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DEPARTMENT OF COMMERCE
LIGHTHOUSE SERVICE

INSTRUCTIONS TO EMPLOYEES

OF THE

UNITED STATES
LIGHTHOUSE SERVICE

1915



WASHINGTON
GOVERNMENT PRINTING OFFICE
1915

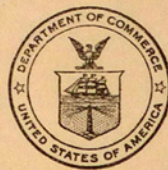
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DEPARTMENT OF COMMERCE,
BUREAU OF LIGHTHOUSES,
Washington, July 15, 1915.

The following general instructions are issued for the guidance of employees of the Lighthouse Service.

Each appointed employee will be furnished with a copy to be personally receipted for and carried on the accounts as Government property.

All previous orders or instructions in conflict with these general instructions are hereby revoked.

G. R. PUTNAM,
Commissioner.

INSTRUCTIONS TO EMPLOYEES, UNITED STATES LIGHTHOUSE SERVICE, 1915.

PART I.

GENERAL INSTRUCTIONS TO ALL EMPLOYEES.

1. **Observance of instructions.**—Employees of the Lighthouse Service shall immediately familiarize themselves with these general instructions and be governed thereby. Each person in the service shall promptly report to the proper authority any disobedience or infraction of the general instructions coming to his knowledge.

All persons entering upon a vessel or property of the Lighthouse Service are required to observe such general instructions for the government thereof as may be authorized by proper authority.

2. **Interests of service.**—It shall be the duty of all officers and employees connected with the Lighthouse Service to further the work of the service in every possible way.

3. **The efficient maintenance of aids to navigation** is the primary purpose of the Lighthouse Service, and all the resources of the service shall be utilized to this end in the most effective manner. All persons in the service shall be vigilant in observing and promptly reporting defects in aids to navigation and in correcting such defects so far as within their power.

4. **Suggestions for betterment of service.**—Employees may submit through the proper channels any remarks and suggestions for the betterment of the service. Such suggestions should be briefly and clearly stated, with reasons for recommendation.

5. **Constant and faithful attention to their duties** shall be required of all persons in the service, and they shall never absent themselves from duty without the consent of their superior officers, except in case of unavoidable absence on account of serious illness, which must be reported at once to the proper officer.

6. **Unauthorized absence.**—Any employee absent from his station or duty without authority shall receive no pay for the days so absent unless the absence be satisfactorily explained. Charges looking to disciplinary action may be filed against an employee for absenting himself from duty without proper authority.

7. **Unfaithful performance of duty.**—No officer, keeper, or other employee shall sleep during his watch, or at his post, or leave his station or post before being regularly relieved. Violation of this instruction may be considered cause for dismissal.

8. Personal character.—All employees of the Lighthouse Service are required to show in themselves a good example of virtue, honor, patriotism, and subordination and to exact similar conduct from persons placed under their jurisdiction.

9. Familiarity with apparatus.—Employees must promptly learn the manner of working, care, and maintenance of all apparatus, equipment, and machinery placed in their charge, and require their assistants to make use of every opportunity to do likewise.

Officers and employees in charge must give proper instructions to their assistants in connection with the care and operation of the apparatus, and should see that such instructions are understood and followed.

10. Efficiency and cleanliness.—Employees in charge of vessels or reservations are responsible for the care, management, efficiency, and cleanliness thereof and for the proper conduct of all persons thereon.

11. Obedience to orders.—All persons in the service are required to obey readily and strictly, and to execute with promptitude and zeal, the lawful orders of their superiors. They shall show to their superiors the proper deference and respect. No person in the service shall join in or abet any combination to weaken the lawful authority of, or lessen the respect due to, his superior officer, or shall treat his superior officer with contempt or be disrespectful to him in manner or deportment.

Violation of this regulation will be deemed cause for the dismissal of the offender.

12. Suspension.—In cases of gross insubordination, neglect of duty, or other serious violation of the regulations, which require immediate action, the employee in charge is authorized to initiate the removal or suspension of the offending person. In cases of this kind the facts, together with the action taken, shall be reported to the inspector at the earliest practicable date in order that effective action may be taken. A person under suspension shall not receive compensation, ration allowance, or commutation thereof during the period of such suspension. This shall apply in cases where, after the investigation of charges, an employee is subsequently restored to duty.

