

UNITED STATES MARITIME COMMISSION

REPORT TO CONGRESS

ON

TRAINING MERCHANT MARINE PERSONNEL

JANUARY 1, 1939



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ON

**TRAINING MERCHANT MARINE
PERSONNEL**

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UNITED STATES MARITIME COMMISSION

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LETTER OF TRANSMITTAL

UNITED STATES MARITIME COMMISSION,
Washington, January 3, 1939.

To the Congress:

I have the honor to transmit herewith the report on a comprehensive system for the training of citizens of the United States to serve as licensed and unlicensed personnel on American merchant vessels, which the United States Maritime Commission was directed to make to the Congress on or before January 20, 1939.

It is the Commission's hope that the plans suggested in this report for the training of merchant marine personnel will meet the approval of the Congress.

Very sincerely yours,

EMORY S. LAND, *Chairman.*

UNITED STATES MARITIME COMMISSION

REPORT TO CONGRESS ON TRAINING MERCHANT MARINE PERSONNEL

INTRODUCTION

The United States Maritime Commission was instructed by Congress under the Merchant Marine Act, 1936, to develop and maintain a strong and efficient merchant marine "manned with a trained and efficient citizen personnel."¹

Well-trained men aboard ship are fully as important as the ship itself. Consequently, at the last Congress the Commission recommended the establishment of the United States Maritime Service for the training of licensed and unlicensed merchant marine personnel. Congress approved the proposal² and the United States Maritime Service was established by the Commission July 14, 1938, under its General Order No. 25 which provided that it should be administered for the Commission by the United States Coast Guard.

Enrollees in the United States Maritime Service are at present restricted by the Commission to unemployed licensed and unlicensed men of the merchant service. They must be citizens with at least 2 years' sea service in the American merchant marine, of which 7 months must have been served within 2 years prior to application for enrollment. Regulations restricting enrollment are subject to change in conformity with improvement in employment generally.

This condition does not apply to the cadet training system under which young Americans are offered on Government-operated and subsidized vessels an opportunity for training to become merchant officers. This system has been in effect for many years and will be touched upon later in this report.

The Commission is convinced that the United States Maritime Service should eventually train a reasonable number of young Americans without previous sea experience. This appears necessary to develop trained replacements in the ranks of unlicensed personnel of our merchant marine who will be required by advancement or retirement of the older men.

The Merchant Marine Act, as amended, directed the Commission after consultation with all interests concerned, to prepare a report to the Congress on or before January 20, 1939, covering a comprehensive system for the training of citizens of the United States to serve as licensed and unlicensed personnel on American merchant ships.

¹ Sec. 101.

² Public, No. 705, 75th Cong., 3d Sess., approved June 23, 1938 (Sec. 218 (a), (b), and (c)).

The accompanying report, prepared after consultation with representatives of seamen's organizations and ship operators in our merchant service, is submitted to the Congress in compliance with that authorization and direction.

Contained in this report are detailed descriptions of the training systems operated by the principal maritime nations.

The United States up to now has had no comprehensive system of this kind. The Commission believes it most important to have at the disposal of the merchant marine a thorough system for training licensed and unlicensed personnel and, in addition, competent young Americans who have had no previous experience.

Present unemployment in maritime occupations justifies deferment of plans to train new unlicensed personnel. However, it takes considerable time to train a seaman properly and the Commission feels that it should be authorized to prepare curricula and facilities for a co-ordinated and comprehensive program to meet the requirements of the revitalized merchant fleet now under construction.

A qualified merchant personnel is of vital importance to the efficient operation of our merchant vessels, both in times of peace and in times of emergency.

To summarize, the Commission desires to emphasize the necessity for perfecting a thorough training system because:

1. New ships with their complicated equipment and modern design require skilled seamen and engineers.
2. Money expended in training will be saved in large part by reduction in repair and maintenance expenditures through more efficient personnel.
3. Seamen of ability will also make for more effective shore personnel which it is desirable to recruit from shipboard.
4. Safety at sea for passengers and cargo is substantially increased through employment of well trained men.
5. It will improve seamen's opportunities for advancement.
6. It will strengthen our merchant marine in competition with foreign-flag ships.
7. It will provide men of increasing skill for national defense should an emergency arise.

That Congress may be provided with the opinions of persons qualified in shipping, and with facts developed by the Commission in connection with the proposed comprehensive training system, this report deals with the subject in two sections, namely:

1. Qualifications and training of merchant officers and men of other maritime nations.
2. Existing agencies for training merchant marine personnel in the United States.

SECTION I

QUALIFICATIONS AND TRAINING OF MERCHANT OFFICERS AND MEN OF OTHER MARITIME NATIONS

Foreign maritime nations, particularly those constituting the principal competition for American shipping, offer intensive training to officers and men of their merchant fleets. Requirements for proficiency are generally high.

The United States Maritime Commission has made a thorough study of the various training systems existing among the foreign nations. It is apparent from these studies that the United States must raise its standards along lines which the Commission is currently following.

On many occasions our American merchant personnel, officers and men, have exhibited heroic conduct in emergencies requiring exceptional skill in seamanship. It is the aim of the Maritime Commission to provide through adequate training opportunities for every man and officer to acquire the knowledge and ability necessary for the proper performance of their duties, both under ordinary and emergency conditions.

Some of the factors of importance in training, in addition to seamanship are:

- | | |
|--|--|
| 1. Leadership—maintenance of discipline. | 3. General educational background. |
| 2. Knowledge of:
Modern navigation.
Ship construction and repair.
Shipping economics—ship's business.
Safety at sea. | 4. Cooperation with employer to (a) Minimize cargo claims, repairs, and other operating costs; (b) stimulation of passenger travel and cargo shipments through good service. |

Such a program involves extensive educational facilities. Proof of this appears in the descriptions which follow of the training systems maintained by the leading maritime nations of the world.

What these nations are doing in regard to training is of vital importance to the success of our own merchant fleet. As we have pointed out elsewhere in this report, the utmost proficiency in maritime personnel is necessary for our success, both in respect to the purely commercial operations of our merchant fleet and in connection with the national defense.

Consequently, we are setting down here in some detail descriptions of the training systems of Japan, Holland, Germany, Great Britain, Italy, Norway, Sweden, Denmark, and France.

As an indication that the application of intensive training is not confined solely to the principal maritime nations, the Commission is in possession of detailed data concerning courses prescribed for both the Mexican and Chilean merchant service.

JAPAN

Japan has two higher nautical colleges and eight prefectural merchant marine officer schools with courses from 5½ to 8 years. All are maintained by the government. In addition, the Japanese Seamen's Aid Association maintains four coaching schools to prepare experienced seamen for entrance to nautical colleges and prefectural officer schools. It also maintains two schools for inexperienced boys beginning careers as seamen.

Enrollment at the Tokyo and Kobe higher schools is generally at capacity of 1,760. The period of instruction is 5½ years. About 240 are graduated each year.

The courses are exhaustive. The academic part (3½ years) embraces the following:

Subject	Deck officers	Engineer officers	Subject	Deck officers	Engineer officers
Moral training.....	X	X	German.....		X
Navigation.....	X		French or Spanish.....	X	
Seamanship.....	X		Law and legislation.....	X	X
Naval architecture.....	X	X	Economics.....	X	
Marine engineering.....	X	X	Commercial science.....	X	
Sanitation.....	X	X	Bookkeeping.....	X	X
Mathematics.....	X	X	Commercial geography.....	X	
Applied dynamics.....	X	X	History.....	X	
Physics.....	X	X	Manual work.....	X	X
Chemistry.....	X	X	Military science.....	X	X
Electrical engineering.....	X	X	Gymnastics.....	X	X
Radio.....	X		Design of engines.....		X
English.....	X	X	Marine affairs.....	X	X

Practical courses are:

Navigating class

- Half year: Naval gun factory.
- One year: Cruise on sailing vessel (owned by each school).
- One year: On a steamship of N. Y. K., O. S. K., or other commercial line.

Engineering class

- Half year: Naval gun factory.
- Half year: Navy yard.
- Half year: Civil shipyard.
- One year: On a steamship of N. Y. K., O. S. K., or other commercial line.

Students are admitted to Kobe and Tokyo schools after competitive examination.

Admission to Kobe or Tokyo schools amounts to automatic listing in the Naval Reserve and maintenance of such status until 53 years of age.

Tuition and subsistence is paid by the government.

Graduates readily find employment. About 90 percent remain at sea permanently. It is estimated that 60 percent of the officers on Japanese passenger vessels and 40 percent on cargo vessels are graduates of the two nautical colleges. The balance are graduates of the prefectural schools.

The following quotation, appearing in the November 10, 1938, issue of "Shipbuilding and Shipping Record" is pertinent to the training of inexperienced men beginning career as seamen:

ENCOURAGING SEAMEN

Approximately 4,000 junior seamen will be sought throughout the country by the Japan Marine Co-operative Society, an organization comprising shipowners and seamen in Japan. To that end, the society is offering material inducements, such as better pay. As the first step, the society plans to obtain 400 junior seamen for the O. S. K., 600 for the N. Y. K., 400 each for the Yamashita Kisen and Nanyo Kaiun, and 300 for the Dairen Steamship Co., by the end of next March. The society is offering a starting rate of Yen 25 for seamen apprentices and Yen 30 for stoker apprentices, or a 40 percent increase over the present rate. In cooperation with the Japan Seamen's Union and the Japan Shipowners Association, the society through its branches in the principal ports of the country will invite young men to follow the sea. The society intends to offset the dearth of seamen created by the unusual shipping boom.

The following is from a consular report "Shipping in the Japanese Empire during July 1938." We quote:

TRAINING CRUISES FOR STUDENTS COMMENCED

The first of a series of training cruises for secondary school students commenced with the sailing of the *Ondo Maru*, a vessel belonging to the Setsuyo Shosen Kaisha, from Osaka, on July 21. The first sailing carried 130 students out of a total of 2,100 from 47 schools that are scheduled to receive training cruises during July and August.

The program is one whereby secondary school students may receive marine training under the auspices of trained personnel and is designed to strengthen the Japanese Navy and merchant marine by making available at least partially trained personnel from year to year, as the need arises. The program of marine training is sponsored by the Osaka branch of the naval society and by the Osaka Kyogo Remmei, an association devoted to student welfare. Training is given under the personnel bureau of the Kure naval base and the Osaka district naval personnel bureau.

Further details on Japanese training are included in an exhaustive report prepared by the American Consulate in Yokohama under date of August 11, 1938, which is attached hereto as appendix A.

HOLLAND

There are 12 schools in Holland for training officers, a majority of which are municipally maintained. All, however, are under direct supervision of the Government with respect to courses of study.

The most important is the Amsterdam Keewschool Voor de Scheepvaart which trains for deck officers.

Students of this school and the engineers' training school, Keewschool voor de Machination, visit ships in port and have access both to shipyards and the Werkspoor machine shops.

Courses at both are of 1- and 2-year periods. To enroll in the former, the student must have completed what is equivalent to a

first-rate high school course in the United States. More advanced classes are provided for students preparing for examination as second officers so that the 1-year course may ultimately become a 3-year course. The curriculum at the Amsterdam Nautical Training School for deck officers is as follows:

- | | |
|--|--|
| 1. Trigonometry, algebra, geometry, stereometry, and goniometry. | 10. Mechanics |
| 2. Navigation and astronomy. | 11. English. |
| 3. Meteorology. | 12. German. |
| 4. Oceanography. | 13. French. |
| 5. Seamanship. | 14. Dutch. |
| 6. Shipbuilding. | 15. Geography. |
| 7. Law, ship's business, marine insurance. | 16. Ship's hygiene and first aid. |
| 8. Practical ship work. | 17. Radio science, law, receiving, and transmitting. |
| 9. Physics. | 18. Physical education. |

After completion of this course, the student goes to sea for at least a year as an apprentice. At the end of his apprenticeship special courses of a year must be taken before appointment as fourth officer.

The curriculum at the engineers' school is as follows:

- | | |
|-------------------------------------|--|
| 1. Algebra, geometry, trigonometry. | 8. Steam mechanics. |
| 2. Physics. | 9. Motors and turbines. |
| 3. Chemistry. | 10. English. |
| 4. Mechanics. | 11. Drawing—freehand and mechanical. |
| 5. Science of power. | 12. Engineering design. |
| 6. Knowledge of material. | 13. Workshop practice. |
| 7. Electrotechnics. | 14. Electro technical laboratory work. |

After completion of a 2-year course, students must serve at least 1 year in a machine shop before receiving a diploma.

The 12 nautical schools of Holland graduate approximately 270 men each year and it is estimated that at least 75 per cent of these graduates remain at sea permanently. The training received, however, is sufficiently comprehensive to fit the graduates for shore positions, including service in foreign ports.

GERMANY

Two elementary schools which offer training only for prospective deck officers are:

(a) The Deutscher Schulschiff Verein, Bremen.

(b) The Deutsche Seeman's-Schule, Finkenweerder, Hamburg.

Here the foundations for an officer's career are laid, and a student, upon graduation goes to sea, subsequently proceeding to one of the institutions maintained by the Government for more advanced study leading to promotion to licensed berths.

Two seagoing sail training ships are maintained by the Deutscher Schulschiff Verein, each of which has a complement of 8 officers and

170 men. The course of training calls for a year on a cruising sail vessel and a second year on a cargo sail training ship.

In addition to the facilities offered by the schoolships of the Deutscher Schulschiff Verein, the North German Lloyd Line maintains its own schoolship.

No seagoing sail training ship is available at the Deutsche Seeman's-Schule. It is located on one of the islands in the Harbor of Hamburg. Representatives of Hamburg steamship lines are on its board of trustees and are assisted by a group of retired sea captains.

The period of training at Seeman's-Schule is only 3 months, after which employment is secured for the boys on sail cargo training vessels. There they must pay for their training and food. After having completed the statutory requirement of 20 months on a sailing vessel out of a total of 50 months at sea, they are ready for the state navigation school and examination for commissions.

Government navigation schools are located in the principal ports of Germany. Courses cover a period of 12 months leading to a mate's commission. After 2 years as mate, the officer must return to the Government school for a 6-months' course before acquiring a master's commission.

GREAT BRITAIN

Three outstanding deck officer training schools in England, which are known through the shipping world, include two ships, the *Conway*, the *Worcester*, and Pangbourne College.

Other routes to licenses as officers are:

- (a) Apprenticeship (4 years at sea).
- (b) Up from forecandle.

About 13 percent of Great Britain's deck officers are graduates of the above-named training schools; 64 percent are former cadets or apprentices and only 23 percent are from forecandle.

The large liner companies usually select their future deck officers from the three schools listed above.

Four years at sea is required to secure the lowest officer's license. The 2 or more years spent in the *Conway* or the *Worcester* or at Pangbourne are credited as 1 year at sea. Graduates must serve 3 years afloat as apprentices, cadets, or midshipmen.

The course at Pangbourne, usually 3 years, covers the following subjects:

- | | |
|---|--|
| <ul style="list-style-type: none"> 1. Mathematics. 2. Chemistry. 3. Physics. 4. English. 5. History. 6. Geography. 7. French. 8. Spanish. | <ul style="list-style-type: none"> 9. Navigation and astronomy. 10. Marine engineering, including elementary steam, electricity, radio, and naval architecture. 11. Workshop practice. 12. Small boat practice. 13. Seamanship. |
|---|--|

None of the three schools maintains seagoing training vessels. The *Conway* and *Worcester* are always at anchor. These schools receive no government aid and charge tuition, averaging about \$800 per annum. However, some British lines offer scholarships at these schools.

Engineer officers serve their apprenticeship in shipyards and machine shops. There are two kinds of apprentices; one trade and the other technical. The latter are required to pay a premium of from £50 to £350 in return for which they receive special instruction. A greater number of marine engineers, however, are those who served as trade apprentices.

The period served is 5 years, though time in a scientific college may reduce it to 3 or 4 years.

A candidate for the lowest engineer's license must have served as apprentice engineer for at least 4 years and prove that of such time, at least 2 years were spent erecting, fitting, and repairing engines and machinery.

Time attending day classes in mechanical engineering at an approved scientific school is accepted as equivalent to artisan apprenticeship at the ratio of 3 years of the former to a limit of 2 of the latter.

It is contended in the shipping fraternity that the cost of shipyard repairs in British vessels is much less than for identical American ships. The British engineer with years of repair apprenticeship behind him is expected to accomplish much aboard and make only major repairs in a shipyard.

Great Britain's Shipping Federation (shipowners) assists about 300 boys to obtain deck apprenticeships each year. Usually each vessel carries two or more of these boys. Premiums as high as £50 are paid by each apprentice. They receive a wage of about £2 a month.

The British Admiralty, recognizing the importance of trained merchant personnel, is reported to spend approximately \$3,000,000 annually on its crack Royal Naval Reserve. The Royal Naval Reserve is composed wholly of merchant officers and men, and recently the British Admiralty began naval training—convoy work, etc.—for all merchant officers not enrolled in this reserve.

The following, pertinent to cadet training, was published in *MARINE AGE* of September 1938:

TRAINING SYSTEM FOR U. K. MERCHANT MARINE OFFICERS PROVED SUCCESSFUL

In 1935, at the instance of the Shipping Federation, the Merchant Marine Officers' Training Board was established. A committee of shipowners and master mariners, with the assistance of principals of nautical schools, prepared a syllabus suitable for providing a uniform system of training apprentices and cadets throughout the merchant marine.

The success of the scheme and the thoroughness with which the ground work was prepared is shown by the fact that in the first 18 months of active operation, 87 per cent of shipowners of all classes of vessels have adopted the course of

training for approximately 2,300 young navigating officers. All apprentices and cadets serving with shipping companies which have adopted the board's scheme are tested annually in seamanship, mathematics, navigation, miscellaneous knowledge, engineering and ship construction; and prizes, which take the form of useful nautical instruments, gifts to the board by the Royal Society of Arts, acting under their Thomas Gray Memorial Trust, are awarded.

The results of the first year's examinations covering 1937, are now at hand, and it is worthy of notice that although the questions set are identical to all types of shipping—tramps and liners alike—a good proportion of the awards have been won by men serving in the former type of vessels.

Many ex-British masters and chief engineers now occupying responsible positions on the shore staffs of steamship companies, including not a few of which are American, class societies, underwriters, and in Government service hold voluntary certificates as extra master and extra chief engineer. In order to secure such certificate applicant must pass rigid board of trade examinations covering the following subjects:

<i>Extra master</i>	<i>Extra chief engineer</i>
1. English: Essay writing ability and speech.	1. English: Essay writing ability and speech.
2. Mathematics: Geometry, algebra, trigonometry.	2. Construction of machinery propellers, etc.
3. Mechanics.	3. Theoretical and applied mechanics.
4. Hydrostatics.	4. Thermo dynamics.
5. Physics, heat, light, sound.	5. Valve diagrams.
6. Advanced navigation.	6. Analysis of indicator cards.
7. Chart work.	7. Mechanical drawing.
8. Chart construction.	8. Boiler manufacture.
9. Marine surveying.	9. Combustion engineering.
10. Magnetism and electricity.	10. Engine room chemistry.
11. Construction working and upkeep of ships.	11. Construction and working instruments.
12. Commercial and legal knowledge: Documents, chartering, insurance, etc.	12. Metallurgy and testing of material.
13. Oceanography.	13. Electrical engineering.
14. Economic geography.	14. Refrigerating practices.
15. Oral examination in seamanship.	15. Stability.
16. Stability problems.	16. Ship construction.
	17. Repair supervision and estimating.

Great Britain has many institutions for the preliminary training of unlicensed men. The foremost of these is Gravesend Sea School, financed by the Shipping Federation, and assisted by Government grant to the extent of £6 per student. Over 13,000 boys have been graduated since 1918 by this school, which has a shore base and the vessel *Triton*. Courses at these institutions vary in length from 10 to 12 weeks at Gravesend to 4 years at Watts Training and Russel-Coates School.

The Gravesend course is recognized by the Board of Trade as the equivalent of 1 month's service at sea. With 12 months' sea service

a boy is entitled to sign on as ordinary seaman and at the end of 3 years he may be rated as able seaman.

Further details on training in Great Britain are included in a special report attached hereto as Appendix B.

ITALY

This country maintains 17 Royal nautical institutes for young men who wish to enter the merchant marine as career officers. All are under the supervision of the Royal Ministry of National Education. No tuition is charged.

Each institute has three courses of 4 years in deck, engine, and construction. Total enrollment in these schools is about 500. Usually the proportion of enrollment is 60 percent deck course, 35 percent engine course and 5 percent construction. Approximately 50 percent of the graduates enter the merchant marine and of this number 80 per cent secure employment on cargo vessels and the balance on passenger ships.

The courses of study are prescribed by the Ministry of Education but the post graduate examinations for positions as commissioned officers are held by Royal Naval officers pursuant to directions from the Royal Ministry of Communications.

Subjects covered in the three courses are:

Subjects	Deck	Engine	Naval construction
Naval building: Practice		X	X
Naval building: Design			X
Naval construction			X
Theory of shipping			X
Italian letters	X		X
History	X	X	X
Geography	X	X	X
French	X	X	X
English	X	X	X
Physics	X	X	X
Chemistry	X	X	X
Mathematics	X	X	X
Law	X		X
Economics	X		X
Commercial geography	X		X
Astronomy	X		
Navigation	X		
Rigging and maneuvers		X	X
Oceanography	X		
Meteorology	X		
Elements of naval construction			X
Elements of marine engineering		X	X
Mechanical drawing		X	X
Marine practice-ship business		X	X
Radio telegraphy	X		
Applied mechanics		X	X
Electricity		X	
Engines		X	
Engine design		X	
Descriptive drawing		X	X
Workshop practice		X	

After graduation from one of the 17 institutes the men serve 2½ years at sea as cadets before receiving the certificates which entitle them to second officer or engineer. Before receiving a license as chief

officer or captain, the candidates must pass Government examinations. Qualifications are:

- (a) Italian subjects not less than 24 years of age.
- (b) Graduates of a nautical institute with service of 4 years afloat, of which 1 year must be outside Mediterranean.

The board of examiners consist of three naval officers and a merchant captain.

No government examinations are required for chief and first engineer licenses. Requirements are similar to those for captains. They must be:

- (a) Italian subjects over 21 years of age.
- (b) Graduates of a nautical institute with 4 years' service afloat.

Naval constructors after graduating from a nautical institute may attend a 4-year course at the Regia Scuola Superiore Navale to become naval architects. As such, they are authorized to direct the building of any war or merchant vessel, but naval constructors who are not naval architects may direct only the building of merchant vessels.

Italy also has two marine universities known as the Royal Superior Naval Institute in Naples and the Royal Superior Naval School in Genoa. Both offer 4-year advanced courses. They also provide a 1-year course of advanced naval studies for merchant captains in active service. Most of the officers of Italy's crack liners and men of the shore personnel are graduates of these universities.

Italy also maintains schools for petty officers in the merchant marine which are attended by about 700 students. They graduate about 450 each year. Schools for stewards and firemen are also maintained by the state. Stewards must study English and French. Also maintained by the state is the Opera Nazionale Balilla, a semimilitary fascist group of youths, which has about 25,000 boys in its marine legions. This organization maintains four training ships for approximately 600 boys.

NORWAY

Norway has about 15 schools training young men for deck officers' licenses, all of which are under control or supervision of the Government. Fourteen schools exist for training engineers, under the auspices of various municipalities, and subsidized by the Government. There are also four or five schoolships for the preliminary training of unlicensed deck personnel.

All personnel start before the mast. There is no apprentice or cadet system for training officers.

It is calculated that the merchant fleet of Norway requires about 3,000 to 3,500 recruits each year. Every year Norwegian ship-owners at their own expense send about 500 boys to sea in 4 special sail-training ships.

Navigating and engineer officers obtain their certificates after experience at sea, in workshops and after passing examinations in schools operated and maintained jointly by the state and municipalities for experienced personnel.

In the case of stewards and heads of catering departments, no compulsory certificate is required, but the catering crew has an opportunity for training in five or six special schools located in the principal ports.

Entrance requirements at Government schools preparing for mates' examination are:

- (a) A certificate showing applicant to be not less than 15 years of age.
- (b) Sea service of at least 30 months of which 12 months were served in foreign trade.
- (c) Physician's certificate.

The period of instruction is about 10 months and later, for masters, an additional 9½ months. Subjects taught are as follows:

- | | |
|------------------------------------|------------------------|
| 1. Mathematics. | 7. Radio telegraphy. |
| 2. Navigation and instruments. | 8. Physics. |
| 3. International rules of the road | 9. Marine engineering. |
| 4. Meteorology. | 10. Norwegian. |
| 5. Seamanship. | 11. English. |
| 6. Signaling. | 12. Ship hygiene. |

Additional subjects for those taking master's examination are:

- | | |
|-------------------|---|
| 13. Oceanography. | 16. Commercial subjects (marine insurance, foreign trade, ship's business, etc.). |
| 14. Shipbuilding. | 17. Admiralty Law. |
| 15. Electricity. | |

The Engineer schools give the following course:

- (a) Third grade: 3¼ months.
- (b) Second grade: 5 months.
- (c) First grade (chief engineer): 5 months.

Entrance requirements are:

- (a) Third grade: At least 17 years of age; at least 9 months in a foundry; at least 3 months in engine room afloat.
- (b) Second grade: Third grade certificate at least 12 months' service as third engineer.
- (c) First grade: Second grade certificate.

SWEDEN

Sweden maintains five nautical academies for training deck officers and engineers, all controlled by the Government.

In addition to the five nautical academies, the Government supports five sail training ships.

Two 9-month courses are offered. The first requires 42 months' service at sea of which 12 must be in sail, to obtain a mate's certificate. The second requires an additional 12 months' sea service as mate to receive captain's certificate. Instruction at academies consists of the following subjects for lower grade certificates:

<i>Deck officers</i>	<i>Engineers</i>
Mathematics.	Mathematics.
Navigation.	Applied mechanics.
Swedish.	Swedish.
Seamanship.	
Law.	

and for the higher grade (captain's and chief engineer's certificate):

<i>Deck officers</i>	<i>Engineers</i>
Mathematics.	Mathematics.
Navigation.	Physics.
Astronomy.	Applied mechanics.
Seamanship.	Mechanics.
Swedish.	Electricity.
English.	Hygiene.
Hygiene.	Mechanical drawing.
Shipbuilding.	
Law.	

For the lowest engineer's certificate, 48 months' training is necessary, of which one-half must be aboard ship and the other half in a work shop.

Under Swedish law, shipping companies are not permitted to employ officers without a diploma from a nautical academy.

DENMARK

This country's principal navigation school is in Copenhagen. There are five smaller institutions in nearby towns. The principal engineers' school is also in Copenhagen, with eight smaller ones in other parts of Denmark. The deck schools are maintained entirely by the Government, while the engineer schools are supported by municipal and Government funds.

For seamen, Denmark has a full-rigged schoolship. This vessel makes extensive cruises during the summer, while in winter it is laid up. Tuition is free and 70 applicants are trained each year. There is also a school at Svendborg for training unlicensed personnel which has a sailing vessel. It graduates about 100 men annually. The training period at both of these seamen's schools is 5 months.

Four years at sea is required of applicants seeking the lowest deck officer's license. One and one-half years is required in sail. Theoretical study at the navigation schools covers about 16 months. Applicants for master's examination must take an additional 6 months of study.

The period of theoretical training for engineers who expect to serve on small vessels is about 12 months. For passenger-vessel service the period is 24 months.

Requirements for entrance to the navigation and engineer schools include 4 years' service at sea. The curriculum for deck officers follows:

Danish.	Seamanship.
English.	Admiralty law.
Mathematics.	Principles of machines and motors.
Physics.	Hygiene and ship sanitation.
Navigation.	

Additional subjects for master's examination are:

Meteorology.	Admiralty law (advanced).
Geography.	Commercial law.

Post-graduate subjects for masters include:

German.	History.
Bookkeeping.	Literature.
Maritime technique.	

For engineers:

<i>One-year course</i> (Small vessel)	<i>Two-year course</i> (Passenger service)
Danish.	Danish.
English.	English.
Mathematics.	German.
Principles of physics.	Higher mathematics.
Principles of electricity.	Extended course in physics.
Applied mechanics.	Hygiene and sanitation.
Draftsmanship.	Strength of materials.
	Thermo dynamics.
	Applied electricity.
	Draftsmanship.

