel as oiler, water tender, or junior engineer, one-third of such service may have been on motor vessels; or (3) Graduation from: (i) The U. S. Merchant Marine Academy (engineering). (ii) The engineering class of a State nautical school ship;

See footnotes at end of table.

Appendix III—Continued

Major Legal Requirements for Engineer Licenses on Ocean Steam Vessels [1]—Continued

Type of Requirement	Chief Engineer	First Assistant Engineer	Second Assistant Engineer	Third Assistant Engineer
Experience requirements—Continued		of steam vessels of not more than 1,000 horsepower.		(iii) The U. S. Naval Academy; or (iv) The U. S. Coast Guard Academy; or (4) Satisfactory completion of the prescribed course (engineering) at a U. S. Maritime Service or other Government-operated training-school approved by the commandant may be accepted as the equivalent of sea service up to a maximum of 4 months, provided the applicant has obtained the additional qualifying experience prior to enrollment; or (5) Graduation from the marine engineering course of a duly recognized school of technology together with 3 months' service in the engine department of steam vessels, one-third of such service may have been on motor vessels; or (6) Graduation from the mechanical or electrical engineering course of a duly recognized school of technology together with 6 months' service in the engine department of steam vessels; one-third may have been on motor vessels; or (7) 1 year's service as oiler, water tender, or junior engineer on steam vessels, while holding a license as third assistant engineer of motor vessels.

[1] The requirements listed are those given in part 10 of the U. S. Coast Guard's "*Rules and Regulations for Licensing and Certificating of Merchant Marine Personnel.*" Additional information nay be obtained from the United States Coast Guard, Washington, D. C., or any Coast Guard regional office.

Appendix IV

Subjects Covered by Coast Guard Examinations for Deck Officers of Ocean Vessels [1]

Subjects	Master	Chief mate	Second mate	Third mate
1. Latitude by Polaris	X	X		
2. Latitude by meridian altitude			Sun or star	Sun
3. Latitude by ex-meridian	Any body	Sun or star		
4. Fix or running fix	Any bodies	Any bodies		
5. Longitude by position line or time sight [2]			Sun or star	Sun
6. Star identification	X	X		
7. Deviation of the compass by amplitude			X	
8. Deviation of the compass by azimuth	Any body	Sun or star	Sun or star	Sun
9. Position finding by dead reckoning—traverse or Mercator sailing	X			
10. Position finding by dead reckoning—great circle, Mercator, traverse, or middle latitude sailing		X		
11. Great circle sailing	X			
12. Traverse sailing			X	X
13. Mercator sailing			X	
14. Middle latitude sailing				X
15. Distance off a fixed object and land bearings	X	X	X	X
16. Speed by revolutions		X		
17. Practical chart work	X	X	X	X
18. Fuel conservation	X			
19. Instruments and accessories	X	X	X	X
20. Magnetism, deviation, and compass compensation	X	X		
21. Construction of a deviation table	X			
22. Chart navigation	X	X	X	X
23. Chart construction	X			
24. Aids to navigation	X	X	X	
25. Tides and currents, including use of tables	X	X		
26. Ocean winds, weather, and currents	X	X		
27. Nautical astronomy			X	
28. International and inland rules of the road	X			
29. International rules of the road		X	X	X
30. Signaling by international code flags, Morse, and semaphore; lifesaving, distress, storm, and special signals	X	X	X	X
31. Stability and hull construction	X			
32. Seamanship	X	X	X	X
33. Temporary repairs to hull and equipment	X			
34. Sea terms and navigation definitions				X
35. Stowage and cargo handling		X	X	X
36. Change in draft due to change in density		X		
37. Determination of area and volume			X	
38. Lifesaving apparatus	X	X	X	
39. Ship sanitation	X	X		
40. General rules and regulations for vessel inspection	X	X	X	X
41. United States navigation laws	X	X		
42. Such further examination of a nonmathematical character as the officer in charge, Marine Inspection, may consider necessary to establish the applicant's proficiency	X	X	X	X

[1] The requirements listed are those given in part 10 of the U. S. Coast Guard's "*Rules and Regulations for Licensing and Certificating of Merchant Marine Personnel.*" Additional information may be obtained from the United States Coast Guard, Washington, D. C., or any Coast Guard regional office.