13. Oppression of subordinates.—Superiors of every grade are forbidden to oppress those under them by tyrannical conduct or by abusive language. Authority over subordinates shall be exercised with firmness and justice, and each person shall set a good example to others.

The use of profane language in giving and enforcing orders or the nagging of any subordinate at any time is forbidden.

14. Making false statements reflecting on the character and conduct of a superior, malicious talebearing to officers in authority, or detri-

mental criticism of the same character, whether orally or in writing, will be considered cause for the dismissal of the offender.

15. Repairs and alterations.—The persons attached to a vessel or reservation are expected and required to make without delay all needed repairs and authorized alterations within the capabilities of that force. Repairs or alterations beyond the capabilities of the personnel shall be made the subject of a special and detailed report.

16. Assistance to mechanics.—Employees are required to give such assistance as they can to persons or working parties connected with the Lighthouse Service.

17. Alterations in aids.—No alterations shall be made in the color, appearance, or other characteristics of any aid to navigation or lighthouse structure without authority of the Commissioner.

18. Defects in aids to navigation.—Keepers of light stations and masters of lighthouse vessels shall report promptly to the inspector, and will require their assistants to report, any defect in any light or displacement of any buoy or other damage to, or loss or improper functioning of any aid to navigation coming under their observation. To this end they shall observe from time to time all aids to navigation visible from their station, or that are passed by tenders, and particularly unattended lights and buoys. Such reports will give specifically the official name, number, and location of the aid or property and its present condition. The telephone or telegraph should be used when practicable and the circumstances warrant it.

19. Damage to property.—If buoys or other aids to navigation have been damaged by any vessel or person, employees in charge who observe or have knowledge of such damage shall immediately report same to the inspector, together with all information that will aid in fixing the responsibility, including the whereabouts of the vessel or person causing the damage.

Damage by storm, sea, fire, or other cause to buildings, grounds, or protective works shall be promptly reported.

The action of the sea on the foreshores at stations shall be watched, and any encroachment causing or threatening damage shall be promptly reported.

20. Assistance to vessels and persons in distress.—It shall be the duty of light keepers and their assistants, and officers and crews of vessels of the Lighthouse Service, to give or summon aid to vessels in distress, whether public or private, and to assist in saving life and property from perils of the sea whenever it is practicable to do so; but under no circumstances, except those of extreme and imminent danger, shall a light vessel be moved from her proper station to aid in such work: *Provided*, That no salvage or other compensation, in

addition to the stated salary to which such employees are regularly entitled, shall be claimed or received by them for aid or assistance so rendered. Report of the assistance rendered, with all important facts, shall be immediately made through proper channels to the inspector.

21. Supplies furnished shipwrecked persons.—Whenever shipwrecked persons are sheltered at a light station or on board a vessel belonging to the Lighthouse Service without provisions and with no means of paying for or procuring the same, the keeper of a light station or the master of a vessel is authorized to furnish such persons subsistence from any stores which he has on hand, or necessary clothing, if practicable. When subsistence or clothing has been thus furnished, the proper officer will take a receipt from the persons so furnished for the actual value thereof, and when practicable shall present an account covering the same to the master of the vessel or the owner or agent of said vessel for payment.

In case the master of the vessel, its owner, or agent is inaccessible or refuses to pay the account, the keeper of a light station or the master of a vessel by whom such subsistence has been furnished shall transmit an account, specifying the number of meals furnished, accompanied, if practicable, by a certificate signed by the master or officer in command of said vessel, or by the owner or agent thereof, that the account is correct and no payment thereof has been made, to the inspector of his district, accompanied by a letter stating the name and address of the owner or agent of the shipwrecked vessel, the date and nature of the disaster, the number of persons sheltered and subsisted or provided for, together with such other facts as are pertinent thereto, to all of which statement the keeper of the light station or master of a vessel shall certify.

22. Data affecting charts.—Masters of tenders and other persons in the Lighthouse Service shall report to the inspector information affecting the charts and sailing directions, including notes as to prominent landmarks, dangers, or important improvements not shown, or erroneous information on the charts. When desirable to use pieces of charts in forwarding this information, the copies so used will be replaced. The inspectors will promptly forward such reports to the Commissioner, for transmittal to the office publishing the chart, together with any similar information that they may observe on their inspection trips, and that will be of benefit in correcting or improving charts or sailing directions for use in navigation.