A junior school and schoolship, owned and operated by the Government, is maintained in Copenhagen in which boys may be enrolled at the age of 15. After 6 months at this school, they go to sea for 6 more in commercial vessels and become eligible for the 1-year course aboard the sailing ship *Danmark*. The curricula for this and the senior course are outlined above. This course is followed by 2 more years in commercial vessels. Thereafter they may go to the nautical college for 18 months. Graduation qualifies them for a mate's license and most of the boys also attend radio school for 6 months. Another course of 6 months, followed by 2 years at sea, prepares them for a master's license.

FRANCE

There are 11 national and several independent schools for training officers. The largest, at Marseilles, is the only one giving a course in

radio. All offer courses for deck officers. Engineering instruction is available only at schools in Havre, Nantes, and Marseilles. It has been estimated that only 2 percent of the officers in the French marines have not studied at one of these institutions or a naval school.

Courses for seamen and unlicensed engine force are given in the industrial schools at some ports. Many are night courses.

National schools are under authority of the Government. The most important private institutions are maintained by the chambers of commerce at Dunkirk, Brest, and Dieppe, and up to recently the training ship *Jacques Cartier* of the Compagnie Generale Transatlantique. About one-third of the graduates of this ship entered the employ of the French Line. Marine instruction is also available at the "Ecole de Genie Civil" in Paris.

Administration of the national schools is under the Ministry of the Marine.

Periods of courses at national schools are:

- (a) Nine months for theory student officers, plus 1 year at sea for practical student officers.
- (b) Nine months at school for theory lieutenant, plus 1 year at sea for practical lieutenant. This second 9 months at school can be taken after first 9 months, if desired, and followed by second year at sea. In other words, all schooling may be consecutive.
- (c) Nine months at school, after 5 years at sea, 2 years of that time as an officer of a watch. Two of these years must be in ocean trades.

Tuition is gratis.

To enroll for preparation as student officers the candidate must be 16 years of age and pass an examination covering:

- | | |
|--|---|
| <ul style="list-style-type: none"> 1. A narrative and scientific composition. 2. Practical arithmetic (oral). 3. Algebra (second degree equations). 4. Geometry (plane). | <ul style="list-style-type: none"> 5. Trigonometry (plane). 6. Physics (experimental). 7. History. 8. Maritime geography. 9. English (conversation). |
|--|---|

The program of studies for student officers includes following subjects:

- | | |
|--|--|
| <ul style="list-style-type: none"> 1. Algebra (advanced). 2. Geometry (spherical). 3. Trigonometry (spherical). 4. Mechanics. 5. Experimental electricity. 6. Elements of chemistry. 7. Cosmography. 8. Chart and astronomical navigation. | <ul style="list-style-type: none"> 9. Coastwise navigation. 10. Boilers and steam engines. 11. Marine technology. 12. Practical sailing. 13. Signalling. 14. English. 15. Admiralty law |
|--|--|

For lieutenants (mates) the subjects are:

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Advanced mechanics. 2. Ship construction. 3. Practical and experimental electricity. 4. Engines. 5. Navigation. 6. English. 7. French composition. | <ol style="list-style-type: none"> 8. Applied legislation. 9. Geography. 10. Materials. 11. Ship evolutions. 12. Discipline. 13. Hygiene and first aid. 14. Life saving practice. |
|---|--|

For sea captains the subjects are:

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Advanced navigation. 2. Meteorology. 3. Steamship evolutions. 4. Accidents to vessels. 5. Boiler and engine mechanics. 6. Marine equipment. 7. Commercial transportation. | <ol style="list-style-type: none"> 8. Maintenance and repair of ships. 9. Hygiene. 10. Marine legislation and commercial law. 11. Ship reports and business (insurance, etc.). 12. English. |
|--|--|

Applicants for course leading to student-officer-engineer must be 18 years of age and have served an apprenticeship of two years in a machine shop, or as boiler maker, fireman, or mechanic. Qualifications for course leading to engineer-officer (2nd class) are similar to student-engineer, but the applicant cannot serve as officer-engineer until 21 years of age.

Officer-engineer (1st class) must at time of examination be at least 24 years of age and have served five years at sea of which two must be in capacity of a watch officer.

The curriculum for engineers at national school includes following:

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. French narration. 2. English translation. 3. Scientific and technical composition. 4. Arithmetic, algebra, geometry, trigonometry. 5. Mechanics. 6. Navigation. 7. Physics. 8. Electricity. | <ol style="list-style-type: none"> 9. Chemistry. 10. Boilers and engines. 11. Mechanical drawing. 12. Hygiene. 13. Maritime law. 14. Boilers and engines. 15. General mechanics. |
|---|---|

Advancement to officer-engineer, second class, and of the first class occurs after 2 and 3 years, respectively, of actual service at sea and the passage of examinations.

As is generally known, France has a conscriptive system for its military services. It, therefore, is customary for students after finishing course at national and private schools to serve 2 years in the French Navy.

It is interesting to note that the French Line compels its officers to retire at 55 years of age. Another company has in effect a discretionary age of 50 years, after 25 years of service. The effect of low retire-

ment age is to give maximum opportunities to younger officers, thereby making advancement more rapid.

France requires for its seagoing fleet each year: 50 masters, 225 lieutenants and student officers, 100 engineers and student engineers.

The examinations for commissions are very thorough as is indicated by the many candidates who fail.

During a recent year:

Commission	Total candidates	Successful
Student officers.....	725	151
Lieutenants (mates).....	920	137
Sea captain (master).....	253	127
Student engineers.....	245	24
Officer engineer (second class).....	489	90
Officer engineer (first class).....	155	74

The education and preliminary training of officers have been established in France for more than a half century.

SECTION II

EXISTING AGENCIES IN THE UNITED STATES FOR TRAINING MERCHANT MARINE PERSONNEL

Maritime personnel is divided into two groups. One embraces officers; the other, unlicensed men. Although we have established systems for the training of officers they cannot be considered as adequate as those of some of the other maritime nations.

In the preceding section it was noted that all Japanese and Italian and 98 percent of the French merchant officers are graduates of training institutions; about 75 percent of Great Britain's deck officers and all of its engineers are products of its seagoing and machine shop apprentice systems; and all officers of the Scandinavian countries and Germany must attend government schools before they may take examinations for licenses.

For the United States, it has been estimated that about 80 percent of all officers have received no systematic training. Only 10 percent are graduates of State nautical schools. The balance are from the United States Navy, United States Coast Guard, other schools, and past cadet systems.

In the following description of facilities for the training of officers it will be noted that the recently established United States Maritime Service trains both officers and unlicensed men.

STATE NAUTICAL SCHOOLS

On June 20, 1874, Congress passed an act to encourage the establishment of public marine schools. It authorized the Secretary of the Navy to furnish, upon application by the Governor of the State, a suitable vessel, with all her equipment, charts, books, and instruments of navigation to be used for the benefit of any nautical school established at ports specified in the act. The ports named in the act, as amended on March 4, 1911, are Boston, Philadelphia, New York, Seattle, San Francisco, Baltimore, Detroit, Saginaw (Mich.), Norfolk, and Corpus Christi. Provision was made for the detail of naval officers as superintendents. Only one such school may be established in each of said ports. The schools are for the instruction of youths in navigation, steamship construction, marine engineering, and all matters pertaining to the proper building, equipment, and sailing of vessels. Each school receives annually from the Federal Govern-

ment the sum of \$25,000, or so much thereof as is matched by the State.

Five schools were established under this act, but the one at Seattle has been abolished. Four now remain, located at Boston, New York, Philadelphia, and San Francisco. All train young men to be officers in the merchant marine.

The Massachusetts Nautical School was established in 1893. Instruction is conducted aboard the U. S. S. *Nantucket*, a vessel loaned the Commonwealth by the Navy Department. The *Nantucket* has both steam and sail power, is bark-rigged and was built of iron in 1876. She is equipped with modern appliances at present used for navigating and handling ships at sea. It makes an annual cruise of about 4 months' duration covering approximately 10,000 miles. The remainder of the year the vessel is moored at the Boston Navy Yard. The school offers practical and theoretical instruction in navigation, seamanship, ship construction, law of the sea, marine engineering, and electricity. The course at present is 2 years but an additional year is contemplated. Applicants make a clothing deposit of \$150, graduation deposit of \$50, and pay tuition of \$100. At the beginning of the second year, a further clothing deposit of \$50 and tuition fee of \$100 is required. Applicants must be between the ages of 17 and 20 and residents of Massachusetts, and their parents, or guardians, must be citizens of the United States and residents of Massachusetts. The capacity of the school is about 150 students of whom about 50 graduate annually.

The New York State Merchant Marine Academy succeeded a nautical school established in 1875. It has a shore-training station recently completed at Fort Schuyler, Bronx, N. Y., where barracks, class rooms and laboratories are situated. Its schoolship, moored at the fort, is the *Empire State*, a conventional merchant-type steam vessel, loaned the State by the Navy Department. On this vessel an annual cruise of about 10,000 miles is made every summer lasting from 3 to 4 months for practical and theoretical instruction. Applicants must be between the ages of 17 and 21 and citizens of the United States. For residents of New York, tuition is \$100 per year for 2 years plus a clothing fund deposit of \$150 and other incidental costs. For nonresidents, board and tuition is \$750 per annum. The course now covers 2 years, but a third year is planned beginning in 1939. The course includes all standard maritime subjects. Total enrollment has averaged about 150 with graduating classes averaging something over 60 cadets annually. With increased facilities at Fort Schuyler, it is planned to add to the number of enrollees.

The Pennsylvania State Nautical School was established in 1919. It was suspended for a time since its establishment, but is again in operation and has been continuously since June 1, 1934. Its courses

include all maritime subjects and are conducted aboard the schoolship *Annapolis* loaned the State by the Navy Department. When in port the ship is berthed at Pier No. 1, Navy Yard, Philadelphia, and cadets are permitted to use all recreational features of the navy yard and its library. Both summer and winter cruises are held, the former averaging about 9,000 miles and the latter about 4,000. Applicants must be citizens of the United States and residents of Pennsylvania and have either a parent or guardian resident of Pennsylvania. They must be between the ages of 17 and 20. The sum of \$125 for the first year and \$30 for the second year must be paid upon entrance. The schoolship has a capacity of about 90 cadets. About 40 are graduated annually.

The California Nautical School was established by legislation enacted by the State of California in 1929. It is the only one of the State nautical schools now offering a 3-year course. All standard maritime subjects are included in the course but the authorities now plan to extend the curriculum to include more academic studies and to give a degree upon graduation. The school is maintained aboard the training ship *California State* which is a conventional merchant-type steamship, converted for her present specialized service. She is used for annual cruises of about 4½ months' duration from January to May. Between cruises the training ship is based at the naval fuel depot at Tiburon, Calif., where excellent classroom facilities, wharfage for the ship and a small boat basin, additional machine and electrical shops, sail loft, engineering laboratory and room for recreation are available. Applicants must be between the ages of 17 and 23, citizens of the United States, and sons or legally appointed wards of legal residents of the State of California. Annual tuition is \$225 plus a clothing cost of \$50 upon entrance. Nonresident students may be admitted, when vacancies occur, upon payment of an annual fee of \$500. Cadets are quartered at all times aboard the training ship which has comfortable accommodations for 132 cadets. About 40 cadets are graduated annually.

Summarized, the four State nautical schools have an aggregate enrollment capacity of about 500 cadets of whom some 200 are graduated annually. The only other present sources of supply for officer personnel are the cadet system, maintained by the Maritime Commission on Government-operated and subsidized vessels, which will be discussed hereinafter, and advancement through the forecastle. The superintendents of these schools (all naval officers) are doing excellent work for our merchant marine as well as for our country's national defense. They have evidenced a spirit of cooperation with the Commission's training program that is most commendable.

UNITED STATES MERCHANT MARINE NAVAL RESERVE

In 1925, the United States Merchant Marine Naval Reserve was created by law. It is composed of male citizens of the United States and its insular possessions who follow or have followed the sea as a profession and who are employed, or who have been employed within 3 years, on public vessels of the United States or such other seagoing vessels documented under the laws of the United States as may be approved by the Secretary of the Navy. Not until 1937, however, was an appropriation made for giving a short period of training on naval vessels to a limited number of licensed and unlicensed merchant marine personnel. In 1938, 103 merchant marine officers and 57 unlicensed men received this training. While the training is primarily military in character it does include additional sea service and should be referred to in this report since merchant marine personnel is trained. This system in no way interferes with, nor takes the place of the strictly merchant marine training being given by the United States Maritime Service.

NAVAL RESERVE OFFICERS TRAINING CORPS

Naval Reserve officer training units of about 200 men each have been established since 1926 at eight universities as follows:

University of Washington.
University of California.
Northwestern University.
Harvard University.

Yale University.
Georgia School of Technology.
Tulane University.
University of California at Los Angeles.

Courses in maritime subjects are similar at each, so the University of Washington curriculum will be given as typical.

First year.—Basic course: Indoctrination and seamanship, 3 hours a week plus 2 hours additional drill. Three credits.

Second year.—Basic course: Navigation and nautical astronomy, 3 hours a week plus 2 hours of drill. Three credits.

Third year.—Advanced course: Ordnance and gunnery, 3 hours a week plus 2 hours drill. Three credits.

Fourth year.—Advanced course: Leadership and administration, 3 hours a week plus 2 hours of drill. Three credits.

The following courses in naval science are open to general registration and are offered to all students registered in the university not enrolled in the Naval Reserve Officers' Training Corps: Seamanship, sea navigation, advanced sea navigation, aerial navigation. Total of 15 credits.

In addition to the above, three summer practice cruises aboard naval vessels of about 3 weeks' duration are offered with practical instruction in both deck and engineer departments. Frequent weekend cruises are also offered aboard eagle boats for training in piloting

and deck seamanship. Since 1930 the University of Washington has had 275 students complete the Naval Reserve Officers' Training Corps course and receive Commissions as Ensigns in the United States Naval Reserve. Approximate age of graduates is 22 to 24 years.

While this training is primarily to fit them for membership in the Naval Reserve, some, upon graduation, take up maritime occupations. They can qualify as cadet officers under our cadet system when they get a license and they offer an additional source of material for officers in the merchant marine, after sufficient service at sea.

THE CADET SYSTEM ON GOVERNMENT-OPERATED AND SUBSIDIZED VESSELS

HISTORY OF CADET SYSTEM

On March 3, 1891, an act of Congress relating to the foreign mail service was approved (C. 519, 26 Stat. 830, U. S. C., Title 39, secs. 657-665). It authorized the Postmaster General to enter into such contracts with American citizens for carrying mail on American steamships between domestic and foreign parts as in his judgment would best promote the country's postal and commercial interests. The act required public notice and advertising for bids, specified that the vessels should be American built and owned; required specified ratios of citizens in the crews, provided standards for the construction of vessels to be used, and set up rates of compensation to be paid for the carriage of mails. In brief, the act contained most of the elements later incorporated in mail contract subsidy provisions.

Section 8 of the act of March 3, 1891 (U. S. C., Title 39, Sec. 664; 26 Stat. 832) provided as follows:

Said vessels shall take, as cadets or apprentices, one American-born boy under twenty-one years of age for each one thousand tons gross register, and one for each majority fraction thereof, who shall be educated in the duties of seamanship, rank as petty officers, and receive such pay for their services as may be reasonable.

The act of March 3, 1891, was repealed by section 414 (c) of the Merchant Marine Act, 1928, which was, in essence, an elaboration of the earlier act, using ocean mail contracts as the basis of a subsidy for shipping in foreign commerce, and directing participation in the expanded program by the Shipping Board.

Section 404 of the Merchant Marine Act, 1928 (repealed) authorized the Postmaster General to enter into mail contracts, with such "requirements and conditions as in his best judgment will insure the full and sufficient performance thereof and the protection of the interests of the Government."

Under this authorization the Postmaster General entered into contracts for ocean mail pay, which contracts required steamship operators

under such contracts to carry a specified number of cadets upon each of their ships.

Data developed as early as March 1937 by the Commission from questionnaires submitted by the Commission to the holders of ocean mail contracts showed that ship owners generally desired a continuance of a cadet system for the purpose of producing competent merchant officers, but were almost unanimous in the opinion that the existing system, with no restrictions on selective methods, was ineffective and should be revised.

FIRST SYSTEM ADOPTED

All these facts contributed to a conclusion that definite and systematized plans for selecting and training cadets were imperative.

Much thought and study was given by the Commission to planning proper selection and training of young men to become licensed officers in the Merchant Marine under the cadet system.

As a result of this study, under the general contractual authority vested in the Commission by the Merchant Marine Act, 1936, the temporary contracts for operating subsidies carried a general provision requiring subsidized operators to carry cadets. This provision reads as follows:

Cadets or apprentices, in such minimum number as the Commission shall from time to time designate in the minimum manning scales prescribed by it, shall be carried, at the expense of the applicant, on all subsidized vessels. Only American-born boys under twenty-one years of age (unless such age limit is changed by the Commission) may fill such positions and, if the Commission establishes or sponsors a training school or schools for merchant marine personnel, these boys may be selected by the Commission if it so elects, from the graduates of such school, and shall be educated on such vessels in the duties of seamanship, navigation, and other appropriate duties aboard ship and shall receive such minimum pay from the applicant for their services as shall be fixed by the minimum wage scales from time to time established by the Commission.

After further study the Commission placed a more definite clause in the long-range subsidy contracts which reads as follows:

The Commission reserves the right to adopt regulations providing for cadets or apprentices to be carried upon subsidized vessels at the expense of the operator. When and if such regulations are promulgated by the Commission, the operator agrees to observe such regulations governing the selection of such cadets or apprentices, and their minimum wages, working conditions, status, duties, and course of training. Nothing herein prescribed shall adversely affect the carrying of cadets under rules and regulations of the subsidized operator, pending the promulgation of rules and regulations by the Commission.

These actions reflect realization by the Commission that a centralized and uniform method of supervising the training of cadets is a vital element in the obligation imposed on the Commission by Congress to produce a Merchant Marine "manned with a trained and efficient citizen personnel."

On March 15, 1938, the Commission followed up the plans reflected in the contractual provisions, after a careful survey of general facts and analysis of all available statistics, by adopting General Order No. 23.

This order definitely established the ratings of "cadet officer" and "cadet"; set up minimum qualifications for the ratings; prescribed rates of pay and conditions of employment; and regulated the selection of cadet officers and cadets by requiring operators to fill all vacancies in such ratings with persons certified by the Division of Maritime Personnel as meeting the minimum qualifications established.

A committee of three, two of whom were not employees of the Commission, was asked by the Commission to study the cadet system and make recommendations for further standards of qualifications and training.

As a result of this committee's report, General Order No. 23 was amended and amplified prescribing more detailed standardized requirements for qualifications and training of cadet officers and cadets. The transition from the erstwhile practice was intended to be made with as little confusion as possible, and provisions were written into General Order No. 23 to protect any young man carried as cadet on its effective date from arbitrary separation from that rating. The order provided that after March 15, 1938, appointment of cadet officers and cadets should be made exclusively from the eligible list, and thus limited its scope to filling vacancies created when cadets then sailing left the service of the company, and to new vacancies created by the prescription of additional cadets on subsidized vessels.

RESPONSE OF PROSPECTIVE OFFICER MATERIAL

A press release was issued and when it became generally known that the Commission was maintaining an eligible list from which placements for cadet officers and cadets would be selected, an avalanche of informal applications arrived from all parts of the country. Being coincident with publicity concerning the large new shipbuilding program, many young men and their parents apparently believed there would be many more positions available than there actually were or will be. However, the number of applicants indicated the interest of young men in a seafaring career, at least for some duration.

More than 10,000 letters asking for information and formal applications were received from young men who wished to make the sea their profession. Approximately 15,000 formal applications were printed, of which, 1,500 were sent to Senators and Representatives, at their request, for distribution among constituents; 1,000 were sent to the district manager's office in New York for distribution in answering requests; 10,000 were sent to individual applicants who had presented informal applications, indicating that they were probably

qualified; and of the remainder a large number were sent to district managers other than at New York, to be presented to young men calling in person, and a comparatively few of the formal applications remain on hand.

Up to and including November 1, 1938, 3,275 formal applications were received by this office, of which 2,054 had been approved and certified as eligible. It is estimated that of the balance about 85 percent will be found eligible.

Those found eligible were divided into the following categories: Deck cadet officers 56; deck cadets, 1,925; engineer cadet officers 27; engineer cadets 46.

The actual selection of cadets under the mail contract and subsequent system was made by the operator and was generally the result of direct contact between the applicant and the operator.

From the eligible list, 119 cadet officers and cadets were placed on subsidized and Government-owned vessels up to November 15, 1938. While all minimum manning scales have not yet been completed it is expected that approximately 300 positions for cadet officers and cadets will be required. This estimate of 300 positions for cadet officers and cadets is arrived at by giving consideration to the available space, accommodations, and facilities for training on board presently subsidized vessels and vessels now owned by the Commission and under construction. This will be subject to some revision by changing conditions in the future, but it is felt that it is a sufficiently reliable figure on which to proceed.

NEW CADET SYSTEM NOW IN EFFECT

Realizing that another method of the selection of cadets must be adopted, since the number of applications was out of all proportion to the available positions, the Commission on December 13, 1938, by its General Order No. 28, changed the requirements of the system as to the selection of applicants and the assignment of those chosen to positions (which is now done by the Commission instead of by the operators, subject to the approval of the master of any cadet assigned to his vessel), and strengthened the courses of training and the supervision thereof by the Commission. The age limit was raised from 23 to 25 years to include more advanced applicants. Also the training period was increased from 3 to 4 years, 1 year of which (the second or third) will be spent at a shore training station.

General Order No. 28 provides for the regulation and administration of cadet officer and cadet selection and training, and reads as follows:

General Order No. 28 and amendments thereto are hereby rescinded.

Application of this order.—This order is prescribed to regulate cadet officer and cadet selection and training on vessels receiving an operating differential subsidy

as provided for in section 23 of the standard long-range subsidy contracts, pursuant to provisions of the Merchant Marine Act of 1936, as amended, to the end that a merchant marine with a trained and efficient citizen personnel may be developed.

Persons in training under the system hereby established shall be designated "cadet officers" and "cadets," pursuant to requirements hereinafter set forth.

CADET OFFICERS

1. *Qualifications.*—(a) Age: The applicant must be not less than 19 nor more than 25 years of age. (If less than 21 years of age, the application must contain written consent of a parent or guardian.)

(b) License: The applicant must be the possessor of a license as third mate or third assistant engineer.

(c) Physical condition: The applicant must possess such physical qualifications as the Commission may prescribe.

(d) Character: The applicant shall produce evidence of good moral character in the community in which he resides.

2. *Minimum wages and allowances.*—Minimum compensation for cadet officers shall be at the rate of \$75.00 per month. Cadet officers shall receive the perquisites, privileges, and travel and subsistence allowances of a licensed officer.

3. *Quarters.*—Cadet officers shall be quartered aboard ship with licensed officers.

4. *Selection and assignment.*—(a) Applicants for cadet officer ratings shall be placed on an eligible list when it is determined the qualifications hereinbefore prescribed have been met.

(b) Assignments shall be made from the eligible list with preference to the candidates who have been on such eligible lists longest in point of time.

5. *Limitation.*—Cadet officers shall remain in such rating for a period of not longer than 1 year, except that if a voyage is commenced before the expiration of the year, the rating shall not be impaired until the conclusion of such voyage. The rating may be extended, for cause shown, in the discretion of the Commission.

CADETS

6. *Qualifications.*—(a) Age: The applicant must be not less than 17 nor more than 25 years of age. (If less than 21 years of age, the application must contain written consent of a parent or guardian).

(b) Determination of eligibility.—An official eligible list of cadets shall be compiled as follows: (1) An examination shall be conducted in every Congressional district in the United States. The subject matter of such examination and a minimum passing mark shall be approved by the Commission. For purposes of this order, the District of Columbia, Alaska, and Hawaii shall be deemed the equivalent of Congressional districts.

(2) Candidates shall be placed upon an eligible list when they attain the minimum passing mark and, in addition, either (i) the highest mark in the Congressional district in which the examination is taken, or (ii) a mark as high as the lowest mark qualifying under (i).

(3) The names on the eligible list shall be listed in the order of national competitive standing.

(c) Physical condition: The applicant must possess such physical qualifications as the Commission may prescribe.

(d) Character: The applicant shall produce evidence of good moral character in the community in which he resides.

7. *Minimum wages and allowances.*—Minimum compensation for cadets shall be at the rate of \$50 per month.

8. *Travel allowance.*—While traveling in course of employment, cadets shall be furnished allowance for subsistence at the rate of \$3.25 per day, except where subsistence is included with transportation.

9. *Subsistence.*—When meals are not furnished, cadets shall receive a subsistence allowance of \$2.50 per day. When not furnished with quarters, they shall receive an allowance of \$1.75 per night for lodging.

10. *Quarters.*—Cadets shall be quartered aboard ship with the licensed personnel.

11. *Selection and assignment.*—After examinations have been conducted in all Congressional districts an eligible list for cadets shall be compiled as follows:

(a) The candidate receiving the highest mark in each Congressional district shall be placed on the eligible list, in the order of competitive standing.

(b) Any candidate receiving a mark higher than the lowest mark received by any candidate placed on the eligible list under the provisions of subsection (a) of this section, shall also be placed on the eligible list, in his place of competitive standing on the entire list.

12. *Assignment.*—Cadets shall be assigned by the Maritime Commission to vessels in the order of their standing on the eligible list, subject to the approval of the cadet by the master of the vessel to which he is assigned.

13. *Present candidates on eligible list.*—Those applicants now on the eligible list prescribed by General Order No. 23, Amended, shall be given equal opportunity to take the examination for eligibility under this order. Upon completion of the eligible list, prescribed by this order, the eligible list prescribed by General Order No. 23, Amended, shall be cancelled.

14. *Present cadets.*—Nothing contained in sections 6, 11, or 12 shall be construed to affect or change the existing status of cadets now assigned to vessels. In all other respects, they shall be amenable to the provisions of this order.

ADMINISTRATION

15. Administration of the regulation and procedure required by this order is placed under the jurisdiction of the member of the Commission having supervision over training.

TRAINING COURSES

16. The Commissioner in charge of training shall recommend to the Commission such plans and courses, including shore training and extension courses for cadets enrolled in the Maritime Service as are deemed requisite for the development of competent merchant officers, and, upon approval by the Commission, shall administer the same.

GENERAL

17. Nothing herein contained shall be construed in any manner to affect the operation of the United States Maritime Service as established by the Commission's General Order No. 25. Provisions of this order shall also apply to vessels owned by and operated for the account of the United States Maritime Commission.

EFFECTIVE DATE

18. This order shall become effective and operative as of January 1, 1939, except that the present eligible list shall remain in effect until such time as the competitive eligible list provided for herein may be established by the Commissioner in charge of training.

Details of the cadet training system as presently administered are as follows:

(a) After appointment from the eligible list, 1 (or 2) year's training on shipboard will be given to acclimate the cadet to the sea and give him the fundamentals of ship routine. Cadets having satisfactory reports and passing a progress examination at the end of the first (or second) year will then receive intensive training ashore in their respective departments.

(b) One year's shore training will be afforded to cadets successful in passing the examination above-mentioned. Intensive courses of study will be introduced during this period. The facilities of the United States Maritime Service will be used for this shore training.

The deck cadet will receive instruction in electricity to such an extent that he will be able to repair, in case of emergency and in the absence of an electrician, the existing electrical aids to navigation, such as direction finders, fathometers, etc. He will be taught the principles of radio which govern these instruments. He will be instructed in the gyroscopic compass. He will receive instruction in the handling of small boats and be taught geographical, astronomical, and coastal navigation. He will receive instruction of a basic nature in law, economics, and marine commercial practices. He will be taught ship sanitation and certain dietetic principles.

The engineer cadet will be taught to handle the lathe and all tools connected therewith. He will receive training in advanced mathematics, applied dynamics, applied physics, and a basic knowledge of electricity as a power agency.

(c) One or 2 years' further training aboard vessels will then be given.

The cadets' progress will be followed closely at all times. Annually, they will take a progress examination. Having completed 4 years' training, 3 at sea and 1 ashore, they should experience no difficulty in passing the examination necessary to secure a license as third mate or third assistant engineer.

Outstanding cadets in the deck department will probably then be assigned to 6 months' service with the United States Coast and Geodetic Survey or some other service to round out their training. Outstanding engineer cadets will be given 6 months' additional experience with a shipyard which has in operation a superior training school.

Cadets on the eligible list will be permitted to select the department they desire to enter. The original examinations will take into consideration the need for ascertaining minimum qualifications for both departments (deck and engineer) as is done at Annapolis, West Point, and the Coast Guard Academy.

Appendix C, attached hereto, describes the cadet courses in detail.

