

UNITED STATES MARITIME COMMISSION

REPORT TO CONGRESS

ON

TRAINING MERCHANT MARINE PERSONNEL

JANUARY 1, 1939



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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.*

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 $5\frac{1}{2}$ years is prescribed, 3 of which are to be on shore at the college, and $2\frac{1}{2}$ 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	2	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.

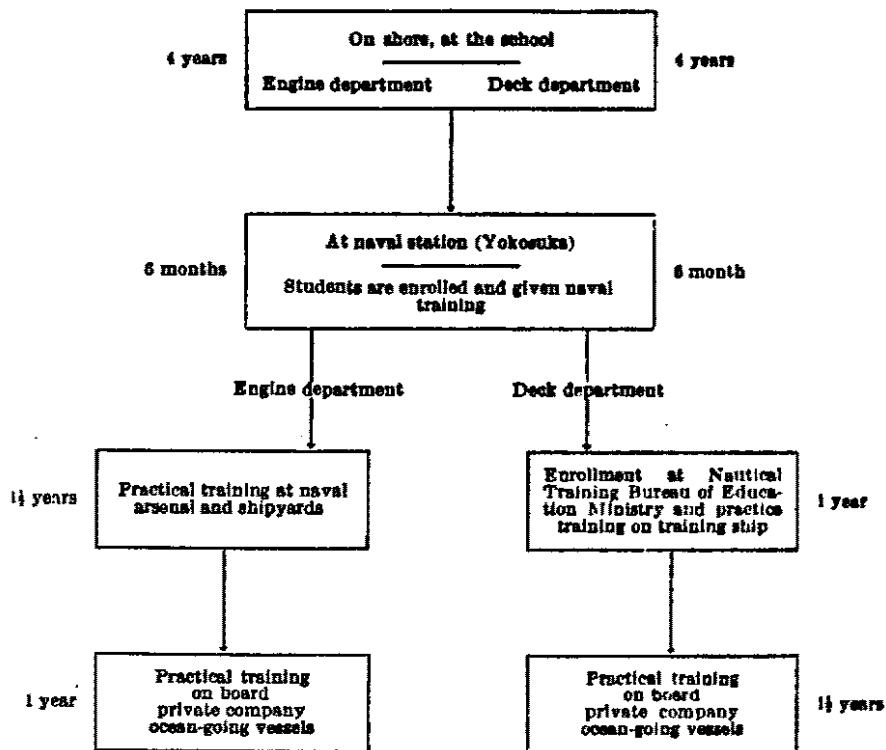
The prefectural schools are all in the classification of technical schools, and all similar in organization. All have departments to train deck officers, but some are without facilities to train engineers.

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.....	3¼.....	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.....	2¼.....	Boys detained under order of court, under sec. 57 of the Children Acts, 1908.	68
Liverpool.....	Training ship <i>Indefatigable</i> .	13-14¼.....	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.....	2¼.....	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	12¼-15.....	1½.....	Poor boys of good character who wish to go to sea.	31
London (Limehouse).	Prince of Wales Sea Training Hostel, London.	14¼-16.....	¾.....	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.....	3¼.....	Physically fit boys of all classes, including those who might be homeless, destitute, or truants.	6
Wallasey.....	Lancashire and National Sea Training Homes. ²	14-15¼.....	1¼.....	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	729	1,276	43
Ordinary seaman.....	63	253	316	20
Cadet.....	39	170	209	14
Apprentice.....	100	574	674	15
All ratings.....	749	1,726	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: Timbies, 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 MATHEMATICS ¹

(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: pneumaticators, 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; ROWING.	SEAMANSHIP; ship construction.	Ship construction; SEAMANSHIP.
Friday.....	PHYSICAL DRILL.	ROWING; nautical terms.	Nautical terms; ROWING.	SEAMANSHIP; ship construction.	Ship construction SEAMANSHIP.
Saturday....	PHYSICAL DRILL.	POLICE BARRACKS.	INSPECTION.		

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	Total.....	3, 035
Montana.....	2		

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
Duration

Unknown.....	6	Merchant Marine experience	None.....	495
Common school (1-8):		Under 2 years.....	211	
1 year.....	2	2-5 years.....	602	
2 years.....	4	5-10 years.....	508	
3 years.....	6	10-20 years.....	789	
4 years.....	22	Over 20 years.....	480	
5 years.....	52			
6 years.....	98	Total.....	8,035	
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			

Merchant Marine grade

Unknown.....	39
Licensed:	
Deck.....	757
Engineers.....	789
Unlicensed:	
Deck.....	449
Engineers.....	363
Stewards.....	258
Miscellaneous.....	402
Total.....	3,035

Maritime Service grade

(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

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

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