Additions, corrections, or other information affecting Coast Pilots, Sailing Directions, or other publications for the benefit of mariners, shall be promptly forwarded to the inspector and by him to the Commissioner.

23. Salary checks.—Salary checks shall be mailed between the 2d and 5th of each month, at the discretion of the inspector, depending upon isolated location of stations or vessels and their accessibility with regard to mail and telegraph service. Officers or employees in charge are directed to inform the inspector, using the telegraph or telephone when necessary, when any change occurs that affects the pay of any employee under their charge. Officers or employees in charge are directed to return to the inspector checks sent in their care if they know or believe such checks to be incorrect.

24. Interference with duties.—Employees shall not allow any private or other interests to interfere with the proper discharge of their duties, and they must engage in no business or trade that will in any way so interfere.

25. No traffic or trade shall be carried on within any vessel or reservation of the Lighthouse Service, and no article shall be exposed for sale on the premises. Refreshments shall not be sold on any reservation nor any lodger be permitted to reside thereon, without the written authority of the Commissioner, which will be given only in cases of special exigency, and under proper supervision of the inspector, who shall fix the scale of prices to be charged.

26. No work for private parties, firms, or corporations shall be done by the Government force at any lighthouse reservation or on any lighthouse vessel, or by any person in the Lighthouse Service, except by authority of the Commissioner upon an application specifying the nature of the work to be done, and accompanied by a certificate from the inspector that the necessary labor or appliances can not be procured in the vicinity from private contractors. In cases of emergency such work may be commenced by order of the inspector, who will immediately report the circumstances in full to the Commissioner.

27. Neglect of duty.—All persons interested in navigation shall be encouraged by the officers of the Lighthouse Service to give information of any neglect of duty on the part of those employed in the Lighthouse Service.

28. Intoxicants.—The use or introduction for drinking purposes of alcoholic liquors or other intoxicants on board any lighthouse vessel or within any lighthouse reservation is strictly prohibited, and officers or employees in charge will be held directly responsible for the enforcement of this order.

29. Use of intoxicants.—Drunkenness or the excessive use of intoxicating liquors or drugs will be considered cause for the dismissal of the offender.

Inspectors and their authorized representatives are authorized and required to initiate the suspension from duty, pay, and allowances, in accordance with civil-service rules, of any employee of the Light-

house Service found in a state of intoxication, and such action must be at once reported in detail to the Commissioner. Final power to suspend from duty, pay, and allowances rests with the appointing power.

Personal habits which are liable to detract from the ability to perform duty in times of stress or danger will not be excused or tolerated. The importance of sobriety and temperance should be brought to the attention of all employees. Habits of intemperance militate against the prospects of employees for promotion and, if carried to excess, can but result in dismissal.

In the case of any impairment of efficiency of any person in the Lighthouse Service due to indulgence in intoxicating liquors or drugs, inspectors shall report the facts with appropriate recommendation to the Commissioner, setting forth the degree to which such person indulges in intoxicants or drugs and whether or not his indulgence in the same interferes with the proper discharge of his duties.

The transportation on lighthouse vessels of alcoholic liquors or other intoxicants, for the accommodation of private parties, is prohibited.

30. Intoxicated persons on lighthouse premises.—No intoxicated or other objectionable person shall be allowed on vessels or reservations belonging to the Lighthouse Service, and any violation of this regulation shall be considered proper cause for dismissal or other disciplinary action.

31. Vaccination.—Employees whose duties require them to perform interstate travel, or who are regularly engaged in the handling of mail or other material to be carried in interstate traffic, may receive, without cost, vaccination against smallpox or typhoid fever, or both, upon applying in person at those places designated by the Surgeon General of the United States Public-Health Service and presenting a certificate from their immediate chief showing the nature of their employment.

32. Payment of debts.—All persons in the Lighthouse Service must pay their honest, just, and legal debts; failure to do so will be considered cause for dismissal.

33. Presenting false claims against the Government for payment or approval is punishable by a fine of not more than \$5,000 or imprisonment of not more than five years, or both. (From act Mar. 4, 1909, sec. 35, 35 Stat., 1095.)

34. False documents.—No person in the service shall knowingly or negligently make or sign or aid or abet, direct, or procure the making or signing of any false or misleading report, return, or other official paper, even though he believe he is ordered to do so by a superior.