EXTENSION COURSES FOR CADETS

It is planned to supply cadets on such terms as may be arranged with extension or correspondence courses which they may study aboard ship if authority for such courses is obtained. Many of the necessary courses are now available from existing correspondence schools, including the very important subjects of engineering and navigation. Certain other courses to be prepared for the Commission by experts in each particular subject are now under consideration, including the subjects of seamanship, naval architecture, maritime law, health and hygiene, and such other subjects as may from time to time be found helpful. Negotiations with the Coast Guard Institute for the conduct of these extension courses if authorized are now in progress.

UNITED STATES MARITIME SERVICE

By its General Order No. 25, dated July 14, 1938, as directed by section 216 (b) and (c) of the Merchant Marine Act, 1936, as amended, the Commission established the United States Maritime Service and requested the United States Coast Guard to undertake the administration thereof. General Order No. 25 is as follows:

ESTABLISHING THE UNITED STATES MARITIME SERVICE

There is hereby established, pursuant to the authority vested in the Commission by section 216 of the Merchant Marine Act, 1936, as amended, a voluntary organization to be known as the United States Maritime Service which shall consist of such licensed and unlicensed personnel of the United States merchant marine as may be enrolled under the provisions of said section, this order, and such rules and regulations as may be prescribed by the Commission for the government of said Service.

The number of persons to be enrolled in said Service, the rates of pay of such persons, and the courses and periods of training shall be determined, fixed, and prescribed by the Commission in such manner and form as may appear to it to be necessary to maintain a trained and efficient merchant-marine personnel. The ranks, grades, and ratings for the personnel of the said Service shall be the same as are now or shall hereafter be prescribed for the personnel of the Coast Guard.

In the administration and conduct of the said Service the Commission shall, subject to the consent and approval of the Secretary of the Treasury, avail itself of the use of such information, services, facilities, officers, and employees of the Coast Guard and the Public Health Service as may be necessary for the operation of said Service, such use to be at the expense of the Commission.

Enrollment and training in the United States Maritime Service shall be voluntary and shall be open to all licensed and unlicensed personnel of the United States merchant marine who comply with the requirements prescribed by the Commission. In the selection of applicants for enrollment no discrimination shall be practiced because of the applicant's race or creed, or because of membership or nonmembership in any organization. Eligibility for enrollment shall be determined by the Commandant of the Coast Guard in accordance with rules and regulations prescribed by the Commission.

Nothing in this order shall be construed to affect the cadet system established by the Commission's General Order No. 23, as amended.

This regulation shall become effective as of July 14, 1938.

Under date of September 1, 1938, the Commission received the consent of the Secretary of the Treasury for the Coast Guard to administer the Maritime Service by a letter in the following form:

MY DEAR MR. CHAIRMAN: Reference is made to your letter of July 6, 1938, and to my reply of July 13, relative to the establishment and administration of the Maritime Service.

The Rules and Regulations for the Government of the Maritime Service drafted by the Maritime Commission, including the redraft of sections 2 and 3 of article II, dated August 11, 1938, are satisfactory to the Treasury Department subject to minor modifications in the interest of clarification.

At a conference on August 24, 1938, between the Acting Secretary of the Treasury, Roswell Magill, and the Chairman of the Maritime Commission, Rear Admiral Emory S. Land, a mutually satisfactory understanding was reached on the degree of Coast Guard authority and responsibility as defined by the August 11 draft of section 3, article II, of the Rules and Regulations.

The request contained in your letter of July 6, 1938, is, accordingly, approved, and the Commandant of the Coast Guard is authorized to proceed with the administration of the Maritime Service in conformity with the Rules and Regulations approved by the Maritime Commission.

Very truly yours,

(Signed) H. MORGENTHAU, Jr.,
Secretary of the Treasury.

The Rules and Regulations prescribed by the Maritime Commission were promulgated as of September 1, 1938, and a copy thereof is attached to this report as appendix D.

The Maritime Commission acquired from the Procurement Division of the Treasury Department two islands in lower New York Bay, known as Hoffman Island and Swinburne Island as a shore training station for the Atlantic Coast. These islands were formerly used as a quarantine station. There are 15 buildings on Hoffman Island and these have been rehabilitated and where necessary reconstructed. It is hoped to train approximately 2,500 of the present personnel of the merchant marine at this station annually. An aerial photograph of this station appears herein.

The Commission has acquired two sailing vessels for training purposes; namely, the *Tusitala* and the *Joseph Conrad*. The *Joseph Conrad* was sold to the Commission for \$1 by Mr. Huntington Hartford. The *Tusitala* was purchased for \$10,000. These two vessels are among the last of the American full-rigged sailing ships and the interest which has been shown in training aboard sailing vessels by the trainees as well as by others interested in the shipping industry has justified acquisition of these vessels. Much of the reconditioning work necessary on them will be done by the enrollees as part of their training. Photographs of each appear herein.

In addition to these two vessels, the Coast Guard cutter *Faunce*, as well as several other Coast Guard vessels, have been attached to the Hoffman Island Training Station. The S. S. *American Seaman*

(ex *Edgemoor*), owned by the Commission, is now being converted into a training ship by the Bethlehem Shipbuilding Co., at Baltimore, Md. When the work is complete the vessel will be equipped with all modern facilities for training, including adequate quarters for approximately 225 students with class rooms, machine shops, and other equipment. This vessel will be available about April 1, 1939, and will be used in connection with the training system maintained by the United States Maritime Service. An evaporator or distillation plant with a daily capacity of 104,000 gallons, for the conversion of sea water into fresh water, has been installed in this vessel so as to make it serviceable for this purpose in time of emergency.

A photograph of the S. S. *American Seaman* appears as the frontispiece to this report. A profile drawing showing the interior arrangements of the vessel appears herein.

On the Pacific coast, a training station has been established at the United States Coast Guard base at Government Island, Oakland, Calif. It is planned to train annually at this station approximately 650 present unlicensed and 100 present licensed personnel of the merchant marine. The Coast Guard is using the S. S. *Northland* as a training ship in connection with this station and is reconditioning two other Coast Guard vessels for training purposes, one at this station and one at Hoffman Island. An aerial photograph of Government Island, Oakland, Calif., on which the training station is located appears herein together with a photograph of the S. S. *Northland*.

A third training station for licensed personnel is being established at the Coast Guard base at Fort Trumbull, New London, Conn. It is planned to train annually at this station approximately 200 of the present licensed personnel of the merchant marine. This station has the advantage of being located close to the Coast Guard academy, at New London, where laboratory, machine shop, and other facilities are available to the enrollees.

An aerial view of the Coast Guard base at Fort Trumbull where this training station will be located appears herein.

The Commission is conducting a survey of various sites at ports on the Gulf of Mexico with a view to the possible establishment of a training station there. In the meantime, enrollees from the Gulf are being sent to Hoffman Island.

In selecting men for enrollment a quota system has been established so that a fair proportion of enrollees are selected from all parts of the United States.

UNITED STATES MARITIME SERVICE TRAINING SYSTEM

Enrollment in the Maritime Service began in September 1938, the training stations at Hoffman Island, N. Y., and Government Island, Calif., being partly ready. These two stations will be prepared to

receive full complements of trainees in January 1939, and at the same time the training station at New London will be opened for licensed men.

In developing training courses attention must be given to the wide variation in the abilities and requirements of enrollees. For convenience they may be considered in groups as follows:

- | | |
|--|---|
| <p>1. Licensed personnel:</p> <ul style="list-style-type: none"> a. Deck officers. b. Engineer officers. | <p>2. Unlicensed personnel:</p> <ul style="list-style-type: none"> a. Able seamen. b. Members, engine department. c. Members, steward's department. d. Miscellaneous personnel. |
|--|---|

In each group, individuals vary widely in age, intelligence, education, training, seagoing experience, and temperament. Within any group a standardized course of instruction would undoubtedly be too elementary for some and too advanced for others. In view of this condition every effort is made to provide each enrollee with training suited to his individual needs and ability.

Included in the curriculum are the following subjects:

- | | |
|---|---|
| <p>Nomenclature and types of ships.
Knots and hitches.
Rowing.
Boatmanship.
Emergency drills.</p> | <p>Seamen's laws.
Breeches buoy drill.
Marching drill.
Hygiene and first aid.
Customs and traditions.</p> |
|---|---|

An enrollee demonstrating proficiency in any of these subjects may be excused from further training in that subject.

Deck officers are offered instruction in navigation, navigational instruments, signaling, communications, cargo handling, ship's business, damage control, maritime law, first-aid treatment, and hygiene.

Engineer officers may select courses in steam engineering, Diesel engines, electricity, and machine-shop practice.

Unlicensed men of the deck department have courses in seamanship, rules of the road, rigging and canvas work, painting, cargo handling, and upkeep of hulls.

Unlicensed members of the engine department have available courses in steam engineering, Diesel engineering, electricity, machine-shop practice, and welding.

For unlicensed members of the steward's department courses are provided in the preparation and handling of food, dining-room steward routine, and room steward routine.

The original staff for administration of the station and instructors of enrollees was drawn from Coast Guard personnel. As qualified men become available from Maritime Service enrollees they will be added to the staff until at least one-half of the instructors are drawn from the merchant marine.

Licensed officers are enrolled as ensigns at \$125 a month and unlicensed personnel are enrolled in grades paying \$36 a month. An applicant may be enrolled in any port of the Atlantic, Pacific, Gulf, or Great Lakes areas. He is provided with transportation from the place of enrollment to the training station and upon completion of training, a return travel allowance.

While there is considerable variation in the courses of instruction, a fair presentation may be made by considering the training of a typical unlicensed engine-department enrollee at the Hoffman Island Training Station.

He enrolls at Jacksonville, Fla., on Monday as fireman, third class, at \$36 a month and is given a railroad ticket to the training station. Arriving Wednesday, he is assigned to a group which includes all men arriving that week. He is given a thorough physical examination. A medical record is opened in his case, and his physical description and fingerprint records are submitted to Maritime Service Headquarters in Washington.

He is issued a uniform outfit of working clothes on arrival, suitable for use at the training station. It includes a blue serge suit, and Maritime Service insignia is furnished after he has completed 3 weeks at the station.

His first week is taken up with the details incident to group organization, medical examination, vaccination and typhoid inoculation, issue of clothing, assignment of quarters, and preparation of miscellaneous records. Spare time is spent in exercise and instruction in the station routine. During this time recruits arriving from day to day have been added to his group.

His schedule for the second week calls for five class- and various ship-drill periods during the day, beginning at 8 a. m. and ending at 4 p. m. These five periods are devoted to resuscitation drill, general instruction, rowing practice, and a medical lecture.

During the third week he is assigned to general duties incident to the operation of the station such as mess, cleaning quarters, upkeep of buildings and grounds, and handling of supplies. In general, for this 1 week out of the 13 he is under training, the enrollee is engaged primarily in working for the station rather than being under instruction.

On his fourth week the enrollee has five daily periods of instruction, the subjects being those incident to his department.

Beginning his fifth week he will start specialized training. For his principal subject he can choose steam engineering, Diesel engineering, machine-shop practice, welding, or electricity. He is provided with suitable study material and is given practical instruction.

From the fifth week until the end of his instruction period the daily schedule of the engineer enrollee will comprise five periods between 8 a. m. and 4 p. m., three to instruction in his specialty and two to

general subjects such as boat drill, marching drill, seamen's law, hygiene and first aid, and practical work about ship. He will be expected to study during the evening in preparation for class work the following day.

Two months after his date of enrollment the fireman may be advanced in rating to fireman, second class, at \$54 a month. Upon completion of his probationary period of 3 months he will, if his service has been satisfactory, be offered regular enrollment in the Maritime Service in a grade commensurate with his ability and experience. He will be released from active duty and given a travel allowance in cash to his place of enrollment. If his probationary service is unsatisfactory he will, at the end of his probationary period, be disenrolled and given a travel allowance in cash to his place of enrollment.

A regular enrollee may be retained on active duty with the Maritime Service as an instructor or in connection with the operation of the station if he chooses to accept. A regular enrollee released from active duty will be expected thereafter to serve annually 8 months on a sea-going merchant vessel and 1 month with the Maritime Service. If he fails to serve 10 months on a merchant vessel during a period of 24 months he will be disenrolled.

The daily routine of the Hoffman Island Training Station is as follows:

0615. Call cooks.	1035 to 1145. Instruction.
0645. Turn out all hands.	1200, noon. Dinner.
0720. Breakfast.	1245. Requests and complaints.
0800. Muster, turn to.	1300. Muster, turn to.
0815 to 0915. Instruction.	1315 to 1430. Instruction.
0930. Sick call.	1430 to 1600. Instruction.
0920 to 1030. Instruction.	1730. Supper.
1000. Inspection of barracks.	2200. Lights out.

After the first 3 weeks, an enrollee is given liberty from 4:30 p. m. to midnight every other day and from Saturday noon until Monday morning.

The square-rigged ship *Joseph Conrad* and the Coast Guard patrol boat *Faunce* are in active service at the Hoffman Island Training Station making frequent cruises at sea, and the Coast Guard cutter *Northland* is at the Oakland station. The square-rigged vessel *Tusitala* has been assigned to the Hoffman Island station but must be reconditioned and provided with living accommodations before being used by enrollees of the Maritime Service. The 7,000-ton steamer *American Seaman* (ex *Edgemoor*) which is now being reconditioned as a training vessel with facilities for 225 trainees, should be ready for service by April 1, 1939.

Upon completion of work now in progress, Hoffman Island, N. Y., will have facilities for 600 unlicensed trainees; Fort Trumbull, Conn.,

50 licensed trainees; and Government Island, Calif., 18 licensed and 145 unlicensed trainees. Accommodations of training vessels now attached to the stations are included in these figures, but the commissioning of the training ship, *American Seaman*, will provide facilities for an additional 225 trainees. Since the training period is for 3 months, the annual capacity of the stations will be approximately four times the numbers given above, i. e., 272 licensed officers and 2,980 unlicensed seamen.

Training equipment such as boats, davits, boatswain's stores, machinery, tools, models, and books, will be available at training stations in reasonable quantities by January 1939. Procurement of equipment necessary for housing, clothing, and feeding enrollees has kept pace with the rate of enrollment.

Enrollments are made through the offices of Division Commanders of the Coast Guard at Boston, New York, Norfolk, Jacksonville, Mobile, Cleveland, Chicago, Seattle, and San Francisco. Each of these offices is assigned a monthly quota of enrollments intended to distribute the benefits of the Maritime Service equitably throughout the country. A table is appended showing the quotas based on a total annual enrollment of 2,976 officers and men.

Enrollees are drawn from seamen with over 2 years' service in the merchant marine, preference being given at the present time to unemployed men. They vary from 21 to over 60 years of age and in general they are mature men. Service is voluntary and may be terminated at any time by an enrollee. Experience with enrollees at the training stations during the first 3 months has indicated that they are generally well behaved and eager for instruction.

NOTE.—Statistics concerning United States Maritime Service are included in the appendix.

RETAINER PAY SYSTEM FOR REGULARLY ENROLLED MEMBERS OF THE UNITED STATES MARITIME SERVICE

Every regular enrollee in the United States Maritime Service—that is, one who has completed the 3 months training course satisfactorily—will be given 1 month's pay of his grade for each 12 consecutive months; providing he produces satisfactory evidence that he has served 8 months of the 12 on board documented vessels of the United States of over 500 gross tons, sailing on the Great Lakes or ocean. And also that he has served 1 month of the 12 on active duty with the Maritime Service. During the first 12 months of service as a regular enrollee, no active duty with the Maritime Service will be required for the retainer pay, because he will already have served 3 months in training. It is also provided that the required sea service may be consolidated into 2 or 3 years—that is, a regular enrollee who fails to serve the required time in the merchant marine (8 months in

each 12) may make it up without disenrollment within the second 12 months so long as he serves a total of 16 months in the merchant marine within the 2-year period; but in that event he would receive no retainer pay until the 16 months' service was completed when he would be given retainer pay for 2 years, at the end of the second year, provided that he had also at that time completed 2 months' duty with the Maritime Service within the 2-year period. The same method would be followed if it took him 3 years to complete 24 months' service in the merchant marine and 3 months' duty with the Maritime Service, in which case he would receive no retainer pay until the end of the third year but would then be entitled to 3 annual retainer payments. Failure, however, to perform at least 10 months' sea service in 2 years will result in disenrollment.

This retainer pay will be in addition to compensation received while serving on a merchant vessel, as prescribed above, and in addition to compensation received while serving the required periods of training with the United States Maritime Service. Attention is invited to the fact, however, that the 3 months' initial training period is probationary and that only those who successfully complete it and are regularly enrolled are eligible to receive the retainer pay when and if they also complete the remainder of the required service. This retainer pay feature is a reward for service and for continued membership in the United States Maritime Service.

THE COAST GUARD INSTITUTE

The Coast Guard Institute is conducted to assist the personnel of the Coast Guard to increase its general and professional education. It is under the supervision of the Commander, Fort Trumbull Training Station, at New London, Conn., and this officer is designated as the Director of the Institute. This organization conducts all correspondence courses issued by the Coast Guard.

Courses issued by the Institute are divided into three general classes: Correspondence school courses, radio engineering courses, and rating and service courses. Educational certificates are awarded to all students who satisfactorily complete the courses. At least one lesson must be submitted each month, but more frequent submission of lessons is encouraged. Some of the courses offered at the present time are as follows:

Boatswain's mates courses.
Quartermasters courses.
Machinist's mates courses.
Watertender's courses.
Electrician's mates courses.

Radiomen courses.
Carpenter's mates courses.
Electrician's mates (telephone) courses.
Ship's cooks courses.
Fireman course.

RADIO ENGINEERING COURSES

Mathematics for practical radio engineering.	Practical radio engineering—elementary.
Preparatory course for advanced resident radio schools.	Practical radio engineering—advanced.

CORRESPONDENCE SCHOOL COURSES

Ocean navigation.	Grade school subjects.
Motor boat navigation.	High school subjects.
Lake navigation.	Elementary electrical engineering.
Diesel engines.	Electrical engineering.
Marine steam engineers.	High school mathematics.
Reading shop blueprints.	Internal combustion engines.
Short mechanical drawing.	Communications.
Good English.	Algebra course.

A number of correspondence school courses are now being used by the United States Maritime Service in classroom instruction at its training stations. Plans are under consideration to make these and other courses available to the men after they leave the training station, provided they are then regularly enrolled and remain members of the Maritime Service. If this is done, the services of the Coast Guard Institute will probably be used to conduct the courses by correspondence if suitable arrangements can be made.

VOCATIONAL HIGH SCHOOLS

Last year some 1,500,000 boys and girls were enrolled in vocational high schools throughout the United States. About a year ago, the Metropolitan Vocational High School for the five boroughs of the city of New York, located at Oliver, Oak, and James Streets, in lower Manhattan, added to its curriculum courses in training for maritime occupations. These courses are being conducted by trained men, among whom are several graduates of the New York State Merchant Marine Academy who have also had experience at sea in our merchant marine. The students are graduates of the New York City grade schools and they take various kinds of vocational training while completing their high school courses. They are usually 14 to 18 years of age and the high school courses require from 3 to 4 years for completion. The aim of the course is to give training in the general duties of seamen, in machine-shop work, gas-engine mechanics, carpentry, radio, plumbing, electrical installation, and food preparation and serving. On November 30, 1938, 115 boys were enrolled for this instruction.

The training of boys for the sea at an early age has been carried on by most of the leading maritime nations many years. One of the principal advantages of vocational training in maritime subjects is that, being elective, the courses will be chosen only by those boys who feel that they would like to make a career of the sea. If they keep this

desire throughout their high school course and graduate in these maritime subjects, the chances of their remaining at sea are greatly multiplied. They would also furnish an excellent source of supply for recruits for more advanced systems of training for the merchant marine. Hence, the Maritime Commission is most interested in the development of vocational high school training in maritime occupations. The Office of Education of the Federal Department of the Interior has, through its Commissioner for Vocational Education, agreed to encourage the addition of courses in maritime occupations in other high schools at strategic points throughout the Nation.

OTHER SCHOOLS AND AGENCIES

Attention is directed to the courses offered in shop work, marine engineering, marine architecture, and kindred subjects by the Massachusetts Institute of Technology, Webb, Stevens, and other important technical schools and colleges. The Bureau of Marine Inspection and Navigation of the Department of Commerce recognizes the value of such training by giving credit to the graduates of accredited technical schools who apply for appropriate marine licenses.

The Lake Carriers' Association maintains both engineers' schools and navigation schools for deck officers on the Great Lakes to assist men who have had the requisite sea service on boats operated by members of the Association to acquire sufficient knowledge of technical fundamentals to enable them to pass examinations for Federal license. These schools are conducted during the closed navigation season.

The Seamen's Church Institute at 25 South Street, New York City, sponsors a part-time school in the afternoon and on Saturday where high school students may receive instruction in the rudiments of navigation and seamanship.

Some of the larger steamship companies operating American-flag vessels also give specialized training to prospective and actual employees in maritime subjects relating to their duties at sea. Some of the larger shipbuilding plants also maintain apprentice training systems and have indicated a willingness to cooperate with the Maritime Commission by making their facilities available to men in training for observation and study at their plants.

The Maritime Commission plans to avail itself of the assistance of the entire shipping industry and other allied agencies in the development of its training program.

CONCLUSION

The Maritime Commission is of the opinion that the United States Maritime Service will provide an excellent opportunity for experienced seamen to improve their skill and enhance their opportunities for advancement.

We expect to have the shore stations at Hoffman Island in New York Harbor, Government Island at Oakland, Calif., and Fort Trumbull at New London, Conn., operating to capacity by February 1, 1939. By the first of April, 1939, the steam training ship *American Seaman* (ex-Edgemoor) will be in commission. With these facilities it will be possible to train annually approximately 300 licensed and 3,000 unlicensed personnel.

This capacity will be increased if a survey, now being made of Gulf ports, indicates that establishment of a training station in that area is desirable.

The cadet system for training merchant officers is in need of strengthening, as indicated earlier in this report.

We recommend in this connection that the Congress authorize the Commission to arrange extension and correspondence courses which the young cadets may be given for study aboard ship. It is our intention, if this authority is granted, ultimately to make these studies available to the licensed and unlicensed personnel of the United States Merchant Marine generally. Authority is requested to print, publish, and purchase suitable text books, equipment, and supplies required for the courses and to furnish them to approved applicants, both cadets and other merchant marine personnel, either without cost or at such price as the Commission shall deem advisable. It is also requested that the Commission be authorized to pay such supervisory expenses as may be necessary and to make such use of the facilities of the Coast Guard Institute (at Commission expense) as may be arranged with the Commandant of the United States Coast Guard.

The Commission believes that the State nautical school system, even with its present limited capacity, is providing a valuable feeder for officer personnel in the merchant marine. We are of the opinion that Federal aid for these schools should continue under the general supervision of the Navy Department and that the Navy should provide modern training ships for their use.

As we have indicated, successful operation of the State nautical schools and our own cadet training system may obviate the necessity

for the establishment of a Federal academy for merchant marine officers. The Commission, however, has not abandoned the idea of such an institution and proposes to study the question further.

A substantial percentage of our present merchant officers rose through their own efforts from the ranks. This is recognized as a substantial contribution to our officer personnel. To broaden the opportunities, the Commission plans to extend the facilities for specialized training to such unlicensed men as may qualify to equip them to take examinations for licensed positions. We also propose to provide appropriate specialized training to qualified licensed officers enrolled in the United States Maritime Service to equip them to take examinations for further advancement.

All this leaves one link missing in the training system. That involves young Americans without previous experience at sea. The Commission wishes to emphasize what it believes to be the necessity for providing an opportunity for youth to make the merchant marine a career.

The Japanese training system, which is one of the most successful, takes the green boy and carries him straight through to the bridge, so to speak. In two schools, one at Yokohama and one at Osaka, more than 80,000 men had been trained up to 1931. During July and August 1938, more than 2,000 boys from 47 of Japan's secondary schools made training cruises out of Osaka.

This is an indication of the extent to which the Japanese merchant fleet, one of our strongest competitors, is manned by a thoroughly trained personnel.

Under the extension of our own training system to inexperienced youths, such training and education would be available as to prepare these lads to take the places of those who in the coming years advance in rank, retire, or are incapacitated for further service.

Such training as these young men would require could be provided, as indicated earlier in this report, within the frame-work of the United States Maritime Service.

The Commission realizes, however, that establishment of this part of the program should not be undertaken until a more propitious time because of present unemployment in the shipping industry. In the meantime, further study will be given the problem and the Commission will seek to perfect the existing training system.

As directed by the Congress, the Commission has consulted with all interests concerned before presenting this report. We have conferred with representatives of various seamen's organizations, as well as those of ship operators. The operators, generally, and representatives of a majority of seamen have approved the training system subject only to the understanding that the Commission is not recom-

mending immediate inauguration of training for young men without previous sea experience.

Those consulted do not disagree with the principle of training this type of young men. They feel, however, that existing unemployment in the industry makes it unwise to increase the ranks of maritime workers at this time.

It is true that opposition to any training has been expressed by some seamen's representatives. These representatives, however, speak for a small minority of the men in the industry. It is our belief that further experience with the training system will convince even this small opposition that training is extremely valuable to the individual man, the merchant marine, and to the country.

It should be pointed out, however, that under our tentative plans it would take approximately a year for a youth to acquire sufficient knowledge and experience for an unlicensed position. The Commission, therefore, believes that such training should be undertaken at the earliest possible moment consistent with employment conditions in the industry.

We have shown in this report and its appendices, in considerable detail the extensive training systems of the principal maritime nations. A large number of young men are enrolled in the merchant marine training schools of our principal competitors. We find that one, at least, of these competitors believes training to be so valuable that thousands of dollars have been spent advertising it to the traveling public. That they are justified in this attitude, there can be no doubt.

However, all this is not to suggest that the Commission regards our seamen, as a body, as inefficient or lacking in skill. It is to say, however, that it is the Commission's desire to make our present merchant personnel even more efficient and skillful, to the end that we may have merchant ships and men second to none.

That great leader of seamen and the founder of seamen's unions in this country, the late Andrew Furuseth, was one of the most ardent advocates of training seamen. Twenty years ago he said:

To develop a large number of trained seamen, to foster and develop a tendency to the sea in the population, has ever been the care of statesmanship * * *.

Man is not by nature a seaman. The sea, the vessel, the life is so distinct from man's natural mode of life that it has always taken years of training to make a seaman. His thoughts and feelings need the training as absolutely as does his body. Nearly all seamen begin the life in early youth. It was always one step at a time from boy to master. The sea has not changed. Human nature has not altered very materially. The training is as much needed as it ever was * * *.

Appendix A

VOLUNTARY REPORT

**TRAINING PERSONNEL FOR THE JAPANESE
MERCHANT MARINE**

From **BEFFO R. JOHANSEN**, American Vice Consul
American Consulate, Yokohama, Japan

A third Imperial ordinance, pertaining to candidates for the naval reserve officer list and promulgated October 18, 1934, is of interest here. One provision requires that students be made candidates for that list on entry into the nautical colleges conducted by the Ministry of Education.

A ministerial ordinance of 1931 provides that foreign students may secure through diplomatic channels an invitation to attend the nautical schools of the Ministry of Education. The educational qualification of students who have been invited must be approved by the president of Imperial University or by the head of the nautical school.

Turning to the Tokyo Nautical College, an ordinance of the Ministry of Education, issued March 31, 1937, outlines rather fully the training to be given to students there. A course of 5½ years is prescribed, 3 of which are to be on shore at the college, and 2½ years to be devoted to practical training. Deck and engine departments are required, and a detailed curriculum is prescribed for each. (See the section on Tokyo Nautical College, pp. 47-52.) As to the period of practical training the following outline is provided:

1. For the deck department:
 - a. About 6 months of naval training.
 - b. About 1 year of training on sailing vessels.
 - c. About 1 year of training on steamships.
2. For the engine department:
 - a. About 6 months of naval training.
 - b. About 1 year of training on steamships.

Another article of the ordinance permits the establishment of a special 1-year course, the regulations for which are to be made by the president of the college and approved by the Ministry of Education. As will be noted on page 52, in the section on Tokyo Nautical College, this special course is devoted to promotion examination preparation for experienced seamen.

Further detailed regulations are made by the school authorities, subject to ministerial approval. One of these prohibits voluntary resignation of students except by special permission.

Legal provisions for Kobe Nautical College are virtually identical to those for Tokyo Nautical College.

As for the prefectural schools, it may be said in general that they are under prefectural regulation, subject to general laws and under powers delegated by the Ministry of Education. An ordinance of the Ministry prohibits the voluntary resignation of a student except by special permission, after the period of practical training has begun.