[2] Candidates may use any navigational methods they wish in the solution of problems, provided they are correct in principle. Because of the many different methods of computing a position line it is necessary, in order to obtain uniformity in examinations, to require as an answer either the longitude based on the D. R. latitude as solved by time sight or the longitude of the computed point as obtained by any position line method either with plotting or traverse tables. Computed point is the point at which a perpendicular from the D. R. position (for the instant of the sight) intersects the line of position.

Appendix V

Subjects Covered by Coast Guard Examinations for Qualified Members of Engine Department[1]

Subjects	Machinist	Refrigerating engineer	Fireman	Water tender	Oiler	Electrician	Junior engineer	Deck engineer
1. Application, maintenance, and use of hand tools and measuring instruments	X	X	X	X	X	X	X	X
2. Uses of babbitt, copper, brass, steel, and other metals	X	X	----	X	X	X	X	X
3. Methods of measuring pipe, pipe fittings, sheet metal, machine bolts and nuts, packing, etc	X	X	----	X	X	X	X	X
4. Operation and maintenance of mechanical remote control equipment	X	----	----	X	X	X	X	X
5. Precautions to be taken for the prevention of fire and the proper use of fire-fighting equipment	X	X	X	X	X	X	X	X
6. Principles of mechanical refrigeration; and functions, operations, and maintenance of various machines and parts of the system	----	X	----	----	X	----	X	----
7. Knowledge of piping systems as used in ammonia, Freon, and CO_2, including testing for leaks, operation of bypasses, and making up of joints	----	X	----	----	----	----	X	----
8. Safety precautions to be observed in the operation of various refrigerating systems, including storage of refrigerants, and the use of gas masks and fire-fighting equipment	X	X	----	X	X	X	X	X
9. Combustion of fuels, proper temperature, pressures, and atomization	----	----	X	X	X	----	X	----
10. Operation of the fuel-oil system on oil-burning boilers, including the transfer and storage of fuel oil	----	----	X	X	X	----	X	X
11. Hazards involved and the precautions taken against accumulation of oil in furnaces, bilges, floor plates, and tank tops; flarebacks; leaks in fuel-oil heaters; clogged strainers and burner tips	X	X	X	X	X	X	X	X
12. Precautions necessary when filling empty boilers, starting up the fuel-oil-burning system, and raising steam from a cold boiler	----	----	X	X	X	----	X	----
13. The function, operation, and maintenance of the various engine-room auxiliaries	X	X	----	X	X	X	X	----
14. Proper operation of the various types of lubricating systems	X	X	----	X	X	X	X	X
15. Safety precautions to be observed in connection with the operation of engine-room auxiliaries, electrical machinery, and switchboard equipment	X	X	----	X	X	X	X	X
16. The function, operation, and maintenance of the bilge, ballast, fire, freshwater, sanitary, and lubricating systems	X	X	----	X	X	----	X	X
17. Proper care of spare machine parts and idle equipment	X	X	----	X	X	X	X	X
18. The procedure in preparing a turbine, reciprocating, or Diesel engine for stand-by; also the procedure in securing	----	----	----	X	X	----	X	----
19. Operation and maintenance of the equipment necessary for the supply of water to boilers, the dangers of high and low water and remedial action	----	----	X	X	X	----	X	----

See footnotes at end of table.

Appendix V—Continued

Subjects Covered by Coast Guard Examinations for Qualified Members of Engine Department—Continued

Subjects	Machinist	Refrigerating engineer	Fireman	Water tender	Oiler	Electrician	Junior engineer	Deck engineer
20. Operation, location, and maintenance of the various boiler fittings and accessories	X		X	X	X		X	
21. The practical application and solution of basic electrical calculations (Ohm's law, power formula, etc.)						X	X	X
22. Electrical wiring circuits of the various two-wire and three-wire d. c. systems and the various single-phase and polyphase a. c. systems						X	X	X
23. Application and characteristics of parallel and series circuits						X	X	X
24. Application and maintenance of electrical meters and instruments						X	X	X
25. The maintenance and installation of lighting and power wiring involving testing for locating and correcting grounds, short circuits and open circuits, and making splices						X	X	X
26. The operation and maintenance of the various types of generators and motors, both a. c. and d. c						X	X	X
27. Operation, installation, and maintenance of the various types of electrical controls and safety devices						X	X	X
28. Testing and maintenance of special electrical equipment such as telegraphs, telephones, alarm systems, fire-detecting systems, and rudder angle indicators						X	X	
29. Rules and regulations, and requirements for installation, repair, and maintenance of electrical wiring and equipment installed aboard ships						X	X	X
30. Such further examination of a nonmathematical character as the officer in charge, Marine Inspection, may consider necessary to establish the applicant's proficiency	X	X	X	X	X	X	X	X