35. Purchases within Lighthouse Service.—No employee shall purchase for the Lighthouse Service any article from a person connected therewith without proper authority.

36. Interest in contracts and patents.—It is unlawful for any employee to be interested either directly or indirectly in any contract for labor or supplies for the Lighthouse Service or to possess either as principal or agent any pecuniary interest in any patent, plan, or mode of construction or illumination, or in any article of supply for the Lighthouse Service of the United States.

37. Purchase of property by employees.—No officer or employee of the Lighthouse Service who has taken part in the condemnation and sale of Government property shall be permitted to become the purchaser thereof.

38. Use of political influence.—All persons in the Lighthouse Service are prohibited from using political influence to better or advance their position or standing in the service.

39. Acceptance of gifts.—No person connected with the Lighthouse Service shall take or receive, directly or indirectly, any gift, gratuity, commission, or valuable consideration of any kind from any contractor or other person with whom the service has had or is likely to have business dealings, or in any manner act as agent or attorney for such contractor or person.

Violations of this regulation will render any such person in the Lighthouse Service liable to dismissal and prosecution, and the contract liable to cancellation.

40. Employees are forbidden to accept fees or other remuneration for courtesies extended or aid rendered in their official capacity. With authority of the inspector, just compensation may be accepted, but not demanded, for personal supplies or property voluntarily furnished in an emergency.

41. Contributions, presents, etc.—No officer, clerk, or employee in the United States Government employ shall at any time solicit contributions from other officers, clerks, or employees in the Government service for a gift or present to those in a superior official position; nor shall any such officials or clerical superiors receive any gift or present offered or presented to them as a contribution from persons in Government employ receiving a less salary than themselves; nor shall any officer or clerk make any donation as a gift or present to any official superior. Every person who violates this section shall be summarily discharged from the Government employ. (Act Feb. 1, 1870, sec. 1784, R. S.)

42. Violation of fishery and game laws.—If any employee of the Lighthouse Service is found guilty of violating the laws protecting game, fur-bearing animals, and the fisheries, measures shall be taken toward his dismissal from the service.

Proper report shall be made by keepers and laborers in charge of lights and by masters of vessels of any violations of the "Regulations for the protection of migratory birds" coming to their attention.

Fishing privileges shall conform to prescribed State laws or regulations.

43. Marking of wrecks.—Employees will report any violation of the following provisions of the river and harbor act of March 3, 1899 (30 Stat., 1152), coming under their observation:

Whenever a vessel, raft, or other craft is wrecked and sunk in a navigable channel, accidentally or otherwise, it shall be the duty of the owner of such sunken craft to immediately mark it with a buoy or beacon during the day and a lighted lantern at night, and to maintain such marks until the sunken craft is removed or abandoned, and the neglect or failure of the said owner so to do shall be unlawful. [Sec. 15.]

Every person and every corporation that shall violate, or that shall knowingly aid, abet, authorize, or instigate a violation of the provisions of section * * * fifteen of this Act shall be guilty of a misdemeanor, and on conviction thereof shall be punished by a fine not exceeding twenty-five hundred dollars nor less than five hundred dollars, or by imprisonment (in the case of a natural person) for not less than thirty days nor more than one year, or by both such fine and imprisonment, in the discretion of the court, one-half of said fine to be paid to the person or persons giving information which shall lead to conviction. [Sec. 16.]

44. Employees not fitted for service.—Employees in charge will report without delay any subordinate whom they consider inefficient, lacking in zeal, or in any manner unfitted to be continued in the Lighthouse Service.

45. Charges against employees.—An appointed or registered employee reported for delinquency or misconduct will be furnished by the inspector with a copy of the charges preferred against him and given three days in which to submit such statement as he may desire. An employee under charges who desires to make no statement, will so report in writing.

Reports of misconduct or complaints shall be confined exclusively to the facts of the specific case. Statements submitted in reply to or in explanation thereof must be expressed in temperate language, free from countercharges, and relate specifically to the matters referred to therein. If there are countercharges, they should be put in a separate letter. Opinions must not be expressed nor the motives of others impugned.