Stimuli to shipping from the wars in which Japan participated led to successive expansions of the school, which has tried to adjust its enrollment to the demand for officers.

From 1921 all students have been on a paid scholarship basis, with the obligation of serving in work specified by the school for 6 years after graduation.

In 1925 the Ministry of Education was put in charge of the work and the institution was given the name Tokyo Nautical College.

The great earthquake of 1923 virtually destroyed the school properties, but the training ship *Meiji Maru* with 600 refugees escaped. The school soon reopened, and its present plant was finished by 1932. Dormitories were later acquired in various ports.

A 1-year course was added in 1937 for nongraduate experienced seamen who wished to secure first or second mates' or engineers' papers.

There have been over 4,500 graduates, of whom over 3,300 are now serving at sea.

b. *Foreign students.*—In 1895 a special department was created to prepare young Koreans for entry into the school. In 1905 the first Chinese were admitted, and, finally, in 1934, two Manchukuoan students were accepted, with the stipulation that they were to serve in naval work of their country.

c. *Naval reserve status.*—In 1884 graduates became naval reservists, and special courses in naval matters were added to the curriculum. Provision for naval gunnery and engineering training was soon made. From 1904 students became student reservists on entrance. Increasing stress has been put on this phase of the work, and by 1933 a 6-month period in active reserve training was required. Since 1934, graduates have been able to go directly on the active list. A special unit was created in 1896 to keep up interest. Reservists may rise to the rank of captain in both deck and engineer branch.

d. *Training ships.*—Many vessels have served as training ships for this institution. At first they were Mitsubishi ships, then those of other companies were used as well. By 1892 the practice of borrowing company vessels was abandoned, and one was purchased for school use. In 1898 the first vessel was built especially for this purpose, but soon was lost with all on board during a storm. The *Taisei Maru*, now in use, was built in 1904. Sailing vessels have been used, even the *Taisei Maru* using a motor only for auxiliary purposes.

2. Equipment, personnel

a. *Equipment.*—Tokyo Nautical College is located in Fukagawa Ward, Tokyo, its site comprising a land area of 15,340 tsubo (about 60,746 square yards), and an adjoining water area of 2,693 tsubo

The only charge for the entire 5½-year course is an entry fee of ¥200,¹ which may be paid in small installments.

b. *School life.*—The long daily routine of the students is as follows:

Before breakfast there is a short period devoted to practice in giving commands and calisthenics, after which the students must clean their own quarters. Then comes breakfast, followed by a short rest period for reading, letter writing, etc. After this there is a roll-call, and at 8:10 the 7 hours of school begin. When classes are over each student must devote an hour to a sport of his own selection. Then supper and a period of relaxation in the recreation hall before commencing 3 hours of home work. Before retiring, all must go out of doors for a breath of fresh air.

Saturday afternoons and Sundays are free, and holidays and vacations give an additional leisure of about 2½ months. There is a year-end vacation from December 25 to January 7 and a summer vacation from July 21 to September 10. Usually the first 10 days of the summer vacation are devoted to cruises on small sailing boats for deck department students and to practical factory work for those of the engine department.

c. *Enrollment.*—On June 30, 1937, the enrollment of Japanese students was as follows:

a. Deck department		b. Engine department	
At school.....	168	At school.....	155
At naval gunnery school.....	26	At naval gunnery school.....	25
On training ship.....	45	At naval arsenals and shipyard.....	53
Students on private vessels.....	62	Students on private vessels.....	58
Finished course and awaiting papers.....	4	Finished course and awaiting papers.....	8
Total.....	305	Total.....	299
		Grand total.....	604

4 (A).—Curriculum of deck department

Subjects	Hours per week					
	First year		Second year		Third year	
	First term	Second term	Third term	Fourth term	Fifth term	Sixth term
Morals.....	1	1	1	1	1	1
Navigation:						
Geographical navigation.....	2	2	0	0	0	0
Astronomical navigation.....	0	0	3	3	3	3
Coastal navigation.....	0	0	0	1	2	0
Navigation instruments.....	1	1	2	2	2	2
Maneuvering:						
Maneuvering.....	2	2	2	2	2	2
Loading.....	0	0	0	0	1	1
Marine meteorology.....	0	1	2	2	1	0
Shipbuilding.....	0	0	1	1	1	1
Ship sanitation.....	0	0	0	0	1	1

¹ ¥1 equals approximately \$0.29.

4 (A).—Curriculum of deck department—Continued

Subjects	Hours per week					
	First year		Second year		Third year	
	First term	Second term	Third term	Fourth term	Fifth term	Sixth term
Mathematics:						
Algebra.....	2	2	0	0	0	0
Plane trigonometry.....	2	0	0	0	0	0
Spherical trigonometry.....	0	3	3	0	0	0
Solid geometry.....	1	0	0	0	0	0
Analytic geometry.....	0	2	2	0	0	0
Differential and integral calculus.....	0	0	0	2	2	0
Mechanics.....	0	0	2	2	0	0
Applied dynamics.....	0	0	0	0	2	2
Physics—study and experiment.....	2	4	0	0	0	0
Chemistry—study and experiment.....	4	0	0	0	0	0
Electrical engineering.....	0	2	2	2	0	0
Wireless:						
Wireless telegraphy.....	0	0	0	0	2	1
Wireless laws.....	0	0	0	0	0	1
English:						
Translation and reading.....	3	3	2	3	2	2
Conversation and pronunciation.....	2	2	2	2	2	2
Grammar and composition.....	2	2	1	1	2	2
French.....	2	2	2	2	2	2
Law and economics:						
Elementary law.....	2	2	0	0	0	0
Maritime law.....	0	0	1	2	1	1
Laws to prevent collisions at sea.....	0	0	0	1	1	1
Fundamentals of economics.....	2	0	0	0	0	0
Commerce:						
Elementary commerce.....	0	0	2	0	0	0
Advanced commerce.....	0	0	0	0	1	0
Commercial bookkeeping.....	0	0	0	1	0	0
Commercial geography.....	0	0	0	1	0	0
Outline of maritime affairs.....	1	0	0	0	0	0
Special lectures.....	0	0	0	0	0	2
Practical training:						
Maneuvering.....	3	3	3	3	3	3
Navigation.....	0	0	1	1	1	1
Rowing.....	2	2	1	1	1	2
Signals.....	1	1	1	0	0	0
Wireless.....	0	0	0	1	1	1
Naval study and training.....	2	2	2	2	2	2
Total hours per week.....	39	39	39	39	39	39

4 (A).—Curriculum of engine department

Subjects	Hours per week					
	First year		Second year		Third year	
	First term	Second term	Third term	Fourth term	Fifth term	Sixth term
Morals.....	1	1	1	1	1	
Mechanics:						
Reciprocating steam engine.....	3	2	2	2	0	2
Steam turbine.....	0	0	0	0	2	2
Internal-combustion engine.....	0	0	0	0	2	1
Donkey engines.....	0	0	0	0	2	1
Propulsion.....	0	0	0	0	1	1
Boilers and fuels.....	2	2	2	2	2	0
Handling motors.....	0	0	0	0	2	2
Practice with motors.....	0	1	1	1	1	1
Metals.....	0	0	0	2	0	0
Engine construction study.....	0	0	2	0	0	0
Principles of mechanical engineering.....	0	0	2	0	0	0
Mechanical designing and drawing.....	2	2	2	4	4	4
Electrical engineering—study and experiment.....	1	2	3	3	3	3
Shipbuilding.....	0	0	0	1	1	1

4 (A).—Curriculum of engine department—Continued

Subjects	Hours per week					
	First year		Second year		Third year	
	First term	Second term	Third term	Fourth term	Fifth term	Sixth term
Mathematics:						
Algebra.....	2	2	0	0	0	0
Plane trigonometry.....	2	0	0	0	0	0
Solid geometry.....	1	0	0	0	0	0
Analytic geometry.....	2	2	0	0	0	0
Differential and integral calculus.....	0	2	2	1	0	0
Dynamics:						
General dynamics.....	0	2	2	0	0	0
Thermo-dynamics.....	0	0	2	1	0	0
Hydro-dynamics.....	0	0	0	0	2	0
Mechanical dynamics.....	0	0	0	2	0	0
Material.....	0	0	0	1	2	0
Physics—study and experiment.....	2	2	2	0	0	0
Chemistry—study and experiment.....	2	2	2	0	0	0
English:						
Translation and reading.....	3	2	2	2	2	2
Conversation and pronunciation.....	2	2	1	1	1	1
Grammar and composition.....	1	1	1	1	1	1
German.....	3	3	3	3	0	0
Law and economics:						
Elementary law.....	0	0	0	2	0	0
Maritime law.....	0	0	0	0	0	2
Fundamentals of economics.....	0	0	0	0	0	2
Ship sanitation	0	0	0	0	0	1
Navigation	1	0	0	1	1	0
Special lectures	0	0	0	0	1	2
Practical training:						
Carpentry.....	4	4	4	5	5	6
Rowing.....	2	2	1	1	1	1
Signals.....	1	0	0	0	0	0
Naval study and training.....	2	2	2	2	2	2
Total hours per week	39	39	39	39	39	39

5. Graduation and promotion

Upon the completion of the 5½ years of study, of naval training, and of practical training (see section IV), students return to the college for final examination, after which they receive "A" class second mates' and second engineers' certificates.

Graduates of Tokyo Nautical College are promoted to captain and chief engineer, subject only to a physical examination, after completing stipulated years of service at sea.

6. Special 1-year course

A special 1-year course recently has been added at Tokyo Nautical College. This course is for the benefit of experienced seamen who wish to secure first or second mates' or engineers' papers, and are not graduates of the college. Those who wish to enroll must survive a selective examination. Courses are designed to meet individual needs and to give preparation for government examinations.

B. KOBE NAUTICAL COLLEGE

The college was founded as a private school in 1917, under the name of Kawasaki Merchant Marine School, to train high-class seamen. Three years later it was placed under the Department of Education and given its present name and college status.

Kobe Nautical College is of the same rank, although due to its youth, perhaps has less prestige than Tokyo Nautical College. Since it has the same standards and offers similar facilities for training young mariners, no separate description of them is necessary.

To date there have been about 1,600 graduates, evenly divided between the deck and the engine departments. As in the case of Tokyo Nautical College, graduates are promoted, subject only to a physical examination, to the rank of captain and chief engineer upon the completion of stipulated years at sea.

C. PREFECTURAL MERCHANT MARINE SCHOOLS

At the present time there are in operation eight prefectural merchant marine schools:

1. The Toba Merchant Marine School, under Mie Prefecture, established in 1881 as a private institution and placed under the prefecture in 1911.
2. The Merchant Marine School, under Hiroshima Prefecture, established in 1896 as a villagers' school and placed under the prefecture in 1901.
3. The Oshima Merchant Marine School, under Yamaguchi Prefecture, established in 1897 and placed under the prefecture in 1901.
4. The Awashima Navigation School, under Kagawa Prefecture, established by the town of Awashima in 1897 and placed under the prefecture in 1906.
5. The Merchant Marine School, under Toyama Prefecture, established in 1906 as a prefectural school.
6. The Yuge Merchant Marine School, under Ehime Prefecture, established about 1906 as a private institution and placed under the prefecture in 1908.
7. The Kojima Merchant Marine School, under Okayama Prefecture.
8. The Merchant Marine School, under Kagoshima Prefecture, established in 1907 as a prefectural school.

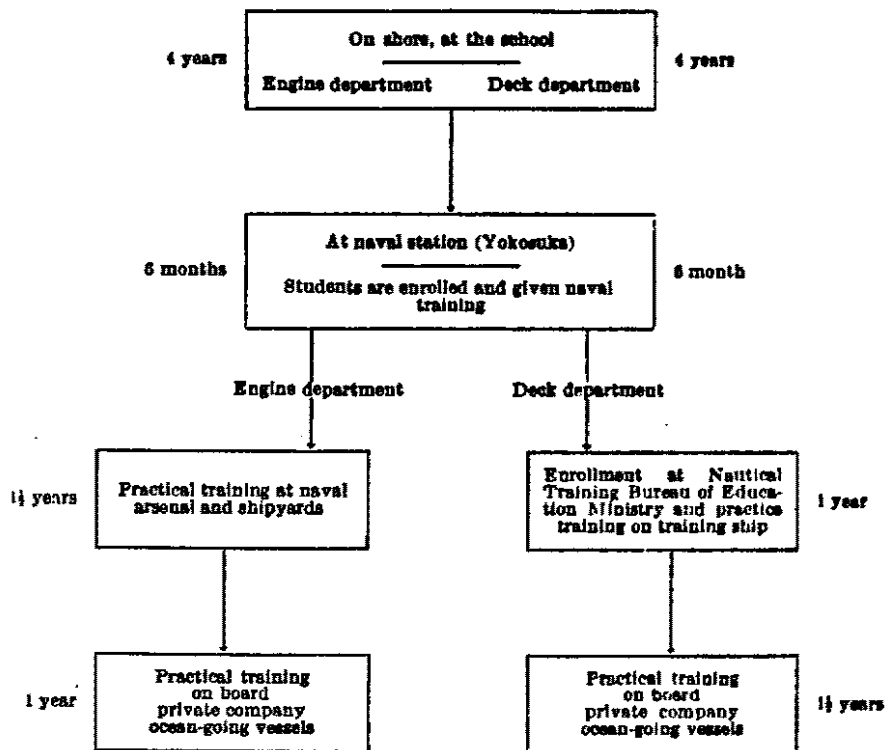
The prefectural schools are all in the classification of technical schools, and all similar in organization. All have departments to train deck officers, but some are without facilities to train engineers.

For the first seven schools listed above the entrance requirements and courses are:

(1) ENTRANCE REQUIREMENTS

- (a) Age: 13 to 17.
- (b) Completion of at least 1 year of middle school in addition to 6 years of grammar school, or the equivalent.
- (c) Applicants must pass selective physical and an oral examination.

(2) COURSE



Upon completing the above program, students are given A class second mate's or engineer's papers and naval-reserve commissions provided they pass a physical examination.

The eighth school differs from the other seven in that its entrance requirements are lowered to the ages of 12 to 16 and the completion of the 6-year grammar school course or its equivalent. The course is increased to 8 years, in compensation, the extra year being added to the initial period at the school.

The schools accept a total of 300 or 400 students a year, and the total graduates from past as well as existing schools approximates 6,500.

School expenses are very low, and students actually earn a small salary when serving their final training period on board company vessels.

D. OSAKA SEAMEN'S TRAINING SCHOOL

The Osaka Seamen's Training School was established in 1917 by the Osaka prefectural government for the purpose of preparing experienced seamen for government examinations for promotion to higher rank. In 1923 it was raised to the status of a technical school by the Ministry of Education, and in 1930 a section for training B

class personnel was added to the original A class groups. Tuition and other charges are low. Dormitory facilities are available if desired.

There are three courses given, to which a total of 300 students are admitted:

- (1) A class deck officers:
 - (a) To become captain.
 - (b) To become first mate.
 - (c) To become second mate.
 - (d) Postgraduate course.
- (2) A class engineer officers:
 - (a) To become chief mate.
 - (b) To become first mate.
 - (c) To become second mate.
- (3) B class officers:
 - (a) To become first mate.
 - (b) To become second engineer on steam vessels.
 - (c) To become second engineer on motor vessels.

For courses (1) and (2) the term is 1 year of two 6-month semesters, except that no term is fixed for (1) (d); for (3) the course is 6 months.

As to entrance requirements, it may be said in general that an applicant must be qualified as an officer of the rank below the one for which training is desired.

Depending upon the results of school examinations and the deportment of the student, he receives a diploma of graduation or a certificate of attendance.

A detailed curriculum for each course need not be given here. Each is designed to give training in science, mathematics, and other subjects appropriate to meet the Government examinations. It may be pointed out that English is the only foreign language listed.

E. JAPAN SEAMEN'S AID ASSOCIATION

The association was formed in 1880 to aid and to train seamen. It is with the latter phase of the work that the present report is concerned, and a brief summary of it appears below:

(1) Training in seamanship.

Schools have been established in Yokohama and Kobe to train inexperienced young men in seamanship. Two-month courses of a practical nature are provided for would-be sailors and engine workers. Board, lodging, and training are given free of charge. Association figures show that up until 1931, 80,000 men had been given instruction.

(2) Training for officer's certificates.

The association seeks to encourage ordinary personnel to rise in rank, and for that purpose has opened schools to prepare them for

Government examinations. Schools are located in Kobe, Kure, Moji, and Sasebo. By 1931 over 10,000 association trained men had passed deck or engine officer's examinations. The length of course and subjects are regulated to meet the needs of the individual.

Neither type of school is organized under regular Government education ordinances.

SECTION IV.—PRACTICAL TRAINING

A. TRAINING SHIPS, DECK DEPARTMENT

After deck students have completed the regular school course and the 6-month period of naval training, they are placed on board training ships for a year. Both the colleges and the prefectural schools follow this procedure.

Tokyo Nautical College and Kobe Nautical College have their own training ships, the *Taisei Maru* and the *Shintoku Maru*, respectively.

Due to the unsatisfactory training-ship facilities formerly available, the Education Ministry has now provided two such vessels, the *Nihon Maru* and the *Kaiyo Maru* for the joint use of all the prefectural schools.

The ships were completed in 1929. To unify control of the students, a nautical training bureau has been created in the Education Ministry. Here the students are enrolled. Upon taking this step, students are not permitted to resign voluntarily except by special permission. The bureau is organized under the leadership of a chief of bureau, who is a high official of the Education Ministry and appointed by the Minister. He is in general charge of the ships and the training conducted on board them. Under him are six technical officials and six assistant technical officials to carry out the details of the program, and two clerks for general office work.

The following is true of all four training ships:

In addition to a regular personnel of officers and men, each vessel carries an instructor to assist the deck department of the vessel in its responsibility of conducting the training work and to supervise a certain amount of systematic study in continuation of that done at school.

Rules require that most of the navigation be by sail, but leave to the captain discretion as to the advisability or necessity of using the auxiliary motors at times. The vessels may carry cargo when necessary for the training work.

Each vessel makes two yearly training cruises, one in winter and one in summer. The former lasts about 3 months and is in the Southern Pacific, while the latter is about a month longer, across the Pacific to North America and through the Mandated Islands area. Students live on board between cruises. An effort is made to divide students between those taking their first and their second cruises.

The following is an outline of the training on board the *Taisei Maru*, of Tokyo Nautical College, and will serve as an example of the type of work done on board all training ships.

The students are organized in four groups with those on their second trip in charge, to give them practice in command. From them are selected group leaders and assistant leaders, deck officers, study officers, a sanitation officer, and a warehouse officer. Since there are not enough positions to go around, turns are taken to give everyone an opportunity. The second-trip men are given in addition exclusive access to the tasks which demand the acquiring of special skill. As a rule they are in charge of the watches. In addition to practical tasks, 2 or 3 hours a day are devoted to study.

The number of students on board naturally varies, since an effort is made to enroll students in accordance with the need for officers. About 60 per ship is the average for recent years.

Description of training ships

	Taisei Maru	Shintoku Maru	Nihon Maru, Kaiyo Maru
Built.....	1904.....	1928.....	1929.....
Type.....	4 masted barks.....	4 masted barkentine.....	4 masted barks.....
Gross tonnage.....	2,423 tons.....	2,518 tons.....	2,533 tons.....
Length.....	84.14 meters.....	85.30 meters.....	79.20 meters.....
Beam.....	13.33 meters.....	13.40 meters.....	12.90 meters.....
Draft.....	8.06 meters.....	8.00 meters.....	7.80 meters.....
Auxiliary motor.....	Reciprocating steam engine.....	Reciprocating steam engine.....	2 Diesel engines.....

B. SHIPYARDS, ENGINE DEPARTMENT

Arrangements have been made with naval and private shipyards for engine department students of both colleges and prefectural schools who are ready to begin practical training. Such students have completed their period of school and of naval training. Efforts are made to send a student to both a private and a naval shipyard, since each offers special advantages, but frequently, perhaps even usually, a change is not practicable. The ideal outline of the year's training is as follows:

1. Two months in the blacksmith shop, handling steel and iron.
2. One month working with copper—welding, brazing, etc.
3. Three months of machine-shop work.
4. Two to three months of boiler-shop work.
5. Three to four months doing repair and other work in ship engine rooms.

Generally speaking, students who go to private shipyards spend most of their time and get their best experience in (5), while at the navy yards (1) through (4) takes up most of their time and offers the best training. The difference is due to the facilities available at the two types of yards.

Students do actual work, not merely observation.

C. PRIVATE COMPANY VESSELS, BOTH DEPARTMENTS

For the final year of education both deck and engine department students are placed on board vessels of private steamship companies. Steamship lines receiving mail subsidies are obliged by law to accept such students, but all companies are glad to have them on board because they are usually willing workers and are paid very small salaries.

While on board company vessels students have what might be termed a sub-officer status. That is, they are over the men but under the regular officers, who supervise and assist them as much as possible. They are given practical and regular duties, and an effort is made to have them devote time to all phases of work done in their respective departments.

The type of vessel—steam or Diesel—is of no great importance in the case of deck students, but engine students are given as great a variety of ships as possible. They never serve more than 6 months on board Diesel engine vessels, but some spend their entire year on vessels with different types of steam engines since this is considered the more important.

SECTION V.—MISCELLANEOUS INFORMATION AND OPINIONS**A. SCHOOLS FAVORED BY STEAMSHIP LINES**

The most highly favored school is Tokyo Nautical College. This is only natural, in view of its long and successful existence. It seems safe to say that at the present time at least 80 percent of the captains and chief engineers of the leading steamship lines are graduates of this institution. Most of the balance are prefectural school graduates. The fact that Kobe Nautical College is as yet hardly represented is explained by its comparative youth and the circumstance that about 15 years at sea are necessary before a deck officer obtains an important captaincy. It takes about 1 or 2 more years to reach a corresponding chief engineer's post due to the fact that more engineers are carried on board. In the lower brackets there is a larger proportion of prefectural and Kobe graduates. This is explained partly by the improving standards of the prefectural schools and consequently increasing recognition, and by the time element mentioned above insofar as the Kobe college is concerned. Another reason is of course that more positions are available than at the top. The lesser companies likewise desire college men, but due to the competition from important lines must lean more heavily on the prefectural schools for personnel. For the same reason, the relatively small number of men who have risen from the ranks go to minor companies or to coastwise units of the large concerns.

There is a tendency now for companies of the Kobe area to lean toward Kobe Nautical College rather than Tokyo Nautical College

for young officers, though both colleges want to be represented in both sections, and shipping companies are primarily concerned with the ability of the individual.

B. COMPARATIVE ABILITY OF GRADUATES OF THE SEVERAL SCHOOLS

Generally speaking, graduates of the colleges are definitely superior to those from the prefectural schools. One explanation is age, the latter being younger and consequently less mature. Again, prefectural graduates are usually weaker in their knowledge of foreign languages, a matter of some importance, especially for deck officers. Thirdly, the prefectural students receive a definitely inferior education in the fundamentals of science, mathematics, etc. This is especially important in the case of engineer officers who must constantly study to keep up with new developments. Almost no prefectural engineer officers have reached the top of their profession. The same measuring stick indicates that deck officers are less handicapped.

C. A NEW TREND

Certain companies are beginning to encourage promising prefectural graduates and ordinary personnel to seek promotion in rank through Government examinations. To this end, assistance is being extended them to attend the special courses at Tokyo and Kobe as well as the Osaka Nautical School. The main reason is a shortage of officers.

D. ORDINARY SEAMEN

Little or no effort in the line of special preparatory work is made by the steamship lines in behalf of untrained men who wish to become sailors and engine-room workers. Consequently, the Japan Seamen's Aid Association is virtually the only agency for special training for such men.

While most lines call upon the Japan Seamen's Aid Association for a good deal of their ordinary personnel, they have no high opinion of the 2-months course offered by that institution. The course is helpful to a certain degree, but too short to be of much value.

E. WHY SAILING VESSELS FOR TRAINING SHIPS?

As might be expected, there are differences of opinion concerning the wisdom of using sailing vessels for training cruises. Some people, including many in naval circles, feel that the sailing ship is outmoded and hence should be abandoned or else the training period should be shortened with increased time devoted to regular ships. They feel that the supporters of the present system overestimate the value of such vessels in instilling through necessity a great respect for care in observing currents, winds, and other meteorological phenomena.

The majority of the men in the merchant marine believe that this aspect is sufficiently important to warrant the continuation of the present plan. As the older men disappear, this argument may lose ground. However, it does not seem probable that modern type vessels will be built for school purposes. Operation expenses would be too great. But it does seem possible that the future may see a reduction in the time spent on board the sailing type training ship.

F. DO GRADUATES CONTINUE WORK AT SEA?

No attempt has been made to secure statistics on this question, but the general opinion is that the percentage of those leaving the sea for reasons other than physical disability is very low. This is especially true of graduates of the colleges. It is perhaps lower in the case of the engineers than it is for the deck officers, due in large measure to their greater specialization. A deck officer, for example, is better qualified to do shore work of various kinds allied with shipping.

G. IMPROVEMENTS FOR PRESENT SYSTEM

Except for the matter of the sailing vessels, discussed above, the writer has heard no concrete suggestions for improving the present system, especially of the colleges. As for the prefectural schools, it is generally agreed that better teachers and more thorough courses would be helpful. Most graduates of any of the schools feel that they could well use more practical experience, but if a young man is to get a reasonably early start in his work it is hardly wise to lengthen the course. To shorten the study period also would be unwise because of the importance of fundamental knowledge in an age when new developments in the profession are constantly arising. More important than changes in the system is constantly attracting better young men to a career at sea.

SOURCES OF INFORMATION

1. Umi to Sora (The Sea and the Sky) published by Umi to Sora Sha.
2. Tokyo Koto Shoen Gakko Ichiran (Catalogue of Tokyo Nautical College) published by the college.
3. Soritsu Rokuju-nen (Sixtieth Anniversary) published by Tokyo Nautical College.
4. Kokai Renshujo Yoran (Catalogue of Nautical Training Bureau) published by Nautical Training Bureau of the Ministry of Education.
5. Osaka Furitsu Koto Gakko Kisoku (Regulations of Osaka Nautical School) published by the school.
6. Osaka Furitsu Koto Kaiin Gakko Gairan (Sketch of Osaka Nautical School) published by the school.
7. Nippon Kaiin Ekisaikai Yoran (Catalogue of Japan Seamen's Aid Association) published by the association.
8. The Nippon Kaiin Ekisaikai (The Japan Seamen's Aid Association) a pamphlet in English published by the association.

Appendix B

TRAINING FOR THE SEA IN GREAT BRITAIN

Report by O. P. M. BROWN, of the Maritime
Commission Staff

GOVERNMENT REGULATIONS CONCERNING EMPLOYMENT ON BRITISH MERCHANT VESSELS

A boy or young man with no previous training, who wishes to go to sea, may obtain employment as a deck boy on a British merchant vessel. After 12 months at sea he may obtain the rating of ordinary seaman. Three years at sea is required before the sailor can obtain the rating of able seaman.

There is no special provision for preliminary training for a fireman or trimmer, but it is illegal to employ any person in that capacity, on any ship under British registry who is under the age of 18 years.

A wireless operator must be a British subject and must possess a certificate of proficiency issued by the Postmaster General.

Cooks, who have received a course of instruction at an approved shore school and who have passed the school examination, may obtain a Board of Trade certificate of competency as ship's cook, after serving 1 month at sea.

Masters, deck officers, and senior engineer officers of vessels in the foreign trade and of passenger ships in the home trade must have Board of Trade certificates of competency.

To qualify for a Board of Trade examination for second mate, the candidate must be 20 years old and have served 4 years at sea, except this period is reduced to 3 years when the candidate has received preliminary training at certain approved schools and to 3 years 6 months as to other approved schools. The usual way of obtaining the actual sea service necessary to qualify for examination is by an apprenticeship with a shipping company. The period of apprenticeship is usually 4 years or either 3 or 3½ years if the boy has passed through an approved school.

To qualify as a senior engineer officer the candidate should have 4 years workshop experience in shops where marine engines are made or repaired, or at such other engine works as would be recognized as affording useful training for a marine engineer. This training must be supplemented by 18 months' sea service. Instruction at an approved technical school will be accepted in lieu of part of the required period of workshop experience.