[1] The requirements listed are those given in part 12 of the U. S. Coast Guard's "*Rules and Regulations for Licensing and Certificating of Merchant Marine Personnel.*" Additional information may be obtained from the United States Coast Guard, Washington, D. C., or any Coast Guard regional office.

Appendix VI

Suggested Readings[1]

America's Maritime History. By A. C. Denison, G. P. Putnam's Sons, New York, N. Y., 1944.

American Maritime Industries and Public Policy, 1789–1914. By John Greenwood Brown Hutchins. Harvard University Press, Cambridge, Mass., 1941.

Economic Survey of The American Merchant Marine. U. S. Maritime Commission, Government Printing Office, Washington, D. C., 1937.

Economics of Transportation. By David Philip Locklin, Business Publications Inc., Chicago, Ill., 1938.

Fo's'le and Glory Hole. By James C. Healey, Oxford University Press, New York, N. Y., 1936.

He's in the Merchant Marine Now. By John Scott Douglas and Albert Salz, McBride & Co., New York, N. Y., 1943.

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[1] For additional references, consult *Bibliography* issued by the Maritime Administration, U. S. Department of Commerce, Washington 25, D. C.

Occupational Outlook Publications of the Bureau of Labor Statistics

Studies of employment trends and opportunities in the various occupations and professions are made available by the Occupational Outlook Service of the Bureau of Labor Statistics.

These reports are for use in the vocational guidance of veterans, in assisting defense planners, in counseling young people in schools, and in guiding others considering the choice of an occupation. Schools concerned with vocational training and employers and trade-unions interested in on-the-job training have also found the reports helpful in planning programs in line with prospective employment opportunities.

Two types of reports are issued, in addition to the *Occupational Outlook Handbook:* Occupational outlook bulletins describing the long-run outlook for employment in each occupation and giving information on earnings, working conditions, and the training required; and special reports issued from time to time on such subjects as the general employment outlook, trends in the various States, and occupational mobility.

These reports are issued as bulletins of the Bureau of Labor Statistics. Most of them may be purchased from the Superintendent of Documents, Washington 25, D. C., at the prices listed with a 25-percent discount on 100 copies or more. Those reports which are listed as free may be obtained directly from the United States Department of Labor, Bureau of Labor Statistics, Washington 25, D. C., as long as the supply lasts.

Occupational Outlook Handbook

Employment Information on Major Occupations for Use in Guidance. Bulletin 998 (1951 revised edition). $3. Illus.

Includes brief reports on more than 400 occupations of interest in vocational guidance, including professions; skilled trades; clerical, sales, and service occupations; and the major types of farming. Each report describes the employment trends and outlook, the training qualifications required, earnings, and working conditions. Introductory sections, as background for an understanding of the individual occupations, summarize the major trends in population and employment, and in the broad industrial and occupational groups.

The Handbook is designed for use in counseling, in classes or units on occupations, in the training of counselors, and as a general reference. Its 576 pages are illustrated with 103 photographs and 85 charts.

Occupational Outlook Bulletins

Employment Opportunities in Aviation Occupations, Part II—Duties, Qualifications, Earnings, and Working Conditions. Bulletin 837–2 (1946). 25 cents. Illus.

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Special Reports

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Employment Opportunities for Student Personnel Workers in Colleges and Universities (1951). Free.

Elementary and Secondary School Principalships—Chief Advancement Opportunity for Public School Teachers (1951). Free.

Employment Opportunities for Counselors in Secondary and Elementary Schools (1951). Free.

Occupational Outlook Mailing List

Schools, vocational guidance agencies, and others who wish to receive brief summaries of each new Occupational Outlook report and wall chart may be placed on a mailing list. Requests should be addressed to the Bureau of Labor Statistics, U. S. Department of Labor, Washington 25, D. C., specifying the Occupational Outlook Mailing List. Please give your postal zone number.

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