46. Notice of resignation.—Any person who leaves the service without due notice or offers his resignation and leaves the service without action thereon on such short notice as to cause embarrassment to the service shall be recommended for dismissal unless he can give satisfactory reasons for his action. Inspectors shall submit proper report and recommendation in such cases.

47. Uniforms.—All male employees stationed on vessels or at light stations and depots shall wear a uniform when at their station, as prescribed in the "Regulations for Uniforms." When the nature of work requires, such as when keepers are assisting in landing coal and supplies, working clothes may be substituted for uniforms.

48. Person and dress.—Untidiness in dress or uncleanness of person will be a subject for disciplinary measures.

49. International code of signals.—Employees on vessels or at stations equipped with the International Code of Signals shall familiarize themselves with its use.

50. Relations to the public.—Courtesy to the public is enjoined on every officer and employee of the Lighthouse Service while engaged on official duties. Employees will cultivate friendly relations with those outside the Lighthouse Service. When persons make serious inquiry concerning the work of the service, courteous reply should be made and the information given if practicable and in accordance with the regulations. Discourtesy to the public will not be tolerated, and persons in charge shall see that their subordinates conduct themselves with politeness and propriety.

51. Publishing information.—Employees of the Lighthouse Service are forbidden to publish or to cause to be published any notice or information, or to give to any newspaper publication or representative thereof any information relative to the Lighthouse Service, or to give any person access to official records, unless authorized to do so by competent authority. Prior authority must be obtained for the publication of articles or the delivering of lectures concerning the Lighthouse Service or its work, and a copy of any published article should be forwarded to the Commissioner through official channels.

52. The immediate families of employees may occupy such quarters on reservations as may be designated by the inspector.

Employees will be held responsible for the personal conduct of their families residing on premises belonging to the Lighthouse Service.

53. Unauthorized persons on lighthouse premises.—Permission shall not be given, except by authority of the Commissioner, to any person to occupy any premises belonging to the Lighthouse Service; and in case of trespass, it is the duty of any employee of the Lighthouse Service to whom it may become known to make report to the inspector without delay.

54. Standard time.—In all records of the Lighthouse Service standard time only shall be used, except in off-lying regions where such time system is not in use.

55. Correspondence.—Official letter paper only shall be used. Communications must be legibly written, in concise terms, without interlineations and writing confined to one side of the sheet.

The first sheet shall be headed with the name of the vessel, reservation, or place where written, and the date.

Each page shall be numbered, and signatures must be followed by the signer's official title.

In communications addressed to officials, their titles only shall be used.

All communications requiring an answer shall be promptly acknowledged, and further reply if called for should follow as soon thereafter as practicable.

All correspondence on business of the Lighthouse Service, whether addressed to persons within the service or persons, firms, or organizations outside the service, shall be forwarded through the immediate official superior of the writer.

Employees receiving communications for higher authority from subordinates, if expressed in respectful language, shall promptly forward same by indorsement making such recommendation as the circumstances warrant. Should an employee in charge refuse to forward such letter, the subordinate may communicate directly with the inspector, stating his reason for so doing. Such subordinate will be held accountable, if his representations are found to be vexatious, frivolous, or false.

No communication will be received as official which is not sent through prescribed channels or as above.

So far as practicable, all communications to district offices should be addressed, using the official title of inspectors, as "Lighthouse Inspector, Portland, Me.," without the name of an individual.

56. Conduct of business.—Subordinates must conduct official business through their immediate superiors; any official act or correspondence relating to the Lighthouse Service, or the use of any papers connected therewith, otherwise than with the knowledge of such superiors, is strictly prohibited.

57. Official letters, documents, or books of a station or vessel shall not be removed or destroyed except by order of the inspector.

58. Penalty envelopes and labels must not be used except for official purposes.

59. Requisitions for supplies.—Requisitions will be known as "annual," "special," or "emergency" requisitions and so marked in submitting.

Annual requisitions must cover the full needs of the station or vessel for the fiscal year and shall be submitted on such dates as directed by the inspector.

Special requisitions shall be used to cover any unusual or unforeseen expenditures or deficiencies, and must be submitted without delay, specifying date on which supplies will be needed for use.

Emergency requisitions will be used only when the urgency is such that the article can not be obtained by the slower special requisition.

Emergency and special requisitions shall be accompanied by an explanation of the necessity of resorting to their use.