Training ships and training schools for fore-castle hands

Location of ship or school	Name of ship or school	Age of admission (years)	Length of course (years)	Class of boys educated	Number of boys sent to sea in the British Mercantile Marine in 1920 ¹
Blyth.....	Wellesley Nautical School.	8-12.....	3½.....	Homeless, destitute, poor, and neglected boys unconvicted of crime, voluntary boys, and boys sent by poor law guardians.	11
Elmhurst, Norfolk..	Watts Naval Training School. ²	11-14.....	4.....	Orphan and destitute boys.	7
Gravesend, Kent..	Sea school, and training ship <i>Triton</i> .	16 and over..	10-12 weeks.	Selected young men of stout build and good character from their school.	454
Heswall.....	Nautical training school.	14.....	2½.....	Boys detained under order of court, under sec. 57 of the Children Acts, 1908.	68
Liverpool.....	Training ship <i>Indefatigable</i> .	13-14½.....	2-3.....	Orphans or sons of seafaring men belonging to Liverpool and other boys of good character.	81
London (Grays Essex).	Training ship <i>Essexmouth</i> .	11-16.....	2½.....	Poor boys; private cases also received on payment.	108
London (Grays Essex).	Training ship <i>Warspite</i> . ²	14-16.....	1.....	Poor boys of good character who wish to go to sea.	79
London (Greenhithe).	Training ship <i>Arcturion</i> . ²	12½-15.....	1½.....	Poor boys of good character who wish to go to sea.	31
London (Limehouse).	Prince of Wales Sea Training Hostel, London.	14½-16.....	½.....	Orphans of sailors, sons of sailors, others of good character.	69
Parkstone, Dorset.	Russell Cotes Nautical School. ²	11-14.....	4.....	Orphans and destitute boys.	21
Portishead.....	Incorporated National Nautical School.	10-14.....	3½.....	Physically fit boys of all classes, including those who might be homeless, destitute, or truants.	6
Wallasey.....	Lancashire and National Sea Training Homes. ²	14-15½.....	1½.....	Boys of good character, physically fit, with excellent eyesight.	67
Total.....					1,076

¹ Official figures not available for years subsequent to 1930.² Recognized by the Board of Education under their regulations for schools of nautical training.

THE SEA SCHOOL AT GRAVESEND

Since 1918, this school has trained over 13,000 boys, approximately half the number fed into the mercantile marine as deck hands and stewards by all the other training schools combined. It is supported by the Shipping Federation and by annual grants from funds of the Board of Education.

The board of management is composed of representatives of ship-owners, seamen and the Board of Trade. On the governing committee there are representatives of other bodies including the Board of Education.

This school trains boys only for the deck and stewards departments. The boys must be 15 years of age or over, and those boys who intend to go to sea as sailors must pass the Board of Trade sight test for form and color vision. No boy is accepted without the consent of his parents or guardians.

The course of training lasts normally from 10 to 12 weeks. When the course is completed boys are found employment on board ship, but must provide their own kit, costing £2 for deck boys and £5 for stewards. The full course of training, food and living accommodations are free but the boys receive no pay while training at the school.

The shore buildings of the school are on the Thames at Gravesend, and moored in the river at a short distance is the training ship *Triton*. On the forecourt of the school, a jetty has been built and equipped with a full size ship's lifeboat and radial davits. On the forecourt itself there is erected a mast with topmast and derrick of the type found in smaller vessels. Two Sampson posts, fitted with derricks and rigged with permanent topping lifts, blocks and cargo runners, complete the cargo working equipment for the full size ship's hatch coaming, which has been built round an excavation representing the hold of a modern cargo vessel. A steam winch completes the transformation of the forecourt into the replica of the deck of an ordinary cargo steamer. Practice in the launching and lowering of the lifeboat is undertaken daily. Training in the use of safety appliances available on board ship, such as lifeboats and fire fighting appliances, smoke helmets, etc., is given to deck and catering boys alike. Practice in the rigging of derricks, preparing a hatch for the working of cargo, unrigging, buttoning down and securing for sea, tuition in knotting, splicing, heaving the lead, signalling, reading the compass and steering is given to deck boys. Great attention is paid to the importance of efficient instruction in steering and the school is equipped with three approved steering devices, two of which make it possible to teach the fundamental principles of steering on the shore premises, and the third permits actual practice to be given afloat.

On the *Triton*, on which every boy is required to spend a certain period of training, the routine is a reproduction of ship's service conditions, and contact between the ship and the shore is maintained by the ship's boats.

The training of the stewards is comprehensive and covers the normal duties associated with catering and service of meals for the officers and crew of a vessel. Steward boys are required to serve a short period in the galley, and are then taught the serving of meals, making of beds, cleaning of cabins and the serving of crew messes. The domestic arrangements of the school are performed by the boys as part of their training under the supervision of the chief steward and chief cook.

The school as a whole is run as a ship, the instructors being ranked as officers and the boys being rated as are seamen.

Ample facilities are provided for recreation. There is a well-equipped gymnasium where indoor games are played in the evening. There is a good library and boys are allowed leave on certain evenings and some week-ends. During the summer, boys are taken for swimming, under supervision, to the Gravesend Council Baths. The hold in the forecourt is also flooded in summer and used as a pool.

The training agrees with boys as is shown by the fact that during the course, boys put on an average of 9 pounds in weight, 1 to 1½ inches in chest measurement, and half an inch in height.

SCHOOLS FOR ORPHANS AND POOR BOYS

There are nine land schools and training ships for orphan boys and poor boys, who are given a course of education and are also trained for the sea. The total that can be accommodated at one time at such schools is approximately 2,000 and as a rule these schools are full. In the year 1936 these schools sent to sea 690 boys, of whom 326 were placed in the Royal Navy and 690 found berths in merchant vessels in the deck, engine room, or stewards departments.

These nine schools are supported in various ways. Most of them are maintained through voluntary public subscriptions and donations, supplemented by Board of Education grants.

The Exmouth School at Grays, London, is supported out of London County taxes; the Prince of Wales Sea Training Hostel in the East End of London is supported almost entirely by the British Sailors Society; the Russell Cotes Nautical School in Dorset is supported from the General Fund of Dr. Barnardo's Homes (a charitable fund supported by private contributions).

The course of instruction in these schools ranges from 6 months at the Prince of Wales School, to 4 years at the Watts Naval Training School in Norfolk. Those schools having a short course devote most of the time to training the boys in obedience, discipline, and moral and physical cleanliness and in the elements of seamanship. In those schools having longer courses, the general education of the boys is continued (corresponding to the subjects taught in our high schools) and the sea training is more intensified, with stress upon sportsmanship, obedience, and cleanliness.

All of these training institutions encourage athletics, a competitive school spirit and publish a magazine devoted to the interests of the school and of the boys as individuals after they leave school. They make a point of keeping in touch with their graduates, obtaining employment for them and looking after their welfare when they are ashore.

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Many of the boys qualify as mates or masters in the Mercantile Marine after 3 or 4 years' service or subsequently become petty officers in the Royal Navy.

All of these schools are regularly inspected by Board of Education and Board of Trade officials and by officers of the Royal Navy. They are under the management of boards or committees on which representatives of various groups interested in sea training serve as members. The superintendents of the schools usually hold certificates as masters in the Mercantile Marine and are reserve officers in the Royal Navy. The Mercantile Department of the Board of Trade and the Board of Education maintains a close advisory connection with the sea-training institutions.

PRINCE OF WALES HOSTEL

A detailed description of the school may be of interest.

This school was established in 1919 and is supported largely by funds supplied by the British Sailors Society. There are a few scholarships maintained by charitably inclined people and a small amount is received in fees from the students, but the amount received in fees is negligible in comparison with the expenses of running the institution. The classes of boys received are orphans of sailors, sons of sailors, and other poor boys who are of good character and who are recommended to the governors of the school. The period of training is 6 months. The number of boys that can be accommodated is 54. This school especially stresses teaching the boys personal cleanliness, discipline, and moral training. The boys are expected to attend church and they are held to rigid standards of conduct. The boys are received at the age of 14½ years, and after 6 months' training at the hostel they are placed on board merchant ships as deck boys.

I visited this school on October 11, 1937, and was shown over the institution by Commander J. C. K. Dowding, an ex-merchantmarine master who is also a member of the Royal Naval Reserve. The house is arranged like a ship in that the various rooms are given the usual ship designations. The entrance way is designated as the quarter deck; the kitchen is designated as the galley; and the boys' dormitory, where they sleep on folding cots, is designated as the forecabin. The boys receive instruction in the names of the parts of the ship, navigation lights, knotting and splicing rope, the names of sails, their use, and once a week they are taken down to the Thames, where they are given exercises in pulling a boat.

Orphan sons of sailors are trained free of charge. Those boys who are sons of sailors who are living pay a minimum of 5 shillings a week, but those who are able to pay more are expected to do so. Boys who have no claim on the society are supposed to pay a minimum fee of 10 shillings per week. The full fee is 30 pounds for 6 months

which includes uniform on entry, board, lodging, training, and a complete sea kit on leaving the hostel to join a ship as a deck boy or bridge boy. Parents and others are expected to pay these fees if they are in a position to do so but the selection committee will sympathetically consider each application on its own merit. The boys do all the work around the house including scrubbing of the floors, preparing food in the kitchen, washing their own underwear, and keeping the house clean and shipshape. Their lockers are inspected at unusual intervals and boys who fail to keep themselves and their possessions clean are disciplined by various means, but no chastisement is allowed except with the permission of parents or guardian. The boys are not allowed to leave the hostel except they have liberty Saturday afternoon from 2 to 6 o'clock, and on Sundays they are permitted to attend church under the direction of one of the senior boys. Boys are constantly being received and discharged so that the process of training is carried on continuously. The older boys who are about to leave the institution act as instructors.

I was very favorably impressed with the worthwhile effort that was made at this school to give these boys a proper start before they go to sea.

REHABILITATION OF DELINQUENT BOYS

Besides the 10 training schools previously mentioned, there are 3 other institutions that prepare boys for the sea. These are the training ship *Cornwall*, the National Nautical School in Somerset, and the Nautical Training School in Cheshire.

The training ship *Cornwall*, moored in the Thames near Gravesend, is maintained by grants from the British Treasury and from local authorities under the Children's Act 1933, and by voluntary contributions. It receives young delinquents selected for sea training, the average period of commitment being 2 years. It has facilities for training 175 boys. In 1936 it placed 58 boys in the Mercantile Marine, of whom 8 were stewards. The superintendent is a retired paymaster captain of the Royal Navy.

The National Nautical School was formerly on a ship but is now a shore school. It is maintained in the same manner as the *Cornwall*. It receives physically fit boys between the ages of 11 and 14, who may be homeless, destitute, or truants. It can accommodate 205 boys. In 1936 it sent to sea 34 boys, including 3 boys in the Royal Navy. The superintendent is a retired commander of the Royal Navy.

The National Training School in Cheshire is also a land school. It is supported in the same way as the two schools last mentioned. It receives boys detained under order of court, between the ages of 15 and 17. The period at the school averages from 18 months to 3 years. In 1936, 58 boys were first sent to sea from this institution,

including 7 stewards and 51 in the deck department. The superintendent is a retired officer of the Royal Navy.

The general education of the boys is continued at all three of these schools and they receive a thorough preparation as seamen or as stewards or cooks.

It is especially noteworthy that most of the boys turned out from these three institutions go straight. That is, although they may have been wayward or may have started on a criminal course, the training they receive and the interest in their welfare maintained after they leave, results in their complete rehabilitation. This is shown by the fact that less than 10 percent of the boys turned out have subsequent criminal records. Many of them subsequently pass the Board of Trade examinations and become officers in the Mercantile Marine or obtain responsible posts ashore.

The following tabulation of boys or young men up to 21 years of age who first went to sea in the year 1936 has been compiled from official records:

Rating on engagement	Recorded as having had previous training in a training ship or sea school	Recorded as without previous vocational training	Total	Percent having previous training
Deck boy.....	547	726	1,276	43
Ordinary seaman.....	63	253	316	20
Cadet.....	39	170	209	14
Apprentice.....	100	574	674	15
All ratings.....	749	1,720	2,475	30

TRAINING OF OFFICERS

The Shipping Federation is an organization comprising representatives from all British ship-owning companies. In March 1927, the Federation appointed a committee entrusted with the duty of advising upon the training of officers for the Mercantile Marine. The following extracts have been quoted from a report submitted by the committee in 1934:

The committee start with the assumption that the training of officers is to be based on apprenticeship. This is the method which has been in practice for some hundreds of years, and though antiquity does not necessarily recommend a practice there is no alternative before the committee, and the practice is, in their opinion, one which should form a quite satisfactory foundation for the training. * * *

It is sometimes asserted that apprentices are "cheap labor." This is a plausible assertion which might be made with equal justification of apprentices in any trade or profession. In the great majority of ships the assertion clearly has no justification at all, and it cannot be justified in any case unless it can be shown that the apprentice receives no advantage as compensation for the difference between his wages and those of a fore-castle hand. Provided that the boy is

receiving a real training, the owner is entitled to the apprentice's services at a wage below a seaman's rate. * * *

In 1902 the Shipping Federation issued a recommendation to its members to carry apprentices in all suitable steamships. At that date the decline of the sailing ship was rapidly advancing, and a shortage of seamen was feared. The Federation scheme was primarily intended to replenish the fore-castle, and, as an inducement to owners to carry apprentices, half an owner's regular financial contribution to the Federation was returned if he carried "beginners" in his ships. The training of fore-castle hands by means of apprenticeship was a failure, and in a very short time was abandoned, and the Federation for the past 30 years has recruited boys for the quarter-deck only and they have all been carried with that object. The boys are not required to reach any specified educational standard before apprenticeship, but must be of the best character, physically and medically fit, and up to a reasonable standard of physical measurements. In the last 10 years the Federation has received 8,718 applications for apprenticeship, of which 4,765 have been rejected. Of the balance of 3,951, 3,466 have actually gone to sea as apprentices. A special form of indenture is used. Applications are spontaneous and do not result from advertisements. They come from all parts of the country. * * *

It is sometimes said that under present conditions of unemployment, too many apprentices are being trained, but this is fallacious. Although unemployment is rife, the natural wastage in the supply of available officers not only continues, but may even be abnormally large, and if the conditions of the trade which existed a few years ago are to return, provision must be continuously made to meet this wastage. * * *

Before setting out its recommendations for training, it is desirable to say something on the vexed question of "training in sail." The deep-sea sailing ship has disappeared from the British register and her memory has been surrounded by a glamour of romance, which has been the inspiration of a good deal of sentimental, but not very practical, talk on this subject. In the opinion of the committee, it is by no means certain that a boy who spends the years of his training, or some of them, in a sailing ship, does in fact acquire any of those qualities which are required to make a good ship's officer in a steamship, more readily or to a greater degree than he would acquire them as an apprentice in a steamship. It must be remembered that the question is not whether an officer, who has served as such in a sailing ship, will not be a better officer than one who has only served in a steamship. The boy who has served 2 years' apprenticeship in a sailing ship, which is the usual period suggested, would have had no responsibility, or opportunity for initiative, and beyond acquiring considerable agility aloft, would not really develop any characteristics which he could not, under proper training, acquire in a steamship. Obviously, the actual work required in a steamship can be best learnt in a vessel of that type. There is, moreover, the almost insuperable practical objection that we have no ships in which to train boys. Schemes that have been suggested for running sailing ships as training ships under artificial conditions, and at very considerable expense, only touch the fringe of the question. If training in a sailing ship is definitely the proper training for an officer, all aspirants should have the same training, which would mean a fleet of from 60 to 80 large sailing vessels, a proposition which is manifestly absurd.

The committee have, therefore, decided not to recommend any scheme for providing for sailing ship training.

This may be a convenient point at which to make a few remarks on boat sailing. This is an art which, under present conditions, is in danger of dying out. Indeed, it is largely due to the increasing enthusiasm of amateurs that it survives. It is, in the opinion of the committee, very unfortunate that so few opportunities are

given for making use of ship's boats under sail. Sailing is not only a first-rate sport and recreation, which is natural to seamen, but there is no reason why under favorable conditions it should not be put to practical use. Indeed, on occasion it may be the means of saving life. They recommend, therefore, that at least one boat in each ship should be specially equipped for sailing, that is to say, that the equipment should not be restricted to the ordinary lifeboat standard, and that apprentices should be given every encouragement and opportunity to use the boat under proper supervision. At all preapprenticeship schools it is already a recognized part of the course.

It being agreed that the training of officers is to be carried out (a) by apprenticeship, (b) served in steamships, it is proposed to examine the question of pre-apprenticeship training, or, in other words, the standard of general education, which a boy should reach before going to sea, and the necessity or desirability of some specialized education.

As to age, it is recommended that a boy should not be apprenticed below the age of 16. Except in cases where the Board of Trade allows remission of sea time, he would serve 4 years, thus completing his apprenticeship at about the age of 20, which is the minimum age for admission to examination for a second mate's certificate.

At the present state of depression, and under the existing conditions of training, it is not practicable to lay down any hard and fast requirements for the school education of a boy who means to go to sea. Parents do not always definitely decide upon their sons' careers at an early age. The decision is often left until the time is approaching at which he will have to make a practical start, and it is in a minority of cases that a course of vocational training is adopted in advance. The committee can, therefore, only make a general recommendation for application as far as circumstances permit. It is believed that when a regular, and reasonably uniform system of training has been adopted for the whole Mercantile Marine, which is the ideal that the committee have in mind, much can be done through the Board of Education and by other means to draw the attention of parents in good time to the advantages offered by a sea career, and to the preliminary education which is advisable, or perhaps necessary, for boys who have such a career in contemplation. When that happens, definite requirements can be laid down by means of the machinery which will be described later in the report.

The committee are quite agreed that it is wrong to accept apprentices from chance applicants regardless of their general knowledge and intellectual ability, judged by school performances. The best results cannot be expected from such a method of recruiting. The difficulty, however, is to know where to draw the line. If the standard of education is put too high, it will limit the supply, because there are fewer boys who reach the higher standards, and probably a small proportion of those who do will choose the mercantile marine as a career. The further elevation of the status of an officer in the mercantile marine is a very laudable object, but can only be attained by slow degrees, and obviously a good deal depends on the attractions which the career offers to ambitious young men. * * *

With regard to the importance of nautical training before going to sea, there appears to be a distinct difference of opinion amongst those who have experience of apprentices. Whilst some definitely prefer it, others are indifferent, and some think boys are better without it. The committee, therefore, advise that definitely specialised training should not be insisted on as a general rule, but there is no reason why a company which attaches importance to it should not require its apprentices to spend a specified time at a nautical school before going to sea. One of the principal objections to making it generally compulsory is that boys

living inland very seldom have an opportunity of getting teaching of this description, unless they can afford to go to a residential school.

All boys should be required to produce medical evidence of physical fitness for a sea life, and should come up to a reasonable standard of physical measurements. A Board of Trade eyesight certificate should be required, but it is in the interests of the applicant that this should be supported by a special examination by an ophthalmic surgeon, as defects sometimes exist which are not revealed by the Board of Trade test.

Reliable certificates of character are, of course, indispensable.

Every boy should either be able to swim, or be required to learn at the earliest opportunity.

Under present arrangements apprentices are carried in most foreign-going cargo vessels, the number usually being either two or four in each vessel or, in a few cases, six. In the opinion of the committee either two or four is the better arrangement. Two of the principal liner companies, however, employ two vessels each as training ships, carrying a considerable number of apprentices or cadets on indentures, who, with the addition of the petty officers and a very small number of A. B.'s, form the deck crew of the vessel. * * *

The time has now arrived to deal with the real crux of the problem which the committee have had under consideration, that is to say, the method by which an apprentice is to be taught his profession whilst serving at sea. It should be remembered that a sea apprentice is, by the nature of his occupation, taken out of reach of certain valuable educational facilities, which are put at the disposal of learners in other trades and professions. He is entitled to some special consideration on that ground alone. For example, the apprentice to an engineering concern who spends his day in the shops learning to use tools and attend to machines, can, and usually does, attend evening classes (and sometimes day classes) held under the best possible conditions, where he is taught the theoretical part of his trade. He may eventually become a marine engineer and has this advantage over a deck officer.

Although it is not impossible to make good this handicap, to do so will depend almost entirely upon the good will and ability of the ship's officers, and upon the degree of interest which they take, or can be persuaded to take, in the apprentices for whom they are responsible. In these days it is recognized that a teacher needs certain special attributes beyond the mere possession of the knowledge which it is his task to impart, and there are numerous special courses for the technical training of teachers as such. A ship's officer cannot be assumed to possess all or any of these attributes. He is not either trained or primarily employed as a teacher, and too much must not be expected of him. The committee recognizes this, but are nevertheless confident from their own experience that when officers understand that their owners expect them to undertake seriously the teaching of their apprentices, and that their progress will be officially tested from time to time, they will rise to the occasion, and that very good results may be expected. Moreover, under the scheme outlined below, officers should receive a good deal of assistance which they cannot now get.

In much that has been written about the training of officers, stress is quite properly laid upon various qualities or attributes which the ideal officer should possess, for example, "leadership" and "initiative." These are qualities which, to a great extent, depend upon the gifts with which a man is born, supplemented by experience and example. They cannot be taught by precept, but officers should remember that the example they themselves offer in the performance of their duties forms part of the training of their apprentices. If an intelligent boy is serving under good and efficient officers he will, by observation, discover why they are good and efficient, and will, if he is wise, try to follow their example.

The committees are of the opinion, therefore, that, whilst as much formal and oral instruction as possible should be given to the apprentices by the officers, this should be confined to a definite curriculum based on the Board of Trade examination. At the same time, the boys should be encouraged to advance their general education as much as circumstances permit, and assisted in that direction as much as possible. Every master must be made to understand quite clearly that it is part of his duty to superintend the education of his apprentices, and that he is responsible for seeing that the routine laid down for this purpose is carried out with a genuine intention to give every boy the opportunity of acquiring the knowledge and experience necessary to fit him to become an officer. Of course, it will sometimes happen that a boy is lazy, recalcitrant or stupid, but that will soon become apparent, and in such a case, it would be much better to terminate the apprenticeship as soon as possible. * * *

The essence of the scheme which the committee have decided to recommend is that it should be, as far as possible, uniform, that it should involve as little disturbance as possible with existing methods of training and that no great expense should be involved.

In order to secure the maximum degree of uniformity there should be a permanent Central Board of Control to carry out the system proposed, the Board to consist of 14 members, appointed as follows:

- Eight by the shipowners, of whom not less than four shall be marine superintendents.
- Three by the Association of Navigation Schools (which includes the *Conway, Worcester, and Pangbourne*).
- One by the Board of Trade.
- One by the Board of Education.
- One by the Association of Headmasters.

The board would probably require a small office and a secretary. The expenses might be met by an annual charge on shipowners of half-a-guinea per head for each apprentice carried, and it is thought that a grant might be secured from the Board of Education. The Shipping Federation already incurs considerable expense in running the Gravesend Sea School for the training of fore-castle hands, and it is hoped that it would be prepared, if necessary, to find a moderate annual sum to make up the expenses of the board.

The functions of the board would be:

1. To draw up and issue, and revise as required, a standard curriculum or syllabus, covering a course of 4 years' instruction which would be used in the ships of all owners, including cadet ships.
2. To set annual examination papers based on this syllabus.
3. To issue from time to time advice and assistance for the practical guidance of masters in carrying out the curriculum.
4. To appoint a number of local boards of examiners, say five, at London, Liverpool, Newcastle, Glasgow, and Cardiff, respectively; consisting of competent persons with proved experience in nautical subjects to read and mark the answers to the annual examination papers. The issue and collection of papers could be done through the Shipping Federation office.
5. To collate and publish periodical statistics relating to the scheme of education.

It is thought that under such a scheme the training of boys would be sufficiently uniform to enable comparable results to be obtained from different ships, and to enable the board to draw the attention of the owners to any particular ship in which the results were clearly below the average. At the same time, there would be ample elasticity allowed, and probably no two ships would carry

out precisely the same routine, either for teaching apprentices their duties as practical seamen, or for teaching them the book work necessary for their final examination. * * *

This is a very slight outline of the machinery contemplated by the committee, but it is hoped that it is sufficient to indicate succinctly the purpose and the main duties of the board. It has been thought better that all the necessary details of working, which will require considerable care and, perhaps, involve some experiments, should be left to the Central Board itself. If it is thought desirable, this committee might be kept in being until the board has been formed. The scheme is capable of considerable development after some experience. It is believed that if shipowners adopt the scheme and give it their practical support, they will secure the sympathy and assistance of both the Board of Trade and the Board of Education. It only remains to repeat very clearly that the success of the scheme will depend on the personal interest of the shipowners, and the willing cooperation of masters and officers.

The apprentice system recommended by the Shipping Federation's committee has now been in operation about 2 years. Like all compromise plans of this nature, requiring the cooperation of numerous private units, there have been some disappointments in execution of the plan, but the Shipping Federation's officials hold to the opinion that in time the plan may show worthwhile results.

PRINCIPAL TRAINING SCHOOLS FOR OFFICERS

There are four principal institutions for training boys who wish to go to sea as officers in the mercantile marine.

The training ship *Conway* is the oldest of the four. It is at the port of Liverpool and was established in 1859. It is intended for sons of professional and business men, naval, army, and mercantile marine officers. The tuition fees for each cadet are 120 pounds per annum. The average period of training is 2 years.

The training ship *Worcester*, at the port of London, was established in 1862. It is for "sons of gentlemen," and the tuition fees, including uniforms, are 140 pounds per annum. The term is 2 years.

The Nautical College at Pangborne was established in 1917 and the term is 3 years. The tuition fees are 160 pounds per annum.

The training ship *Mercury*, at Southampton was established in 1885. Unlike the three schools first mentioned, it is not supported entirely by tuition fees, which are 65 pounds per annum. In addition, this institution receives Admiralty and Board of Education grants, and scholarships provided from private sources and by local educational authorities. It is open to selected boys from primary and secondary schools. The course of instruction is 2 years.

Besides these four expensive and exclusive schools, there are a number of other institutions for training of cadets. Outstanding among the technical schools which specialize in training for the mercantile marine are the Sir John Cass School and the Poplar High School, both located in London.

The Sir John Cass School takes boys who have reached the age of 15, and who have finished the elementary grades in school and have progressed in secondary education equivalent to our high school courses. They are given a 12 months' course in navigation and other studies to give them a foundation for taking the Board of Trade examination. At this school students pay tuition fees.

THE LONDON COUNTY POPLAR HIGH SCHOOL

The Poplar School takes boys around the age of 13, who have finished the elementary school and gives them a 3-year course of instruction, which is equivalent to graduation from the Sir John Cass School. I visited this school on October 11, 1937, and was greatly impressed with its functions and operation. The workings of the institution were explained to me by Capt. W. Hamilton, the Head of the Navigation, Nautical, Astronomy, and Seamanship Departments. Captain Hamilton is an ex-merchant marine master and has a certificate as extra master.

This is a general school supported in part by fees paid by the pupils, in part by the appropriation of taxes from the London County Council, and in part by a grant from the British Board of Education.

The Poplar School receives boys who have completed an elementary course of studies and provides them with a special 3-year pre-apprenticeship training to fit them to go to sea as apprentices with the object of becoming navigating officers in the Mercantile Marine. At the present time about 48 boys are enrolled in this course of training.

The school also receives boys who desire to enter the engineering profession, either on the mechanical or electrical side and there are about 150 boys now pursuing those courses.

Pupils who are able to pay fees are charged 30 shillings per term or 4 pounds and 10 shillings per annum, and these charges include books. Those boys who are unable to pay the full fee are allowed to pay whatever their means allow. There are a number of boys who are received without payment of any tuition and a rough estimate given by the school officials showed that 34 percent of the boys paid full fees or partial fees while 66 percent were entirely free or were on scholarships.

The cost per pupil for running the school is 16 pounds per term or 48 pounds per annum. There are three terms with a 9 weeks' vacation in summer, 4 weeks at Christmas and 4 weeks at Easter.

The course of training includes a general scholastic education in addition to education along mechanical lines. The first year about one-third of the time is devoted to technical subjects and two-thirds to general education. The second year the proportion is about half and half. In the third year more time is devoted to the technical side than to general educational subjects.

In addition to the 3-year course for boys, the school features special courses for men who come to prepare themselves to take Board of Trade examinations for certificates as second mate, first mate, master and extra master. About 260 men come yearly for these courses. Two months are usually required for the refresher course for mate or master and 9 months for the course to fit the candidate to take the examination for extra master. About 30 men come up for the extra master examinations every year and only about eight pass this examination, which is highly technical and very difficult. At the time I visited the school there were 24 first mates taking instructions for their examination as master. The fee for these refresher courses ranges from 2 or 3 pounds for mates studying for the home trade, to 3 pounds 10 shillings for second mates studying for first mate in foreign trade; 5 pounds for first mate studying to be master; and 6 pounds for masters studying for extra master examinations. These fees include correspondence courses in addition to attendance at the school and cover all charges until the student has passed his examination. There is a special correspondence course for apprentices serving time on ships for which a charge of 2 pounds 2 shillings is made.