A frequent resort to emergency or special requisitions, through failure to anticipate the needs of a station or vessel, will be considered a subject for disciplinary measures. Requisitions, except such as are made in cases of emergency, shall not be approved until the inspector is satisfied, from examination, at the station or on the vessel, by himself or his representative, that the articles asked for are necessary.

Only sufficient supplies for the proper maintenance of a station or vessel should be furnished, and if there is an accumulation of supplies a corresponding quantity should be deducted from the amounts to be delivered for a subsequent year, and the supplies on hand should be used up or returned to the depot.

Particular care must be exercised that new articles are not furnished when those on hand may be economically repaired.

60. All supplies shall be inspected when received by the employee in charge or his representative. Any deficiencies or defects in quality or quantity shall be noted on the receipts given and a prompt report of the fact made to the inspector.

61. Economy in expenditure of supplies.—In the expenditure of stores and supplies, employees must practice the strictest economy compatible with maintaining at all times a most efficient vessel, light, or station. Unauthorized or excessive expenditures, damage or loss through neglect, shall be considered misconduct and may subject the offender to a checkage of pay. In cases of excessive expenditure, or where the regular supplies for a station run short, explanations will be demanded, and if they are not satisfactory, the inspector shall inform the Commissioner of the circumstances.

62. Medicine chests and medical handbooks must be kept accessible. All medicine chests shall be kept in good condition, and care shall be taken to see that they do not contain deteriorated medicines. Medicine chests shall be accounted for on the property return.

63. Storage of oil and carbide.—All oil and carbide belonging to the Lighthouse Service shall be kept in an oil house, carbide house, or room by itself, and shall be visited daily to detect loss by leakage or otherwise, and every precaution taken for its safe-keeping. No fire or lighted lamps shall be carried into the houses.

Without the sanction of the Commissioner no oil belonging to the Lighthouse Service shall be stored in any cellar, warehouse, or other place of deposit with goods, wares, or merchandise. Oil and carbide houses and paint lockers should be used only for the purpose intended.

64. Empty export oil cases should be surveyed, condemned, and destroyed at the light stations, unless there is a local market for their sale in the usual way, to be determined by the inspector. Any old-style 5-gallon boxed oil cases on hand, if in serviceable condition, may be sold after proper authority has been obtained, with the export cases, if considered advisable, or may be returned to the General Depot for disposition; unserviceable cases to be disposed of through survey and condemnation at the light stations or depots.

Every precaution must be taken to keep the transporting cans for oil dry and to prevent the accidental addition of water to the illuminating oil through the unsealed corks. Landing the transporting cans by floating, or their use as steps, chocks, etc., in boat work, is strictly forbidden.

65. The utmost neatness of vessels, reservations, their equipment, appurtenances, and all other property of the Lighthouse Service is demanded. Spare articles and utensils must be kept at hand and ready for use.

66. Movable articles to be marked.—All movable articles of every description belonging to the Lighthouse Service must be marked "U. S. L. H. S." before applying them to the service.

67. Protection of property.—Employees are required to take proper measures to protect public property in their charge from encroachment, trespass, or any other acts inimical to the interests of the Lighthouse Service. In case of controversy, the facts will be reported to the inspector.

68. Responsibility for safe-keeping of property.—All persons having charge of property belonging to the Lighthouse Service are held responsible for its preservation and safe-keeping, and are required to take all proper measures to protect it from loss or damage, and when such property is not satisfactorily accounted for, the officer or other person to whom it was intrusted shall be charged with its value.

69. Waste of property.—No person in the service shall waste or permit improper use of supplies, materials, or other public property, or fail to attempt to prevent such waste if the same comes to his knowledge.

70. Loan or gift of public property.—No article of public property shall be disposed of by gift, loan, or in any other way for the personal use or benefit of anyone.

71. Recovery of lost, etc., property.—Employees shall take charge of any Government property found adrift, lost, or in unauthorized hands, and shall receive such property if offered for delivery with or without a claim, giving receipt for same, stating its condition, and reporting all facts in detail to the inspector.

72. In the event of the destruction of a vessel or station, the personnel shall remain under the authority of the employee in charge until released by proper authority. The employee in charge must promptly account for all Government property under his charge and await orders.

73. No lost moorings or appurtenances thereof belonging to the Lighthouse Service shall be removed except by an employee, or by proper authority.