The classes have been established for the purpose of giving seagoing apprentices and navigating officers opportunities of acquiring a sound knowledge of the scientific principles which underlie their work. The necessity for passing the Board of Trade examinations is given full consideration, but a much wider and more general education than the minimum requirements for these examinations can be obtained by those who are able and willing to give the time.

The school is equipped with the best modern nautical instruments and seamanship materials, and a large portion of the roof of the building is arranged so as to form an observing terrace for meteorological and astronomical observations.

Besides the course above outlined the school is also operated as a night school for the accommodation of men in shops or others who are desirous of taking mechanical or electrical engineering courses. Quite a large number of men avail themselves of this opportunity and the fees are very nominal.

The basement of the building is very well equipped with power lathes, drills, presses, and other machines usually found in well-equipped machine shops. There is also a shop devoted to motors, generators, and other electrical equipment and these shops are used to full capacity by the various classes. A conservative estimate of this equipment would be about \$50,000.

The staff of the school consists of about 30 instructors serving full time and my impression was that these instructors were very earnest and hard-working in their teaching duties. The general impression of the whole establishment is that the plant is being used to the fullest

capacity both day and night in the education of youth and young men. In many respects it resembles our modern manual-training schools except it goes far beyond the rather casual instruction we give to the ordinary high school pupil.

A certificate from the Poplar School, when the boy has completed its 3-year course satisfactorily, is accepted by the Board of Trade in lieu of 1 year's service at sea, so that the graduate of this school may take his second mate examination after only 3 years at sea as compared with the usual requirement of 4 years. In this respect the Poplar School ranks with the Worcester and Pangbourne training schools, which are elsewhere mentioned.

The Royal Technical College at Glasgow, the Gordon College at Aberdeen, and the Leith Nautical College have courses similar to those pursued at Sir John Cass School. Recently the Southampton University has established a nautical-training course intended for boys who have finished a high school course and the instruction will be the same as that pursued at Sir John Cass School. The Cardiff Technical College and Hull Boulevard Nautical School are operated on the same plan as the Poplar High School.

In addition to the courses pursued at the institutions above mentioned, the following technical colleges have correspondence courses or have attendance courses lasting from 3 to 6 months to prepare for examinations for Board of Trade certificates: Royal Technical College, Glasgow; Liverpool Nautical School; Southampton University; Gordon College, Aberdeen; Dundee Technical School; Leith Nautical College; Marine School at South Shields; Marine Venturers' School at Bristol; Plymouth Nautical School, and Cardiff Technical College.

DEFENSE COURSES FOR OFFICERS

In August 1937, as a part of British preparations for war, a plan was put into effect for courses of lessons in the defense of merchant ships, offered to navigating officers and chief engineers of the British Mercantile Marine. This plan was sponsored by the Admiralty with the cooperation of the Board of Trade.

The lessons deal with the particular forms of cooperation between warships and merchant ships for the successful operation of a convoy system, and instructions are also given in the use of defensive equipment to be installed in merchant vessels when the need arises.

The courses of lessons are being given at the ports of Liverpool, Glasgow, South Shields, London, Hull, Cardiff, and Southampton. The lessons include instruction in the following subjects:

General principles of trade protection.	Signaling.
Convoys systems.	Low-angle gun control.
Defense against mines, submarines, and gas.	Low-angle gun drill.
	Air defense and air gunnery.

These merchant navy defense courses are open to all masters and navigating officers of British nationality. Chief engineers are supposed to take only the courses in convoy and defense against gas, and all British ship operators are being urged to encourage their officers to take these courses.

The various subjects in the course may be taken whenever convenient and in any order, except:

- (a) An officer should not attend instruction on convoy, signaling, or defense against submarines until he has attended the session on general principles;
- (b) H.-A. Gunnery, part I, should be taken before part II;
- (c) It is desirable that convoy should be taken before signaling.

Officers who attend the courses are paid their traveling expenses, up to a distance 25 miles from the place of instruction and an allowance for meals, by the Admiralty. In editorial comment upon this course of training, the *Journal of Commerce and Shipping Telegraph* said (August 25, 1937):

There is no need to stress the value of such instructions in view of the situation in the Mediterranean where two British ships have already been bombed from the air and 14 vessels of all nationalities have been subjected to attack during the present month.

TRAINING FOR ROYAL NAVY

The liner *Majestic* has been renamed the *Caledonia* and is now moored in the Firth of Forth at Rosyth, about 10 miles from Edinburgh, where it is being used as a receiving and training ship for the Royal Navy.

The ship's propellers have been unshipped, and the boys received on the vessel, mostly recruited from Scotland, are keeping the machinery and engines in first-class condition. Every other day one of the engines is turned over by a battery of boilers (used in rotation) so that the entire propelling mechanism is kept ready for immediate service.

Practically no change has been made in the superstructure, except for knocking out a few bulkheads to provide class rooms. Some temporary buildings have been erected on shore for service purposes and a large field has been laid out for games and drills. Access between ship and shore is maintained by temporary stagings.

The training course lasts about 10 weeks, in which time the boys are taught the rudiments of seamanship. Stress, of course, is laid upon discipline and obedience. The enlistment age is around 16 years and the enlistment is for 4 years.

Similar training ships have been established recently at other places in Great Britain, but details as to their number and location were not available when I was in London (August, September, October, 1937).

Appendix C

**CADET TRAINING SYSTEM ON GOVERNMENT-
OWNED AND SUBSIDIZED VESSELS**

CADET TRAINING COURSES

CADET TRAINING COURSES

NOTES FOR MARINE SUPERINTENDENTS, MASTERS, CHIEF ENGINEERS, AND SHIP'S OFFICERS

(To be distributed in circular letter form. At the end of a year revisions to be made and handbook published)

IT IS THE OBJECTIVE OF CADET TRAINING COURSES TO PROCURE EFFICIENT MERCHANT OFFICERS. TO ATTAIN THIS OBJECTIVE THERE MUST BE COOPERATION FROM SHORE STAFFS, MASTERS, CHIEF ENGINEERS, AND SHIP'S OFFICERS

Young men assigned as cadets will have obtained their appointment by competitive examinations. It will be assumed that their preliminary education included mathematics, mechanical drawing, and physics.

In the outline of courses attached hereto, it may be noted that the United States Maritime Commission has endeavored to adopt part of our state schoolships' curriculum and some courses given by foreign maritime nations.

The Commission will appreciate any suggestions you may have to improve the courses of training. Necessary revisions will be made in light of such suggestions and at the end of a year a handbook will be published.

You will note that the attached outline of courses covers 2 years. It is planned that during the third year cadets will review previous work, take courses at a gyro school; visit fathometer, radio direction finder, paint, and rope factories, shipyards, machine shops, etc. There also may be correspondence courses, study at a shore base, scholarships to State nautical schools, prizes, etc. These suggestions and others for the improvement of officer training will be given consideration by the United States Maritime Commission.

The following should be noted by all ships' officers:

1. The cadet is a unit of the ship's complement and must carry out ship's work assigned to him. Regulations relative to wages, quarters, and allowances may be found in General Order No. 28.
2. They should acquire not only the knowledge to fit them for officers' duties, but be taught to appreciate those qualities needed for leadership. They must understand the meaning of responsibility.
3. Ship's officers should remember that the example they set in the performances of their duties is part of the training for cadets.
4. Cadets should be given written quizzes on practical work by ship's officers. Each cadet will write the questions and answers in his notebook.
5. Annual progress examinations will be given by representatives of the United States Maritime Commission. During the year these representatives will visit

ships to inspect notebooks and discuss progress with masters, chief engineers, and ship's officers.

6. Masters will submit progress reports at the end of each quarter to marine superintendent, who in turn will transmit to Supervisor of Cadet Training, United States Maritime Commission, Washington, D. C.

7. Average marks based on masters' quarterly reports, quizzes given by ships' officers, correspondence course grades, annual progress examinations conducted by representatives of the Commission, and content of cadets' notebooks will be issued periodically and distributed to all cadets via marine superintendent and master. A competitive list of grades may be published at the end of each year.

8. Masters should report promptly to the Supervisor of Cadet Training, via marine superintendents, the name of any cadet who, after reasonable tests, has been found unfitted for officer's profession. The Supervisor of Cadet Training will promptly investigate each case and make recommendations to the commissioner in charge of training. Masters should always bear in mind that such a cadet is denying an opportunity to some capable and ambitious boy. Also of importance is the waste of money and time to teach and carry young men who have been found unfit.

9. It is very desirable that periods of study be allotted to cadets for their book work.

10. Deck cadets should be given every opportunity to participate in the rigging and dismantling of cargo gear, the preparation of the holds and observation of how the loading and discharge of cargo is handled. They should know the principles of proper stowage. They must always realize that the purpose of a ship is to carry cargoes safely and discharge them in good condition. Engine cadets should be given every opportunity to engage actively in engine room repair and upkeep work. During periodical overhaul they should observe work done by shipyard employees. They must realize that repair work done aboard ship minimizes shipyard expense.

11. During the earlier stages of training, cadets must not be discouraged because they are given considerable practical work of a routine nature. They should be made to understand they have much to learn and must acquire knowledge and experience before given responsibility and opportunity for initiative.

12. Cadets should purchase necessary standard text books. Their interest in training may be gauged by the intelligent questions asked ship officers, the content of their notebooks, and the library of references they acquire. Most important, of course, is the practical application of what they study.

13. In addition to technical instruction cadets should be encouraged to supplement general education by reading and observation. Ship's officers may advise them on questions which are not covered in outline of courses.

14. Cadets should not be forced to cram. They must have natural initiative and interest in training.

15. Every opportunity should be taken to give cadets practice in boat pulling and sailing.

16. Cadets must realize that discipline includes courteous respect to officers and tolerance of what they may dislike in the manners of those with whom they may have to associate.

17. Cadets must cultivate cleanliness of person and quarters. They must be punctual. Habitual unpunctuality disqualifies a man from most positions of responsibility.

18. Uniforms and insignia will be prescribed by the United States Maritime Commission. The cost will be borne by cadets. They must be worn aboard ship.

19. The conduct of cadets aboard ship and ashore must be that of gentlemen.

NOTES FOR CADETS

(To be distributed in circular letter form. At the end of a year revisions to be made, and handbook published)

IT IS THE OBJECTIVE OF CADET TRAINING COURSES TO PROCURE EFFICIENT MERCHANT OFFICERS. TO ATTAIN THIS OBJECTIVE, CADETS MUST APPLY THEMSELVES DILIGENTLY

You have been assigned as cadet to a vessel which is subsidized by your Government. It is subsidized because the costs to build and operate under the American flag are higher than those of foreign competitors. During your career at sea you will observe that foreign officers are quite efficient and well educated. It is the aim of the United States Maritime Commission that our officers be at least as efficient and well educated as those serving in foreign flag vessels. If our objective is attained, the subsidy now necessary for maintenance and repair expenditures will be decreased, and, quite important, the revenue from cargo and passengers increased.

Cadets of the future will have been appointed after competitive examinations. Those examinations will include mathematics, and physics. In the outline of courses attached hereto the United States Maritime Commission has adopted part of our State schoolships' curriculum. These courses may appear "stiff" to some young men embarking on a sea-going career. In reality these are less than required at State schoolships where considerable time is given to mathematics, physics, mechanical drawing, infantry drill, and, in two ships, the handling of sail.

Necessary revisions may be made after these courses are given a trial and at the end of a year a handbook will be published.

The attached outline of courses covers 2 years. It is planned that during the third year cadets will review previous work, take courses at a gyro school; visit fathometer, radio direction finder, paint and rope factories, shipyards, machine shops, etc. There also may be correspondence courses, study at a shore base, scholarships to State schools, prizes, etc. These suggestions and others for the improvement of officer training will be given consideration by the United States Maritime Commission.

The following are to be noted by all cadets:

1. The cadet is a unit of the ship's complement and must carry out ship's work assigned to him. He must learn the practical part of an officer's duties by working as a member of the crew under ship's officers. Regulations relative to wages, quarters, and allowances may be found in General Order No. 28.

2. Cadets should acquire not only the knowledge to fit them for officers' duties, but be taught to appreciate those qualities needed for leadership. They must understand the meaning of responsibility.

3. Discipline is one of the fundamental requirements for the management of a vessel. Every person must take his proper part in maintaining discipline.

This means prompt and willing submission to orders of those in authority over you. It also means that you must always be ready to work loyally with your shipmates in the successful prosecution of the voyage. It includes courteous respect to officers and tolerance of those whose manners you may dislike.

4. Cadets may be given written quizzes on practical work by ship's officers when practicable. Each cadet will write the questions and answers in his notebook.

5. Annual progress examinations will be given by representatives of the United States Maritime Commission. During the year these representatives will visit ships to inspect notebooks and discuss progress with masters, chief engineers, and ship's officers.

6. Masters will submit progress reports at the end of each quarter to marine superintendent, who in turn will transmit to Supervisor of Cadet Training, United States Maritime Commission, Washington, D. C.

7. Average marks based on masters' quarterly reports, quizzes given by ships' officers, correspondence course grades, annual progress examinations conducted by representatives of the Commission, and content of cadets' notebooks will be issued periodically and distributed to all cadets via marine superintendent and master. A competitive list of grades may be released to the press at the end of each year.

8. Newly appointed cadets who believe the merchant marine offers a "soft" career after a "snap" course aboard a "cruise vessel" will soon discover that the reverse is true. They will encounter not a few ships' officers who are not able to give them the instruction available at shore institutions. These officers will be too busy or too tired to help. They are not expected to hold classes each day. In many cases, the cadets will be compelled to "dig in" for themselves or after examinations be released from the service.

9. Masters have been instructed to report promptly to the Supervisor of Cadet Training, via marine superintendents, the name of any cadet who has been found unfitted for the merchant officer's profession. The Supervisor of Cadet Training will promptly investigate each case and make recommendations to the commissioner in charge of training. Masters will always bear in mind that a cadet who does not apply himself is denying an opportunity to some capable and ambitious boy.

10. Masters will endeavor to arrange regular periods of study for the book work of cadets.

11. Deck cadets will be given opportunity to participate in the rigging and dismantling of cargo gear, the preparation of the holds and observation of how the loading and discharge of cargo is handled. They should know the principles of proper stowage. They must always realize that the purpose of a ship is to carry cargoes safely and discharge them in good condition. Engine cadets will be given opportunity to engage actively in engine-room repair and upkeep work. During periodical overhaul they should observe work done by shipyard employees. They must always realize that repairs made by ship's complement will minimize shipyard expenses.

12. During the earlier stages of training, cadets must not be discouraged because they are given considerable practical work of a routine nature. They should be made to understand they have much to learn and must acquire knowledge and experience before given responsibility and opportunity for initiative.

13. Cadets should purchase necessary standard textbooks. Their interest in training may be gauged by the intelligent questions they ask ship's officers, the content of their notebooks, and the references they acquire. Most important, of course, is the practical application of what they study.

14. Cadets will not be forced to cram. They must show natural initiative and interest in training.

15. Every opportunity should be taken to give cadets practice in boat pulling and sailing.

16. Cadets, soon after joining a ship, will learn that there is much which members of the crew can teach them about practical work. Cadets should maintain a spirit of good fellowship with crew. If discreet and tactful, they will encounter no difficulty in finding their proper level with the men. They must learn the art of leadership. It cannot be imposed. It must be inspired by confidence. One of the essentials of leadership is that a leader should himself thoroughly understand the jobs that he has to supervise and would do himself, if necessary. An offensive and overbearing manner towards one's subordinates forms no part of leadership.

17. Cadets must cultivate cleanliness of person and quarters. They must be punctual. Habitual unpunctuality disqualifies a man from most positions of responsibility.

18. Uniforms and insignia will be prescribed by the United States Maritime Commission. The cost will be borne by cadets. They must be worn aboard ship.

19. The conduct of cadets aboard ship and ashore must be that of gentlemen.

OUTLINE OF COURSES FOR DECK CADETS¹

FIRST YEAR

I. GENERAL ASSIGNMENTS

During first 6 months: To work with ordinary seamen.

During second 6 months: To be with able seamen during day work.

2. SEAMANSHIP

Types of vessels.	Clouds, winds, hurricanes, etc.
Knots, splices, bends, hitches, etc.	Pilot charts, storm warnings.
Blocks, tackles, ropes, slings, nets, etc.	Radio forecasts.
Rigging.	Texts: Riesenbergs Standard Seaman- ship for Merchant Service, and others.
Deck machinery.	All rules of the road.
Boats: Types and construction.	Texts: Department of Commerce Circular No. 230.
Compass, lead, log, fathometer, gyro compass, automatic steering device.	
Ground tackle.	

PRACTICAL

Knotting and splicing.	Splicing wire.
Overhauling rigging and blocks.	Overhauling boats, lowering boats, etc.
Maintenance and upkeep of vessel— soaling, cleaning, and painting.	Mending and making signal flags.
Sewing canvas.	Assisting with carpenter work.

3. SIGNALING

Semaphore. ²	International code flags. Text: H. O. No. 87.
Blinkers. ³	

¹ It, of course, is impossible to list in order that which cadets will learn of practical work. Such will vary with ship and circumstances. The following, therefore, is intended to show what book work may be stressed and on what items questions may be asked during annual examinations.

² To send and receive at minimum of eight words per minute, by end of the year.

PRACTICAL

Semaphore: With another cadet aboard ship and/or in port and sea with apprentices or cadets of other vessels.

Blinkers: As with semaphore. In addition radio operator may assist.

4. NAVIGATION

<p>Definitions. Instruments and accessories. Log book and records. Compass error and correction of courses. Use of logarithms. The sailings. Piloting. Buoyage systems. Tides and currents. Charts and publications.</p>	<p>Dead reckoning. Radio direction finder. Definitions of nautical astronomy. The solar system. Time and Nautical Almanac. Texts: Bowditch, The American Practical Navigator. Dutton, Navigation. American Nautical Almanac, and others.</p>
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PRACTICAL

Not much should be given until second year when cadets will work with quarter-masters and deck officers.

5. CARGO

<p>Rigging and dismantling cargo gear. Preserving cargo gear. Hatches, covers, battens. Preparation of holds. Dunnage, shifting boards, ceilings, etc. Stowage of cargo. Ventilation.</p>	<p>Refrigerated cargoes. Cargo plans. Capacity plans. Texts: Taylor, Stowage of Ship's Cargoes. Hillcoat, Stowage of Ships.</p>
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PRACTICAL

As much actual work as can be given on deck and in holds.

6. GENERAL PRACTICAL WORK

Watch standing: Lookout, helmsman, and gangway (with regularly assigned crew).
Draft marks (noting with ship officer).
Drills: Man overboard, abandon ship, fire, lifeboat, and collision (active participation—but not in charge).
Handling boats under oars and sail (not in charge).
Heaving hand lead. Use of deep sea lead, sounding machine, fathometer, etc.
Heaving lines, mooring ship; use of pneumatic tools, spray gun, etc.

7. ENGINEERING AND ELECTRICITY

(a) Elementary engineering

<p>Cycle of steam. Units of measure. Expansion. Evaporation. Condensation. Heat calculations. Boyles law. Indicator diagrams.</p>	<p>Losses. Engines (reciprocating, turbine, and Diesel principles). Valves and gears. Condensers and auxiliaries. Fire tube boilers. Watertube boilers. Boiler handling. Test: Ripper's, The Heat Engine, and others.</p>
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(b) *Elementary electricity*

Flow of electricity.
 Definitions.
 Measure of current and voltage.
 Resistance.
 Simple calculations.
 Simple circuits.
 Action of current.
 Application of Ohm's law.
 Lighting systems.

Voltage required for line drop.
 Power: Units, equations, measurement.
 Wire and wiring: Effect on resistance.
 Wire tables: Safe capacity, line drop.
 Batteries: Types, construction, care.
 Magnets: Types, application, amperes turns, etc.
 Motors: Principles, construction, care, starting and control.
 Test: Timbics, The Essentials of Electricity, and others.

PRACTICAL

Arrangements to be made for visits to engine room and talks by chief engineer or assistants.

8. PHYSICS AND MATHEMATICS³

(a) *Elementary Physics*

Mass and volume, force, elasticity, work, friction, parallelogram of forces, lever and screw, machines, motion, falling bodies, energy, heat, measurement of heat, buoyancy, gases, fluid pressure.

Text: Black and Davis, Physics; and others.

(b) *Mathematics*

Mensuration.
 Use of slide rule.
 Logarithms.
 Spherical trigonometry.
 Practical application to following:
 Simple problems used in naval architecture. Simple horsepower and bunker calculations.

Texts: Barr's Practical Mathematics. Walton's Know Your Own Ship, and others.

9. FIRST AID AND SHIP HYGIENE

(a) *First aid*

Fractures and dislocations.
 Wounds and burns.
 Tropical diseases.
 Intestinal complaints.
 Dosage, narcotics.
 Antiseptics.

Text: Ships Medicine Chest and First Aid, and others.

(b) *Ship hygiene*

Sanitation and measures for preventing diseases aboard ship.
 Marine quarantine, fumigation, disinfection.

Text: Seamen Church Institute's Ship Sanitation and Hygiene.

PRACTICAL

Observation of work done by master, doctor, and public health officers.

SECOND YEAR

I. GENERAL ASSIGNMENTS

During first 3 months: To work with boatswain and carpenter.
 During second 3 months: To stand watch with quartermasters.⁴
 During third 3 months: To stand watch with radiomen.⁴
 During fourth 3 months: To stand watch with deck officers.⁴

³ Required of those cadets whose service started previous to establishment of competitive examinations. To be completed within 6 months. (May be waived by Supervisor of Cadet Training, if proof given cadet passed these subjects in an accredited school.)

⁴ One watch every other day may be sufficient.

2. SEAMANSHIP

Lifeboats—construction, handling, and equipment.	Rules of the road.
Maneuvering—steam and sail.	Text: Department of Commerce Circular No. 230.
Use of oil at sea.	Weather: Construction of weather charts.
Standing watch on bridge.	Storms.
Use of Lyle gun and breeches buoy.	Texts: Radio Reports, Weather Charts, H. O. No. 205.
Handling small boats in a surf.	Definitions.
Various tackles.	Text: Bradford's Sea Terms; and others.
Ground tackles.	Safety at sea.
Fire-fighting equipment.	Text: Bureau of Marine Inspection's Rules and Regulations.
Drydocking.	
Ship maintenance.	
Texts: Riesenbergs's Standard Seamanship for Merchant Service; and others.	

PRACTICAL

Application of as much of above as circumstances permit.	Checking stores and equipment; costs of stores.
Drills (not in charge).	Practical use of fathometer, gyro, etc.
Lifeboat handling (not in charge).	Upkeep of vessel.
Mixing of paint.	Shipyard repairs (hull, deck, and steward).
Preservation of metals.	
Carpenter's materials and tools.	

3. CARGO

Duties of an officer toward cargo.	Texts: Riesenbergs's Standard Seamanship for Merchant Service.
Cargo gear and deck machinery.	Brown's Stowage of Cargo.
Stowage of cargo.	Morrill's Oil Tankers; and others.
Tanker cargoes.	
Refrigerated cargoes.	

PRACTICAL

Continuation of preceding year.

4. COMMUNICATIONS

Semaphore.	Radio (to receive and transmit 10 words per minute by end of year).
Blinkers.	
International code flag.	

PRACTICAL

Continuation of previous year.
 To increase speed and accuracy in semaphore and blinkers.
 To stand watch with radio operators.
 Compensation of direction finder.

5. SHIP CONSTRUCTION

Types of construction.	Canal rules.
Holds, peaks, and tanks.	Double bottoms.
Surveys by classification societies.	Watertight compartments. How watertightness secured.
Nomenclature of structural members.	Caulking and welding.
Kinds of tonnage.	

<p>Procedure of construction. Steering gear. Propeller and rudder assembly. Removing dents from plating. Stability and trim. Repairs after stranding and collision. Building ways; launching. Half models; mold lofts; bending slabs.</p>	<p>Laying out tables; punching. Fitting out after launching. Blueprints which owners should have. Blueprints which should be aboard ship. Texts: Manning's Manual of Naval Architecture. Walton's Know Your Own Ship. Atwood's Naval Architecture; and others.</p>
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PRACTICAL

Observation during drydock and shipyard periods.
Items for shipyard repairs; items for ship crew repairs.
Writing of specifications.
Unit repair costs.
Repairs for owners' and underwriters' accounts.

6. MARITIME LAW—MARINE INSURANCE—SHIP'S BUSINESS

General maritime law.
Title and transfer.
Owners and managers.
The master.
Seamen.
Contracts of affreightment; bills of lading.
Charter parties; manifests.
Liabilities and limitations.
Maritime liens.
Loadline regulations.
Collisions.
Salvage and general average.
Crimes at sea.
Wrecks and derelicts.
Wharfage and moorage.
Admiralty remedies.
Texts: Canfield and Dalzell, *Laws of the Sea*. United States Department of
Commerce, *Navigation Laws*; and others.

7. NAVIGATION

Time of sunrise and sunset.
Time of moonrise and moonset.
Problems and diagrams involving chronometer error.
Latitude by meridian altitude.
Reduction to meridian.
Polaris.
Longitude by time sights: Greenwich hour-angle method.
Summer lines.
Time azimuth by tables and computations.
Altitude azimuth and azimuth by diagrams.
Amplitudes by log and inspection.
Construction of magnetic curve of azimuth and use of Napier diagram.
Star sights.
Lines of position by cosine haversine method (Marc St. Hilaire and others).
Dreisenstok and Ageton.
Problems in day's work at sea with use of plotting sheets.

General problems involving sights, bearings, and speed and current from second-class naval academy practical work.

Current diagrams.

Review of problems required by Bureau of Marine Inspection.

Review of chart work and construction of mercator chart.

Review of sextant work and with artificial horizon.

Texts: Bowditch. Dutton. Nautical Almanac. H. O. No. 71; No. 120; No. 127; No. 203; No. 204; No. 208; No. 211; and others.

FRACTICAL

Application of foregoiug while on watch with deck officers.

Use of instruments and charts and tables. Notebook to contain problems worked out by cadet.

TEXTS OF UTILITY TO DECK CADETS ¹

"Standard Seamanship for Merchant Service", Riesenbergr.

"American Merchant Seaman's Manual", Cornell and Hoffman.

Nicholls's Seamanship.

The Blue Jackets' Manual, United States Navy.

The Watch Officers' Manual, United States Navy.

Practical Mathematics, Barr.

American Nautical Almanac.

Azimuth Tables, Hydrographic Office, Nos. 71, 120, 127, 203, 204, 208, 211.

The American Practical Navigator, Hydrographic Office.

Navigation, Dutton.

Navigation, Hosmer.

The Danger Angle and Off-Shore Distance Tables, Lecky.

The Heat Engine, Ripper.

The Essentials of Electricity, Timbie.

The Ship's Medicine Chest and First Aid.

Ship Sanitation and Hygiene, Seamen Church Institute.

Laws of the Sea, Canfield and Dalzell.

Navigation Laws, United States Department of Commerce.

Manual of Naval Architecture, Manning.

Know Your Own Ship, Walton.

Ship Stability and Trim Made Easy, Watts.

Naval Architecture, Atwood.

Brown's Meteorology for Masters and Mates.

The Elements of Astronomy, Young.

A New Astronomy, Todd.

A Practical Manual of the Compass, United States Naval Institute.

Practical Shipbuilding, Holmes.

Deviation and Deviascope, Brown.

Physics, Black and Davis.

Nicholls's Concise Guide (two volumes).

The Ship Painter's Handbook, Welch.

Cargo Storage, Thomas.

Stowage of Ships, Hillcoat.

Stowage of Cargo, Brown.

Stowage of Ship's Cargo, Taylor.

Oil Tankers, Morrell.

¹ It is not intended that cadets purchase all of foregoing books. Many may be found aboard ship; others in shore libraries. Other references may be added to list in future.

OUTLINE OF COURSES FOR ENGINEER CADETS*

FIRST YEAR

I. GENERAL ASSIGNMENTS

During first 6 months: To work with wipers.

During second 6 months: To work and stand watch with firemen and with water tenders.

2. ELEMENTARY ENGINEERING AND ELECTRICITY

(a) *Elementary engineering*

Cycle of steam.
 Units of measure.
 Expansion.
 Evaporation.
 Condensation.
 Heat calculations
 Boyle's law.
 Indicator diagrams.
 Losses.
 Engines (reciprocating, turbines, and Diesel principles).
 Valves and gears.
 Condensers and auxiliaries.
 Fire tube boilers.
 Water tube boilers.
 Boiler handling.
 Text: Ripper, The Heat Engine; and others.

(b) *Elementary electricity*

Flow of electricity.
 Definitions.
 Measure of current and voltage.
 Resistance.
 Simple circuits.
 Simple calculations
 Action of current.
 Ohm's law.
 Lighting systems.
 Voltage required for line drop.
 Power: Units, equations, measurement.
 Wire and wiring: Effect of resistance.
 Wire tables: Safe capacity, line drop.
 Batteries: Types, construction, care.
 Magnets: Types, applications, ampere turns, etc.
 Motors: Principles, construction, care, starting, and control.
 Text: Timbie, Elements of Electricity, and others.

3. FIRST AID AND SHIP HYGIENE

(a) *First aid*

Fractures and dislocations.
 Wounds and burns.
 Tropical diseases.
 Intestinal complaints.
 Dosage, narcotics.
 Antiseptics.
 Text: Ships Medicine Chest and First Aid; and others.

(b) *Ship hygiene*

Sanitation and measures for preventing diseases aboard ship.
 Marine quarantine—fumigation—disinfection.
 Text: Seaman Church Institute's Ship Sanitation and Hygiene.

PRACTICAL

Observations of work done by master, doctor, and public health officers.

4. MACHINE SHOP PRACTICE

This is entirely practical. Cadets must be taught bench work and use of the lathe, and other equipment and tools. They must observe and assist in repair

* It, of course, is impossible to list in order that which cadets will learn of practical work in engine and boiler rooms and machine shops. The main propelling unit auxiliaries and equipment of ships will differ. It, therefore, is the intent of the following to show what book work may be stressed and on what items questions may be asked during the annual examinations.

work. Many texts may be recommended but none can take the place of constant practice in the machine shop.

Definitions.
Principles.
Types of boilers.
Boiler fittings.
Accessories.
Furnaces.
Combustion.
Fuels.
Boiler operation.

Cleaning.
Maintenance.
Design.
Measuring instruments.
Texts: Sterling's Marine Engineers Handbook. U. S. N. A. Dept. of E. & A. Marine and Naval Boilers.

PRACTICAL

Work of wipers, firemen, watertenders, and boilermakers.
Scaling and cleaning. } Boiler repairs.
Preparing for inspection of Bureau of Marine Inspection.

6. RECIPROCATING ENGINES

Classification.
Development.
Efficiency: Thermal, mechanical.
Proportioning of engine parts: Cylinders, framing, reciprocating parts, bearings, shafting, valve gear, reversing gear.
Turning gear.

Attached pumps.
Piping and fittings.
Balancing weights and dimensions.
Machining and tolerances.
Text: Sterling's Marine Engineers Handbook.

7. GENERAL PRACTICAL WORK

In addition to machine shop practice cadets will assist in maintenance and upkeep of all spaces and equipment under jurisdiction of engine department. They must scale, clean, and paint.
Maintenance of motor lifeboats.
Practice in handling of lifeboats (including lowering and pulling).
Knowledge of boat gear.
Watch standing: In boiler room with firemen and watertenders.
Drills: Man overboard, abandon ships, fire, and collision (active participation, not in charge).

8. PHYSICS AND MATHEMATICS¹

(a) *Elementary physics*

Mass and volume, force, elasticity, work, friction, parallelogram of forces, lever and screw, machines, motion, falling bodies, energy, heat, measurement of heat, buoyancy, gases, fluid pressure.
Text: Black and Davis Physics; and others.

(b) *Mathematics*

Use of slide rule.
Logarithms.
Spherical trigonometry.
Practical application to following: Simple problems used in naval architecture. Simple horsepower and bunker calculations.
Texts: Barr's Practical Mathematics. Walton's Know Your Own Ship; and others.

¹ Required of those cadets whose service started previous to establishment of competitive examinations. To be completed within 6 months. (May be waived by Supervisor of Cadet Training, if proof given cadet passed these subjects in an accredited school.)

SECOND YEAR

1. GENERAL ASSIGNMENTS

During first 3 months: To work and stand watch with oilers.
 During second 3 months: To work with electrician.
 During third 3 months: To work with storekeeper, plumber, and deck machinist.
 During fourth 3 months: To stand watch ^s with engineer officers.

2. ELECTRICITY

Inductance. Capacitance. Alternating currents, theory. Reactance. Impedance. Resonance.	Measurements. Three phase systems. Three phase connections. Polyphase motors. Text: Timbie's Essentials of Electricity.
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PRACTICAL

Application of above when opportunity offers.

3. MARINE BOILERS

General design. Effect on design of: Fuel, draft, steam pressure, etc. Sizes and weights of boilers. Design and construction of Scotch and water tube boilers. Rules and regulations governing boiler construction. Care of boilers.	Boiler repairs. Fuel and firing. Air required for combustion. Analysis of gases of combustion. Boiler tests. Texts: U. S. N. A. Marine and Naval Boilers. Sterling's Handbook for Marine Engineers; and others.
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PRACTICAL

Continuation of preceding year. Application of as much of above as circumstances permit.

4. TURBINES

Fundamental principles. Nomenclature and classification. Types and construction. Installation. Shafts, bearings, and packing glands. Governors and valves. Reduction gears and couplings. Regenerators and condensers. High pressure, bleeder, mixed pressure, and exhaust.	Operation and maintenance; testing. Inspection of rotor gage for clearance. Effects on economy: Pressure, superheat, etc. Economics and selection. Texts: Croft's Steam Turbines Principles and Practice. Sterling's Marine Engineers Handbook; and others.
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PRACTICAL

Application of above as circumstances permit.

^s One watch of 4 hours every other day may be sufficient.

5. DIESELS

Action of gases, heat cycle, mechanical cycle.	Lubrication.
Diesel engine construction details; accessory equipment.	Air compressors.
Four-cycle single-acting engines.	Indicator cards.
Two-cycle single-acting engines.	Pyrometers.
Double-acting engines.	Fuels used.
Medium and small Diesels.	Supercharging.
Normal operation of Diesel engines.	Shipyards repairs.
Derangements occurring in operation; remedies.	Texts: Ford's Practical Marine Diesel Engineering. Sterling's Marine Engineers Handbook, and others.
Setting cylinder-head valves.	
Ignition failures, engine knocks, bearing adjustment.	

PRACTICAL

Application of as much of above as equipment of vessel and circumstances offer.

6. MACHINE SHOP PRACTICE

Continuation of previous year.

Endeavor should be to minimize scaling, cleaning, and painting work during second year in order to give cadets more time for machine-shop practice, maintenance work, and watch duties of oilers and engineer officers.

7. SHIP CONSTRUCTION

Types of construction.	Stability and trim.
Holds, peaks, and tanks.	Repairs after stranding and collision.
Surveys by classification societies.	Building ways, launching.
Nomenclature of structural members.	Half models, mold lofts, bending slabs.
Kinds of tonnage.	Laying out tables, punching.
Double bottoms.	Fitting out after launching.
Water-tight compartments. How water-tightness secured.	Blueprints which owners should have.
Caulking and welding.	Blueprints which should be aboard ship.
Procedure of construction.	Texts: Manning Manual of Naval Architecture. Walton Know Your Own Ship. Atwood Naval Architecture; and others.
Steering gear.	
Propeller and rudder assembly.	
Removing dents from plating.	

PRACTICAL

Observation during drydock and shipyard periods.
 Items for shipyard repairs; items for ship crew repairs.
 Writing of specifications.
 Unit repair costs.
 Repairs for owners' and underwriters' accounts.

8. MARITIME LAW—MARINE INSURANCE—SHIPS BUSINESS

<p>General maritime law. Title and transfer. Owners and managers. The master. Seamen. Contracts of affreightment, bills of lading. Charter parties, manifests. Liabilities and limitations. Maritime liens.</p>	<p>Collisions. Salvage and general average. Crimes at sea. Wrecks and derelicts. Wharfage and moorage. Admiralty remedies. Texts: Canfield and Dalzell Laws of the Sea. United States Department of Commerce Navigation Laws; and others.</p>
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TEXTS OF UTILITY TO ENGINEERING CADETS²

- American Merchant Seaman's Manual, Cornell and Hoffman.
- The Heat Engine, Ripper.
- The Essentials of Electricity, Timbie.
- The Ship's Medicine Chest and First Aid.
- Ship Sanitation and Hygiene, Seamen Church Institute.
- Practical Mathematics, Barr.
- Physics, Black and Davis.
- Laws of the Sea, Canfield and Dalzell.
- Navigation Laws, United States Department of Commerce.
- Manual of Naval Architecture, Manning.
- Know Your Own Ship, Walton.
- Practical Shipbuilding, Holmes.
- Naval Architecture, Atwood.
- Oil Tankers, Morrill.
- Marine and Naval Boilers, United States Naval Institute.
- Marine Engineers' Handbook, Sterling.
- Practical Marine Diesel Engineering, Ford.
- Steam Turbine Principles and Practice, Croft.
- Naval Reciprocating Engines and Auxiliary Machinery, Barton-Stickney.
- Steam Turbines, Meyers.
- Marine Engines and Boilers, International Library of Technology.

CADET NOTEBOOKS

All cadet officers and cadets will maintain loose-leaf notebooks measuring about 8½ by 11 inches. They should also build up a neatly indexed file of pamphlets, instruction books, and literature, as secured. These books are to be inspected by representatives of the Supervisor of Cadet Training whenever they visit vessels.

Examinations given to cadets by ships' officers and representatives of the Supervisor of Cadet Training will be written in these books. Each cadet will write questions and answers in ink. Erasures and deletions in answers should be initialed and dated by a ship's officer or representative of the Supervisor of Cadet Training.

It is, of course, impossible to list herein all items which an efficient officer may consider of value to his profession. Nor is it possible to list items in their order of importance. The following are for your guidance.

² It is not intended that cadets purchase all of foregoing books. Many may be found aboard ship; others in shore libraries. Other references may be added to list in future.

DECK CADET NOTEBOOKS

Should contain:

1. A brief running account of practical assignments. State hours allotted to this work each day. Representatives of the Supervisor of Cadet Training will note.

2. Helpful notes for future reference. For example: Free-hand sketches and working drawings of parts of vessel and equipment; extracts from company rules and orders; extracts from regulations of the Bureau of Marine Inspection which you should know for instant use; extracts from textbooks; formulæ frequently used; seasonal weather conditions (fog, rain, etc.) peculiar to the localities which your vessel visits; salinity of water at various ports.

3. A general description of some different type vessels sighted at sea and visited in port. Note anything unusual about the appearance, rigging, cargo-handling equipment, and layout of such vessels. Visit foreign vessels whenever possible. List in detail the dimensions, tonnages, power, and many other characteristics of your own ship. Consult blueprints aboard ship. Make profile and general arrangement sketches labeling various parts of vessel. Draw to a different scale from ship's blueprints.

4. A description of lights and buoys used as aids to navigation. You should recognize group flashing, occulting, etc. Check with light lists.

5. A general description of ports visited. Notes relative to industries; size of the port by comparison with some other port you have visited; cargo handling facilities available; depths alongside berths; important articles exported and imported, including any special reason why they should enter or leave that particular port; port regulations; amount of fall of the tide; names of principal importers and exporters in area of port.

6. Description of jobs, such as loading, stowing, and unloading various kinds of cargo; repairs to the ship and gear; making fast under difficult conditions of wind and tide, including lines used, location of tugs if used, precautions taken to prevent damage to the ship and the dock, etc.; precautions taken during dry-docking; work done in preparation for annual inspection of Bureau of Marine Inspection and special surveys of class societies.

7. A check-off list of what you would do in case of fire (in various parts of the ship), collision, fog, approaching rain or snow. Include items which you, if officer on watch, would have to check. Frequently study this list until you can recite word for word.

8. Description of visits to ship building and ship repair yards, piers of other steamship lines, bunkering berths, steamship offices, training ships and bases, gyro school, fathometer, direction finder, paint and rope factories.

9. Information relative to operation, care and maintenance of navigational instruments and gear.

10. Important information you see on charts and in sailing directions, including channels entered, special lights, landmarks, buoyage system and ranges, character of the bottom, list of shoals near course, and other information considered important by your officers.

11. Titles of textbooks studied. Should give dates commenced and completed chapters or sections of such books. Representatives of the supervisor of cadet training will note.

12. Other information which may be of value to an efficient and well-educated officer. For example:

(a) Complement of the ship:

1. By departments.

2. *By watch standers.*—With duties performed, responsibilities, to whom reporting. Organization diagrams may be used.

- (b) Location of important valves, fittings, openings, vents, escape hatches, and their purposes.
- (c) Certificates found posted aboard:
 1. Required by law.
 2. Contents of each and purpose.
- (d) Diagrams of important piping systems, bilge suctions, fire smothering equipment, fuel oil filling, fire lines and hydrants.
- (e) Location of watertight and fire screen bulkheads.
- (f) Some details of watertight doors and door operating system.
- (g) Location and operation of emergency generator.

ENGINE CADETS NOTEBOOKS

Should contain:

1. A brief running account of practical assignments each day. State hours allotted to this work. Representatives of the Supervisor of Cadet Training will note.
2. Helpful notes for future reference. For example: Free-hand sketches and working drawings of parts of engine room and equipment; extracts from company rules and orders; extracts from regulations of the Bureau of Marine Inspection which you should know for instant use; extracts from textbooks; formulae frequently used.
3. A list of all important characteristics of your ship and especially its propelling and auxiliary equipment. Consult blueprints. Make general arrangement sketches of engine and boiler room layout to a different scale from that of ship's blueprint.
4. Description of jobs, such as: Overhauling and repairing auxiliaries, boilers, and main engines.
5. A check-off list of what you would do if officer on watch, in case of fire, collision, casualties to the auxiliaries, boilers, or main engines. Frequently study this list until you can recite word for word.
6. Descriptions of visits to ship building and ship repair yards, bunkering berths, steamship offices, training ships and bases and machine shops. Also, visits to vessels with engine room layout different from yours.
7. Information concerning the care and operation of each part of the engineering plant with data relative to temperatures, pressures, etc.; location of pipe lines and wiring and use of same.
8. Data on boilers; type, dimensions, number and type of burners; number of tubes; operation and maintenance of auxiliaries; conservation of fuel; renewal of tubes; boiler compounds used and tests made; use of pyrometers, etc.
9. Notes relative to work done in preparation for annual inspections of Bureau of Marine Inspection and special surveys of classification societies. List principal requirements of government bureaus and classification societies during their periodical inspections and surveys. List spare parts aboard vessel.
10. Titles of textbooks studied. Should give dates commenced and completed chapters or sections of such books. Representatives of the Supervisor of Cadet Training to note.
11. Prices of important engine stores and equipment and some standard repair jobs (renewing plates and rivets, drydocking charges, drawing tailshafts, open and examine certain pumps, etc.). Notes of repairs which may be done aboard ship to minimize shipyard expenses. Description of machine shop equipment aboard your vessel.

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12. Other information which may be of value to an efficient and well-educated engineering officer:

- (a) Diagrams of main steam and feed water lines, auxiliary steam and exhaust, fuel oil lines, fire mains, and lubricating oil lines.**
- (b) Fittings necessary to equip a fuel oil deep tank or double bottom.**
- (c) Measuring instruments and routine tests: pneumerators, salinity indicators, pyrometers, flue gas, lubricating oil sight glass, glands, etc.**

Appendix D

**REGULATIONS FOR THE GOVERNMENT OF THE
UNITED STATES MARITIME SERVICE**

REGULATIONS FOR THE GOVERNMENT OF THE UNITED STATES MARITIME SERVICE

By virtue of the authority vested in the United States Maritime Commission by section 216 of the act entitled, "An Act to further the development and maintenance of an adequate and well-balanced American merchant marine, to promote the commerce of the United States, to aid in the national defense, to repeal certain former legislation, and for other purposes," (49 Stat. 1985, ch. 858, approved June 29, 1936, as amended by Public No. 705, 75th Cong., 3d sess., approved June 23, 1938), and in order to provide for the government of the United States Maritime Service authorized by said section, the following regulations are hereby prescribed:

ARTICLE I

AUTHORITY

SECTION 1. *The statute.*—The government of the United States Maritime Service shall be in conformity with the statutory authority for its creation, as contained in section 216 of the Merchant Marine Act, 1936, as amended, which reads as follows:

Sec. 216. (a) The Commission is hereby authorized and directed, after consultation with all interests concerned, to prepare and report to the Congress on or before January 20, 1939, a comprehensive system for the training of citizens of the United States to serve as licensed and unlicensed personnel on American merchant vessels, and may employ as instructors, on a contract or fee basis, such qualified licensed and unlicensed personnel of the merchant marine as the Commission may deem necessary to effectuate the purposes of this section.

(b) The Commission is hereby authorized and directed, under such rules and regulations as it may prescribe, to establish the United States Maritime Service to be a voluntary organization and which shall consist of such licensed and unlicensed personnel of the United States merchant marine as may be enrolled under the provisions of this section. The ranks, grades, and ratings for the personnel of the said Service, shall be the same as are now or shall hereafter be prescribed for the personnel of the Coast Guard. The Commission is authorized and directed to determine the number of persons to be enrolled in the said Service, to fix the rates of pay of such persons, and to prescribe such courses and periods of training as, in its discretion, is necessary to maintain a trained and efficient merchant-marine personnel.

(c) The Commission, with the consent of any executive department, independent establishment, or other agency of the Government, including any field service thereof, may avail itself of the use of information, services, facilities, officers, and employees thereof in carrying out the provisions of this section.

SEC. 2. General Order No. 25.—The government and administration of the United States Maritime Service shall be in conformity with the Commission's General Order No. 25, establishing the Service, adopted on July 14, 1938. General Order No. 25 reads as follows:

There is hereby established, pursuant to the authority vested in the Commission by section 216 of the Merchant Marine Act, 1936, as amended, a voluntary organization to be known as the United States Maritime Service which shall consist of such licensed and unlicensed personnel of the United States merchant marine as may be enrolled under the provisions of said section, this order, and such rules and regulations as may be prescribed by the Commission for the government of said Service.

The number of persons to be enrolled in said Service, the rates of pay of such persons, and the courses and periods of training shall be determined, fixed, and prescribed by the Commission in such manner and form as may appear to it to be necessary to maintain a trained and efficient merchant-marine personnel. The ranks, grades, and ratings for the personnel of the said Service shall be the same as are now or shall hereafter be prescribed for the personnel of the Coast Guard.

In the administration and conduct of the said Service the Commission shall, subject to the consent and approval of the Secretary of the Treasury, avail itself of the use of such information, services, facilities, officers, and employees of the Coast Guard and the Public Health Service as may be necessary for the operation of said Service, such use to be at the expense of the Commission.

Enrollment and training in the United States Maritime Service shall be voluntary and shall be open to all licensed and unlicensed personnel of the United States merchant marine who comply with the requirements prescribed by the Commission. In the selection of applicants for enrollment no discrimination shall be practiced because of the applicant's race or creed, or because of membership or non-membership in any organization. Eligibility for enrollment shall be determined by the Commandant of the Coast Guard in accordance with rules and regulations prescribed by the Commission.

Nothing in this order shall be construed to affect the cadet system established by the Commission's General Order No. 23, as amended.

This regulation shall be come effective as of July 14, 1938.

ARTICLE II

Organization and Administration

SECTION 1. Definitions.—When used in these regulations—

(a) "Commission," or "Maritime Commission" means the United States Maritime Commission.

(b) "Service" or "Maritime Service" means the United States Maritime Service.

(c) "Commandant" means Commandant of the Coast Guard.

(d) "Coast Guard personnel" includes commissioned, warrant, or enlisted personnel of the Coast Guard and other employees thereof.

(e) "Maritime Service personnel" includes all persons employed in the Maritime Service.

(f) "Enrollees" means persons enrolled in the Maritime Service.

(g) "Merchant vessels of the United States" means ocean-going or Great Lakes vessels of 500 gross tons or over documented under the

laws of the United States and engaged in the foreign or domestic commerce of the United States.

SEC. 2. *Maintenance of the Service.*—The Maritime Service shall be maintained at the expense of the Maritime Commission, which shall exercise such supervision over it, through the Commandant, as may be necessary to comply with law and the rules and regulations prescribed by the Commission.

SEC. 3. *Administration.*—The Maritime Service shall be administered by the Commandant of the Coast Guard; who shall have full control over the administration of the functions delegated to him by the rules and regulations prescribed by the Commission. All policies affecting the Maritime Service shall be determined by the Commission, after consultation with the Commandant.

SEC. 4. *Ranks, grades, and ratings.*—The ranks, grades, and ratings for the personnel of the Maritime Service shall be the same as are now or shall hereafter be prescribed for the personnel of the Coast Guard.

SEC. 5. *Forms.*—The Commandant shall prescribe, subject to the approval of the Commission, forms for application for enrollment, enrollment, disenrollment (voluntary and involuntary), release from active duty, assignments of ranks, grades, and ratings, pay and supply of personnel, maintenance and supply of stations and vessels, requests and authorizations for travel, fiscal management and accounts, and all other necessary forms for the administration of the Maritime Service.

SEC. 6. *Authority of Commandant.*—Subject to the regulations prescribed by the Commission, the Commandant is authorized:

(a) To direct and control the employees and enrollees of the Maritime Service.

(b) To employ, for the Maritime Service, on the account of the Maritime Commission, such civil employees as may be necessary for the conduct and maintenance of the Service.

(c) To enroll, disenroll, assign to active or inactive duty, and release from active duty the enrollees of the Service.

(d) To regulate the ranks, grades, and ratings of enrollees of the Service.

(e) To direct and conduct the prescribed courses of training.

(f) To provide for the maintenance of discipline and order.

(g) To conduct the fiscal management and keep the accounts of the Service.

(h) To direct the use and preservation of training stations, training ships, clothing, equipment, and supplies of the Service.

(i) To authorize the procurement of provisions, clothing, materials, equipment, and services for the operation of the Service.

(j) To dispose, by survey, for the account of the Commission, of such materials, clothing, equipment, and supplies as shall be found

to be no longer serviceable. Such disposal shall be in accordance with existing Coast Guard regulations.

(k) To authorize and direct necessary travel in behalf of and on the account of the Maritime Service.

(l) To delegate such authority as is necessary to subordinate personnel of the Coast Guard or of the Maritime Service.

SEC. 7. *Instructions of Commandant.*—The Commandant is authorized to issue directions, instructions, and memoranda, consistent with the regulations prescribed by the Commission, for the proper administration of the Maritime Service.

SEC. 8. *Allotments and expenditures.*—(a) Expenditures and obligations for the Maritime Service shall be limited to the allotment of funds by the Commission to the Service.

(b) Expenditure of funds may be authorized by the Commandant as required for the proper administration of the Maritime Service, including pay of personnel, purchases of equipment, provisions, and supplies, expenses of medical examination, medical treatment and hospitalization, communication and travel expense, and such other expenses of an administrative or ministerial nature as may be necessary for the efficient maintenance of the Service.

(c) The Commandant shall report to the Commission concerning all accounts and other financial matters of the Service in such manner and form as the Commission shall prescribe.

(d) The pay and allowances of the chief warrant and warrant officers and enlisted men of the Coast Guard detailed to duty with the Maritime Service shall be charged to the allotment of funds for the Maritime Service, and all travel expense, including transportation of dependents and personal effects, of all personnel of the Coast Guard detailed to such duty shall be charged to such fund, provided that expense in connection with relief and detail to Coast Guard duty of such personnel shall be borne by the Coast Guard.

SEC. 9. *Investigations.*—(a) The Commandant is authorized to convene boards consisting of Coast Guard, Maritime Service, and Public Health Service personnel to investigate accidents to Maritime Service personnel, damage to Maritime Service property, and any other matters or incidents which in his opinion require investigation.

(b) The Commandant is authorized to promulgate instructions, consistent with law, for the confinement of Maritime Service personnel where such confinement is necessary for safekeeping.

(c) Enrollees charged with violating criminal statutes shall be delivered to the appropriate civil (Federal, State, or municipal) authorities.

SEC. 10. *Medical treatment.*—Medical treatment, including all necessary examinations, of the Maritime Service personnel shall be obtained from the Public Health Service insofar as possible. When

the Public Health Service facilities are not available, hospitalization and treatment of Maritime Service personnel in civilian hospitals or by civilian physicians are authorized and shall be provided at the expense of the Commission.

ARTICLE III

ENROLLMENT AND DUTY

SECTION 1. *Voluntary enrollment: Numbers.*—(a) Enrollment in the Maritime Service shall be voluntary, and shall be open to applicants among the licensed and unlicensed personnel of the merchant marine in such numbers as the Maritime Commission shall from time to time prescribe.

(b) The Commission shall designate the number of persons to be enrolled from the several classifications of ship personnel, including deck, engineers', and steward's departments.

SEC. 2. *Qualifications.*—No applicant shall be accepted for enrollment in the Maritime Service unless he is a citizen of the United States, not less than 21 years of age. Such applicant shall have had sea service of 24 months or more on merchant vessels of the United States, and shall not have any physical or moral defect rendering him unfit for further sea service.

SEC. 3. *Enrollment. Original and regular.*—(a) All original enrollments shall be deemed probationary for a period not to exceed 3 months.

(b) The original enrollment of licensed personnel shall be in a rank not above ensign.

(c) The original enrollment of unlicensed personnel shall be in a rating not above seaman, second class.

(d) Any enrollee may be advanced in rank or rating during his probationary enrollment, and such advancement may be made effective as of such date as may be determined.

(e) Regular enrollees may be advanced in rank or rating at any time.

(f) After the probationary period of enrollment an enrollee whose conduct and qualifications are deemed satisfactory shall be eligible for regular enrollment.

(g) Every enrollee shall, upon enrollment, take an appropriate oath or affirmation.

SEC. 4. *Duty: Active and inactive.*—(a) Duty status in the Maritime Service may be active or inactive.

(b) Every original enrollee shall be deemed to be on active duty immediately upon enrollment, and shall remain on active duty until released therefrom by proper authority.

(c) Regular enrollees may be assigned to inactive duty status subject to voluntary return to active duty at such intervals and for such periods as may be prescribed.

(d) Regular enrollees may be maintained on voluntary active duty for such periods as may be necessary for the proper administration of the Service.

(e) Enrollees on active duty may be assigned as instructors or as under instruction, or to perform administrative or other duties.

SEC. 5. *Disenrollment: Voluntary and involuntary.*—(a) Any enrollee in the Maritime Service shall be disenrolled upon request, the disenrollment to be effective on the date of action on such request.

(b) Any enrollee may be disenrolled from the Service for cause, as follows:

1. During the probationary period of original enrollment, for conduct or qualifications deemed unsatisfactory to the Service.

2. For failure to serve 16 months in any period of 24 consecutive months on merchant vessels of the United States, provided that an enrollee shall be disenrolled for failure to serve 10 months in any such period of 24 months on merchant vessels of the United States.

3. For failure in such period of 24 consecutive months to serve the required period or periods on active duty in the Service.

4. For physical or mental disability.

5. For conduct such as to bring discredit upon the Service.

(c) Any person disenrolled for cause may, upon removal of the disability or upon other correction of the cause of disenrollment, be re-enrolled in the Service.

ARTICLE IV

PAY AND SUPPLY

SECTION 1. *Rates of pay.*—Licensed and unlicensed personnel of the Maritime Service shall receive the following monthly rates of pay while on active duty:

Captain.....	\$333.33
Commander.....	291.67
Lieutenant commander.....	250.00
Lieutenant.....	200.00
Lieutenant (junior grade).....	166.67
Ensign.....	125.00
Cadet.....	85.00
Chief warrant officer.....	200.00
Warrant officer.....	153.00
First pay grade.....	126.00
First pay grade acting appointment.....	99.00
Second pay grade.....	84.00
Third pay grade.....	72.00
Fourth pay grade.....	60.00
Fifth pay grade.....	54.00
Sixth pay grade.....	36.00

SEC. 2. *Computation of pay.*—Pay shall be computed on the basis of 30 days per month. An enrollee shall be credited in the computation of his pay, or allowances, for each day, or fraction thereof, on which active duty is performed.

SEC. 3. *Allowances and increases.*—In addition to the rates of pay prescribed for them, enrollees of the fifth or sixth pay grade, not in steward's branch, shall, when detailed as messmen, be entitled to additional pay at the rate of \$6 per month.

SEC. 4. *Active duty.*—The term "active duty" shall include all service while training or performing duty under authorization of the Maritime Service, but shall not include any full calendar day spent in a hospital or while absent from duty on leave, without leave, or under arrest.

SEC. 5. *Pay periods.*—(a) Enrollees shall be entitled to the pay of their respective ranks or ratings while on active duty exclusive of time absent from duty as provided in the preceding section.

(b) Each regular enrollee who has served a minimum of 8 months within any 12-month period (or 16 months in any period of 24 months, or 24 months in any period of 36 months) of his regular enrollment on merchant vessels of the United States and whose service on active duty in the Maritime Service complies with prescribed standards shall be entitled to one month's pay of his rank or rating in the Maritime Service for each such 12-month period, such retainer pay to be in addition to his pay for active duty, and to become payable only upon the submission to the commandant of satisfactory proof of the minimum service hereinabove required.

SEC. 6. *Transportation and travel.*—(a) Except as otherwise provided, enrollees and employees of the Maritime Service shall, when performing travel under competent authority, be entitled to the travel allowances prescribed for civilian employees by the Standardized Government Travel Regulations.

(b) Enrollees upon original enrollment shall, in lieu of any other travel allowance, be entitled to transportation, including sleeping car or stateroom accommodations from place of enrollment to a training station or training vessel.

(c) Upon disenrollment or release from active duty, a probationary enrollee shall be entitled to a travel allowance of 5 cents per mile in lieu of any other travel expense, from place of disenrollment or release from active duty to place of enrollment.

(d) Upon release from active duty a regular enrollee shall be entitled, in lieu of any other travel expense, to a travel allowance of 5 cents per mile from place of release from active duty to place of latest acceptance for active duty.

(e) A regular enrollee disenrolled after release from active duty, but prior to recall to active duty, shall not upon disenrollment be entitled to any travel allowance.

SEC. 7. *Clothing and equipment.*—Enrollees of the Maritime Service shall be supplied, without charge, with such clothing and equipment as may be necessary for the training course prescribed, and other Government property may be loaned to such personnel. Enrollees on active duty may be permitted to purchase articles of uniform clothing, the cost thereof to be deducted from their pay.

SEC. 8. *Subsistence.*—(a) Subsistence at Government expense shall be supplied to all members of the Maritime Service while on active duty. General messes shall be established at training stations and on board training vessels as may be necessary. Such general messes shall be conducted in the same manner as provided in Coast Guard pay and supply instructions for general messes of Coast Guard.

(b) In lieu of subsistence in kind, an allowance of \$1 per day is authorized for each enrollee not in travel status for whom Government messes facilities are not available.

(c) An allowance to be prescribed by the Commandant, not to exceed \$2 per day, is authorized for an enrollee not in travel status for whom Government quarters are not provided.

SEC. 9. *Loss or damage.*—There may be deducted from the pay of any member of the Maritime Service sums sufficient to cover the value of any Government property lost or wilfully damaged by such person.

SEC. 10. *Death of Enrollees.*—The Commandant is authorized to incur expense in connection with the transportation and burial of the remains of enrollees who die while on active duty.

ARTICLE V

TRAINING STATIONS AND SHIPS

SECTION 1. *Assignments.*—Enrollees in the Maritime Service on active duty may be assigned to a vessel or station maintained by the Service or to a vessel or station of the Coast Guard.

SEC. 2. *Stations and ships.*—Only such training stations and training ships shall be maintained by and for the Maritime Service as are authorized by the Commission.

SEC. 3. *Training station.*—A training station for the use of the Maritime Service shall be established and maintained at Hoffman and Swinburne Islands in New York.

SEC. 4. *Training ships.*—The steamship *Edgemoor* shall be outfitted and equipped as a training ship, to be maintained and used as such.

SEC. 5. *Maintenance and supply.*—The maintenance and supply of authorized training stations and training ships shall be in accordance with existing Coast Guard Regulations.

SEC. 6. *Canteens.*—Canteens for the sale of tobacco, candy, toilet articles, and similar merchandise may be established and maintained at training stations and on training ships.

ARTICLE VI

PERIODS AND COURSES OF TRAINING

SECTION 1. *Original enrollment.*—Each original enrollment shall be for a period of 3 months on active duty.

SEC. 2. *Regular enrollment.*—Every regular enrollee shall, within 24 months after his release from active duty under his original enrollment, return to active duty for a period of 2 months or for two periods of 1 month each, and shall likewise return for 2 months' active duty during each period of 24 months thereafter.

SEC. 3. *Courses of training.*—The courses of training at stations and on ships shall be appropriate to the duties performed aboard merchant vessels by enrollees under their licenses or certificates and shall include the following subjects: Lifeboat instruction, including rowing; emergency drills, including fire and abandon ship; maritime law pertaining to seamen; hygiene and first aid; navigation; seamanship; signals; marine engineering; engine room and fire room routine; shop work and overhaul of machinery; care of staterooms, quarters and supplies; procurement, handling, and cooking of food; serving of food and care of tableware (mess gear); and instruction in special ratings, such as radio operators, electricians, and clerical workers.

These regulations shall become effective as of September 1, 1938.

By order of the United States Maritime Commission.

(Sgd.) W. C. PEET, Jr., *Secretary.*

TRAINING SYSTEMS FOR RECRUITS

1. The plan contemplates enrollment in the United States Maritime Service for 1 year of 500 young men (18-23) as apprentice seamen (pay \$21 per month). They will be subject to all the regulations of regular Maritime Service personnel, and will be given a special course of training to fit them for service in the Merchant Marine.

2. Recruits will be enrolled through the Coast Guard recruiting system, using the same care as to fitness and character as for other Coast Guard recruits.

3. The training system will comprise approximately 3 months at a shore training station; 6 months on a training vessel; and 3 months on a cruising cutter of the Coast Guard.

4. For the first 3 months at the training station all recruits will be given the same course of training which will consist of subjects necessary for all seafarers such as rowing, elementary seamanship, seaman's laws, hygiene, and maritime terms and customs.

5. After 3 months recruits will be divided into three groups for more specialized training; deck, engineer, and stewards. The proportion of recruits for these departments will be determined by the Commission, with the advice of the commandant. Assignment to each group will be on the basis of recruit preference, aptitude, and vacancies existing in each quota.

6. After 3 months at the training station and assignment to departments, recruits will be detailed to the training ship for 6 months' training at sea. Steward's department recruits may, however, spend less than 6 months on the training ship in order to take advantage of better training facilities in their specialty at the training station.

7. The training ship will be operated under the supervision of the commanding officer of the training station and will be kept running at sea as much as practicable. Personnel of the training station and the training ship will interchange duties at reasonable intervals, part of the ship's personnel being relieved at a time.

8. On the training ship recruits will be given instruction and practical training in their specialties. Strict discipline will be maintained. Recreational facilities such as sports, movies, and books will be provided. Short stops will be made at foreign and domestic ports. Advantage will be taken of opportunities to inspect shipbuilding yards, repair plants, and other places of practical interest. Watches and the customary routine of vessels will be a part of the recruit training aboard ship.

9. After 6 months on the training ship recruits will be assigned to cruising cutters of the Coast Guard for 3 months. During this

period they will perform the duties of their grade aboard ship and will take part in the usual drills. On the cutters they will participate in the activities of an actively operating vessel and will be brought into contact with a well-organized, well-disciplined crew of experienced seamen. Recruits may be advanced to seaman, second class (\$36 per month) or fireman, second class (\$48 per month).

10. At the end of the 12 months' enlistment period recruits will be discharged from the Maritime Service and paid mileage to their places of enlistment. Those found qualified will be recommended for appropriate certificates of service issued by the Bureau of Marine Inspection and Navigation.

11. Recruits revealing unfitness for life at sea will be discharged for inaptitude or undesirability upon recommendation of a board of training officers, approved by the Commandant.

12. Maritime Service administration will be employed. Instructors will consist of Coast Guard and Merchant Marine personnel.

13. Contact will be maintained by the training administration with the Maritime Commission, and ship operators. Training will be based on the requirements of the Merchant Marine.

14. The training system will be conducted by the Maritime Service for the Maritime Commission. The Commission will control the budget.

15. Recruit pay and allowances for apprentice seamen:

Pay, monthly.....	\$21. 00
Clothing allowance, total.....	100. 00
Cost of ration, daily, approximate.....	. 60
Travel allowed from place of enlistment to training station and from place of discharge to place of enlistment. Average total.....	35. 00

TRAINING STATION ROUTINE AND NOTES ON CURRICULUM SCHEDULES

Practical drills and instruction periods are noted in capital and small capital letters.

Lectures and classroom periods are noted in small letters.

When the weather is suitable a 1-hour swimming period will be provided each day.

When rowing and other outdoor instruction is impracticable on account of weather, practical instruction in boat equipment, davits, falls, etc., will be substituted.

Schedules will be adjusted as necessary to have sufficient boats available for boat details.

For the first 3 weeks recruits will be kept segregated.

Seamanship will include knotting and splicing, handline mooring lines, reeving tackles, going aloft, scrubbing decks, chipping and paint-

ing, deck machinery, gasoline engines, boat stowage, canvas work, and other practical work aboard ship.

Ship construction will include inspection of all parts of the ship with explanations by the instructor and the keeping of notebooks by recruits.

Nautical terms will include a definition of terms and an explanation of nautical customs and the keeping of notebooks by recruits. Recruits will be given an elementary knowledge of the compass and will be required to learn to box the compass by points.

TRAINING STATION RECRUIT DAILY ROUTINE

- 0615. Call cooks and messmen.
- 0645. Turn out—make up bunks.
- 0715. Breakfast.
- 0800. Formation—turn to.
- 0815-1145. Drills and instruction.
- 0930. Sick call.
- 1000. Inspection of barracks.
- 1200. Dinner.
- 1300. Formation—turn to.
- 1315-1630. Drills and instruction.
- 1630-1730. Sports and recreation.
- 1730. Supper.
- 1900. Movies, recreation.
- 2130. Return to quarters.
- 2200. Turn in—lights out.

SATURDAYS

Same except that drills and instruction will be suspended at 1145 and liberty granted at 1300.

SUNDAYS AND HOLIDAYS

Same except that drills and instruction will be omitted and liberty granted at 0900

Training station schedule—First to third weeks

Day	First period 0815-0915	Second period 0920-1030	Third period 1035-1145	Fourth period 1315-1430	Fifth period 1445-1500
Monday.....	ORGANIZATION.	ORGANIZATION.	ORGANIZATION.	ORGANIZATION.	ORGANIZATION.
Tuesday.....	PHYSICAL DRILL.	CARE AND MAKING OF CLOTHING AND MEDICAL EXAMINATION.	Nautical terms;	SEAMANSHIP;	Ship construction.
Wednesday..	PHYSICAL DRILL.	ROWING; nautical terms.	ROWING.	ship construction.	SEAMANSHIP.
Thursday...	PHYSICAL DRILL.	ROWING; nautical terms.	Nautical terms;	SEAMANSHIP;	Ship construction.
Friday.....	PHYSICAL DRILL.	ROWING; nautical terms.	ROWING.	ship construction.	SEAMANSHIP.
Saturday....	PHYSICAL DRILL.	POLICE BARRACKS.	INSPECTION.	SEAMANSHIP;	Ship construction.
				ship construction.	SEAMANSHIP.

Training station schedule—Fourth to fifth weeks

Day	First period 0815-0915	Second period 0920-1030	Third period 1035-1145	Fourth period 1215-1430	Fifth period 1445-1600
Monday.....	BOAT DRILL.	Maritime law.	SEAMANSHIP.	Hygiene.	PHYSICAL DRILL.
Tuesday.....	BOAT DRILL.	Maritime law.	SEAMANSHIP.	Hygiene.	PHYSICAL DRILL.
Wednesday....	BOAT DRILL.	Maritime law.	SEAMANSHIP.	Hygiene.	PHYSICAL DRILL.
Thursday.....	BOAT DRILL.	Maritime law.	SEAMANSHIP.	Hygiene.	PHYSICAL DRILL.
Friday.....	BOAT DRILL.	Maritime law.	SEAMANSHIP.	Hygiene.	PHYSICAL DRILL.
Saturday.....	PHYSICAL DRILL.	POLICE BAR- RACKS.	INSPECTION.		

Training station schedule—Sixth and seventh weeks

Day	First period 0815-0915	Second period 0920-1030	Third period 1035-1145	Fourth period 1215-1430	Fifth period 1445-1600
Monday.....		MESS AND STATION UPKEEP.			PHYSICAL DRILL.
Tuesday.....		MESS AND STATION UPKEEP.			PHYSICAL DRILL.
Wednesday....		MESS AND STATION UPKEEP.			PHYSICAL DRILL.
Thursday.....		MESS AND STATION UPKEEP.			PHYSICAL DRILL.
Friday.....		MESS AND STATION UPKEEP.			PHYSICAL DRILL.
Saturday.....	PHYSICAL DRILL.	POLICE BAR- RACKS.	INSPECTION.		

Training station schedule—Eighth to tenth weeks¹

Day	First period 0815-0915	Second period 0920-1030	Third period 1035-1145	Fourth period 1215-1430	Fifth period 1445-1600
Monday.....	SEAMANSHIP.	Ship construc- tion.	Maritime law.	BOAT DRILL.	PHYSICAL DRILL.
Tuesday.....	SEAMANSHIP.	Ship construc- tion.	Hygiene.	BOAT DRILL.	PHYSICAL DRILL.
Wednesday....	SEAMANSHIP.	Ship construc- tion.	Maritime law.	BOAT DRILL.	PHYSICAL DRILL.
Thursday.....	SEAMANSHIP.	Ship construc- tion.	Hygiene.	BOAT DRILL.	PHYSICAL DRILL.
Friday.....	SEAMANSHIP.	Ship construc- tion.	Maritime law.	BOAT DRILL.	PHYSICAL DRILL.
Saturday.....	PHYSICAL DRILL.	POLICE BAR- RACKS.	INSPECTION.		

¹ 8- and 9-week recruits will make short cruises in small training ships, and will visit shipyards and dry docks.

TRAINING SHIP DAILY ROUTINE

- Midnight. Watches relieved.
0340. Call relief watch.
0355. Muster relief watch and lifeboat crew.
0400. Relieve the watch.
0600. Call cooks and messmen.
0630. Watch on deck wash down.
0645. Call idlers, prepare for mess.
0715. Breakfast.
0755. Muster relief watch.
0800. Relieve watch, muster recruits, turn to on work and study.
0900. Sick call.
1115. Prepare for mess.
1130. Dinner for 12-4 watch.
1150. Suspend work, prepare for mess.
1155. Muster relief watch.
1200. Dinner, relieve the watch.
1300. Muster recruits, drill period.

- 1400. Turn to on ship work.
- 1555. Muster relief watch.
- 1600. Relieve watch, suspend work.
- 1645. Prepare for mess.
- 1700. Supper.
- 1955. Muster relief watch and lifeboat crew.
- 2000. Relieve watch.
- 2100. Turn in, lights out.
- 2340. Call relief watch.
- 2355. Muster relief watch and lifeboat crew.
- Midnight. Relieve watch.

TRAINING SHIP

1. Recruits will be divided into three groups: Deck, engineer, and steward.
2. Deck recruits will stand 2-hour wheel and lookout watches. Engineer recruits will stand 4-hour engineroom and fireroom watches. Steward department recruits will not stand watches but will be assigned duties pertaining to the handling, preparation, and serving of food, the cleaning of mess gear, and the care of living compartments.
3. Watches, practical work, and class instruction of recruits will be laid out generally on an 8-hour working day.
4. Strict discipline will be maintained.
5. The daily routine will be a compromise between the customs of the Coast Guard and of the Merchant Marine.
6. Recruits will be given class work and practical work suitable to the departments to which they are assigned. Class work will include recitations and note books.
7. Appropriate notations of subjects studied will be made on the records of recruits.
8. Facilities will be provided for recreation on the training ship, including sports, movies, and library.

Deck recruit schedule

Hour.....	8-9	9-10	10-11	11-12	1-2	2-4
Monday....	PRACTICAL SEAMANSHIP.	SIGNALS.	Maritime law.	Seamanship class work.	PHYSICAL DRILLS.	SHIP'S WORK.
Tuesday...	PRACTICAL SEAMANSHIP.	SIGNALS.	Maritime law.	Seamanship class work.	PHYSICAL DRILLS.	SHIP'S WORK.
Wednesday.	PRACTICAL SEAMANSHIP.	SIGNALS.	Maritime law.	Seamanship class work.	PHYSICAL DRILLS.	SHIP'S WORK.
Thursday...	PRACTICAL SEAMANSHIP.	SIGNALS.	Maritime law.	Seamanship class work.	PHYSICAL DRILLS.	SHIP'S WORK.
Friday.....	PRACTICAL SEAMANSHIP.	History of ships.	Hygiene.	Seamanship class work.	PHYSICAL DRILLS.	SHIP'S WORK.
Saturday...	PRACTICAL SEAMANSHIP.	History of ships.	PREPARE FOR INSPECTION.	INSPECTION.	PHYSICAL DRILLS.	SHIP'S WORK.
Sunday.....						

Engineer recruits' schedule

Hour.....	8-9	9-10	10-11	11-12	1-2	2-4
Monday....	Class work machinery.	Maritime law.	SHOP WORK.	SHOP WORK.	PHYSICAL DRILLS.	SHIP'S WORK.
Tuesday....	Class work machinery.	Maritime law.	SHOP WORK.	SHOP WORK.	PHYSICAL DRILLS.	SHIP'S WORK.
Wednesday..	Class work machinery.	Maritime law.	SHOP WORK.	SHOP WORK.	PHYSICAL DRILLS.	SHIP'S WORK.
Thursday....	Class work machinery.	Maritime law.	SHOP WORK.	SHOP WORK.	PHYSICAL DRILLS.	SHIP'S WORK.
Friday.....	Class work machinery.	Hygiene.	SHOP WORK.	SHOP WORK.	PHYSICAL DRILLS.	SHIP'S WORK.
Saturday....	Class work machinery.	History of ships.	Prepare for inspection; inspection.			
Sunday.....						

Steward recruit schedule

Hour.....	8-9	9-10	10-11	11-12	1-2	2-4
Monday....	Maritime law.	History of ships.	Food.	FOOD.	Physical drills.	SHIP'S WORK.
Tuesday....	Maritime law.	History of ships.	Food.	FOOD.	Physical drills.	SHIP'S WORK.
Wednesday..	Maritime law.	Care of state-rooms.	Food.	FOOD.	Physical drills.	SHIP'S WORK.
Thursday....	Maritime law.	Care of state-rooms.	Food.	FOOD.	Physical drills.	SHIP'S WORK.
Friday.....	Maritime law.	Care of state-rooms.	Food.	FOOD.	Physical drills.	SHIP'S WORK.
Saturday....	Hygiene.	Care of state-rooms.	Prepare for inspection; inspection.			
Sunday.....						

Subjects comprising the proposed curriculum will include the following:

PRACTICAL SEAMANSHIP

Marlinespike seamanship.	Care and operating of deck machinery.
Canvas work.	Care and handling of ground tackle.
Compasses, sounding apparatus, barometers, etc.	Upkeep of spars and rigging.
Steering, sounding, watch standing.	Stowage and handling of boats and boat gear.

SIGNALS

Sound and flashing light code.	Wreck rescue instructions.
International flag code.	Flags of nations and of steamship lines.
Storm signals and weather reports.	

MARITIME LAW

Rights and duties of seamen.	Certificates of service, discharge books.
Authority of officers.	Requirements for licenses.
Ship's lights, whistles, rules of the road.	Conduct in foreign ports.
Labor laws.	Desertion.
Shipping commissioners, shipping articles.	

HISTORY OF SHIPS

Development of ships and shipping.	Elementary shipping economics.
Types of modern ships.	Trade routes, port regulations.

HYGIENE

Venereal diseases.	Water pollution.
Contagious diseases.	Ship sanitation.
Treatment of common ailments.	Fumigation.
Treatment of common injuries.	Public health facilities.

SEAMANSHIP CLASSWORK

Nomenclature of ships and marine equipment.	Design and care of deck machinery.
Stowage of cargo and stores.	Study of charts and navigational instruments.
Construction of ships.	Cordage, canvas, and other deck supplies.
Construction of equipment of boats.	
Paints and painting.	

DRILLS

Fire drill.	Gas mask instruction.
Collision drill and damage control.	Instruction in fire hazards.
Resuscitation drill.	Physical drill.

SHIP'S WORK

Chipping and painting hull.	Care of rigging, canvas, and lines.
Overhaul and operation of deck machinery.	Stowage and care of holds.
Upkeep of boats and davits.	Routine work incident to upkeep and operation of the vessel.
Care of ground tackle.	

SHOP WORK

Use of hand tools.	Welding.
Operation of lathes, drill presses, etc.	Plumbing.
Overhaul of valves.	Electric wiring, machinery, and fittings.
Packing joints, valves.	Overhaul of internal combustion motors.
Soldering.	Pipe work.

SHIP'S WORK—ENGINEER

Upkeep of engine room and fireroom.	Operation of boilers and machinery.
Overhaul of machinery.	Repairs to piping and plumbing.
Cleaning boilers.	

CLASS WORK—MACHINERY

Marine boilers.	Electric circuits and fittings.
Reciprocating engines and turbines.	Handling coal and oil.
Pumps, condensers, evaporators, and other auxiliaries.	Steam, water, and fuel lines.
Generators and electric motors.	Refrigerating installations.
	Internal combustion motors.

CARE OF STATEROOMS

Making beds.	Cleaning rugs and furnishings.
Handling linen.	Service to passengers.

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Food

Stowage.
Refrigeration.
Cutting of meats.
Cooking.

Baking.
Galley practice.
Table service, linen, silverware.

Enrollment allotments

BY COAST GUARD DIVISIONS

	Licensed						Unlicensed							
	Monthly			Annually			Monthly				Annually			
	D	E	Total	D	E	Total	D	E	S	Total	D	E	S	Total
Boston.....	1	1	2	12	12	24	8	8	8	24	96	96	96	288
New York.....	3	3	6	36	36	72	18	18	20	56	216	216	240	672
Norfolk.....	1	1	2	12	12	24	8	8	8	24	96	96	96	288
Jacksonville.....	1	1	2	12	12	24	8	8	8	24	96	96	96	288
New Orleans.....	1	1	2	12	12	24	8	8	8	24	96	96	96	288
Cleveland.....	1	1	2	12	12	24	8	8	8	24	96	96	96	288
Chicago.....	1	1	2	12	12	24	8	8	8	24	96	96	96	288
San Francisco.....	2	2	4	24	24	48	8	8	8	24	96	96	96	288
Seattle.....	1	1	2	12	12	24	8	8	8	24	96	96	96	288
Total.....	12	12	24	144	144	288	82	82	84	248	984	984	1,008	2,976

BY TRAINING STATIONS

Fort Trumbull.....	9	9	18	108	108	216								
Hoffman Island.....							68	68	68	204	792	792	816	2,400
Government Island.....	3	3	6	36	36	72	16	16	16	48	192	192	192	576
Total.....	12	12	24	144	144	288	82	82	84	248	984	984	1,008	2,976

Training station enrollments as of December 31, 1938

At Hoffman Island, N. Y.:	
Licensed personnel.....	26
Unlicensed personnel.....	283
Total.....	309
At Government Island, Oakland, Calif.:	
Licensed personnel.....	32
Unlicensed personnel.....	48
Total.....	80
Grand total (both stations).....	389

An analysis of the applications for enrollment numbering 3,035, filed from the date the first application was sent in on August 24, 1938, to November 28, 1938, is shown in the following table.

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ANALYSIS OF APPLICATIONS FOR ENROLLMENT

Applications: 1 to 3,035, inclusive. Date: November 28, 1938

Present residence

Alabama.....	28	Nebraska.....	
Alaska.....		Nevada.....	2
Arizona.....		New Hampshire.....	2
Arkansas.....		New Jersey.....	116
California.....	543	New Mexico.....	
Canada.....	1	New York.....	896
Canal Zone.....		North Carolina.....	10
Colorado.....		North Dakota.....	7
Connecticut.....	32	Ohio.....	88
Delaware.....	5	Oklahoma.....	
District of Columbia.....	17	Oregon.....	47
Florida.....	80	Pennsylvania.....	86
Georgia.....	8	Puerto Rico.....	337
Hawaii.....		Rhode Island.....	9
Idaho.....	2	South Carolina.....	8
Illinois.....	15	South Dakota.....	
Indiana.....	7	Tennessee.....	2
Iowa.....	4	Texas.....	80
Kansas.....		Utah.....	1
Kentucky.....	2	Vermont.....	3
Louisiana.....	99	Virginia.....	79
Maine.....	12	Virgin Islands.....	
Maryland.....	98	Washington.....	136
Massachusetts.....	120	West Virginia.....	1
Michigan.....	31	Wisconsin.....	8
Minnesota.....	2	Wyoming.....	
Mississippi.....	6		
Missouri.....	3		
Montana.....	2		
		Total.....	3, 035

Citizenship

Unknown.....	3
Native born.....	2, 549
Naturalized.....	478
Alien.....	5
Total.....	3, 035

Marital status

Unknown.....	39
Single.....	1, 607
Married.....	1, 204
Divorced.....	185
Total.....	3, 035

Age

Unknown.....	6
Under 21.....	85
21-30.....	991
30-40.....	928
40-50.....	766
50 and over.....	259
Total.....	3, 035

Military service

None.....	2, 062
Army.....	252
Navy.....	508
Marine Corps.....	40
Coast Guard.....	173
Total.....	3, 035

Employed

Unknown.....	56
Yes.....	335
No.....	2, 644
Total.....	3, 035

12 ~~1~~ ~~2~~ ~~3~~ ~~4~~ ~~5~~ ~~6~~ ~~7~~ ~~8~~ ~~9~~ ~~0~~ ~~A~~ ~~B~~ ~~C~~ ~~D~~ ~~E~~ ~~F~~ ~~G~~ ~~H~~ ~~I~~ ~~J~~ ~~K~~ ~~L~~ ~~M~~ ~~N~~ ~~O~~ ~~P~~ ~~Q~~ ~~R~~ ~~S~~ ~~T~~ ~~U~~ ~~V~~ ~~W~~ ~~X~~ ~~Y~~ ~~Z~~ THE UNITED STATES MARITIME COMMISSION

- 04
Education

Unknown..... 6 Common school (1-8): 1 year..... 2 2 years..... 4 3 years..... 6 4 years..... 22 5 years..... 52 6 years..... 98 7 years..... 204 8 years..... 740 High school (9-12): 9 First year..... 313 10 Second year..... 438 11 Third year..... 277 12 Fourth year..... 539 College (13-16): 13 First year..... 107 14 Second year..... 144 15 Third year..... 36 16 Fourth year..... 47 Total..... 3,035	<i>Merchant Marine experience</i> None..... 495 Under 2 years..... 211 2-5 years..... 602 5-10 years..... 508 10-20 years..... 789 Over 20 years..... 480 Total..... 3,035
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<p style="text-align: center;"><i>Merchant Marine grade</i></p> Unknown..... 39 Licensed: Deck..... 757 Engineers..... 789 Unlicensed: Deck..... 449 Engineers..... 363 Stewards..... 258 Miscellaneous..... 402 Total..... 3,035	<p style="text-align: center;"><i>Maritime Service grade</i></p> (Eligible for enrollment in grade designated below) Ensign..... 412 Ensign (E)..... 480 Seaman, second class..... 214 Fireman, third class..... 198 Mess attendant, second class..... 146 Licensed: Eligible for seaman, second class..... 118 Eligible for fireman, third class..... 90 Total..... 1,658
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Cause for rejection

Licensed: Lacking 7 months in last 2 years (consider for ensign)..... 133 Lacking 7 months in last 2 years (consider for ensign-E)..... 113 Ineligible for enrollment (lacking required minimum of 2 years total sea service in American Merchant Marine)..... 588 Unlicensed: Lacking 7 months sea service in last 2 years..... 381 Licensed: Lacking 7 months sea service in last 2 years (consider for seaman, second class)..... 81 Insufficient evidence of service..... 5 Licensed: Lacking 7 months sea service in last 2 years (consider for fireman, third class)..... 76 Total..... 1,377 Eligible for enrollment..... 1,658 Total applications..... 3,035
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OFFICERS' PAY

Ratios of salaries paid merchant officers are roughly as follows:

1. American.....	100	5. British.....	67
2. French.....	79	6. Scandinavian.....	65
3. Dutch.....	69	7. Italian.....	52
4. German.....	68	8. Japanese.....	33