74. Property in unauthorized hands.—Employees shall demand the return of all lighthouse property in the hands of unauthorized persons, making immediate and full report of the circumstances to the inspector.

75. Use of public property and services.—No property or supplies of any description belonging to the Lighthouse Service, or official work of any person employed in the Lighthouse Service, or the use of any lighthouse vessel, boat, team, or other equipment, shall be applied to any purpose outside of the public business, or otherwise than as provided in proper instructions or regulations.

76. Receipts must not be given or taken in blank for public money or property, but must be made out in full, with the exact amount of money, or article or articles of property, written out before being signed.

77. Survey of worn-out property at stations or on vessels.—No article of supply or any fixture, tool, implement, or other property belonging to the United States shall be condemned or disposed of, except by proper authority. All employees having the custody of property are required to put aside, in some inconspicuous place, all articles of supply, implements, tools, etc., which are worn out, and a duplicate survey list in ink on the proper form must be prepared by such employees of all worn-out property in readiness for survey at all times. Two persons, either (a) the inspector, superintendent, or assistant superintendent, and (b) any master, first officer, second officer, engineer, or assistant engineer of a tender, or any one of the keepers at a station, may serve as a board of survey for articles at stations or on vessels. One copy of the report of the board of survey shall be retained for the files of the station or vessel and the other forwarded with the condemned articles, when the same are removed from the station or vessel. Supplies, such as oil, etc., which are expended as used, must be entered as expended on the proper form. All worn-out articles which have any value must be sold in the prescribed

manner, if surveyed and condemned. Articles which are worth repairing may be sent to the General Depot for such purpose and re-issue, if their condition warrants such action.

78. Survey of worn-out property at depots.—The same rules shall apply to the survey of worn-out articles at depots, except that the board of survey shall consist of not less than three persons in responsible positions, one of whom at least shall not be an official of the depot in which the articles are stored.

79. Transfer of property.—No public property in charge of an employee of the Lighthouse Service shall be transferred to another person without proper authority. When commanding officers of lighthouse vessels or keepers of lighthouses or any other employees in the Lighthouse Service having custody of property are transferred, removed, resign, or die, an inventory must be made of all the supplies, fixtures, and other property on the vessel or at the light station, and in all cases of transfer, removal, or resignation this inventory must be given by the retiring employee to his successor, who will give him a corresponding receipt. In all cases throughout the service the salary of the retiring employee shall be withheld until he accounts satisfactorily for all the public property placed in his charge. When a depot keeper is relieved and a complete inventory of the lighthouse property in his custody is impracticable, a list will be made by the inspector of selected items from stock and stores, depot tools and equipment, and field tools in charge of the depot keeper, and the quantities, number, etc., on hand as shown by inventory compared with the card records, invoices, and purchase orders, and such check of property shall be as thorough as practicable.

80. Returns of property.—All persons charged with the keeping or application of supplies or other property of the Lighthouse Service shall make regular returns of the receipt and expenditure of the same to the inspector. (See pars. 116 and 196.)

81. Care of buoys.—Employees having charge of the work will be held to a strict accountability in connection with the care of metal buoys. In repainting, all rust shall be properly removed before applying the paint, and except in cases of extreme urgency repainted buoys shall not be placed in the water until the paint is thoroughly dry.

82. Care in storage of gasoline.—Gasoline must be kept in drums or other containers provided for the purpose, stored separately, with good ventilation, protected from the weather and, if practicable, at a distance from other structures. Empty gasoline barrels are highly explosive if containing fumes.

Gasoline tanks must not be filled after dark or gasoline transferred from one receptacle to another while lights of any kind are near by.

Care should be taken when working around the boat with open lights (particularly in the boathouse) to avoid possibility of gasoline explosion caused by leaks in pipes, etc. The gasoline pipe leading from the tank to the carburetor should be kept clean, free from water, and perfectly tight. Shellac should be used on threads of gasoline pipe when making connections. Leaking gasoline is the cause of many fires.

All gasoline should be well strained through buckskin (chamois) before using. The gasoline tank should be kept clean and free from water.

83. Safety matches only shall be used when lighting the lamps and particular care taken that the match is not afterwards thrown where it may start a fire. In case of fire from any cause the fire extinguisher should be used immediately.

84. No smoking will be allowed in gasoline boats.

85. Power boats.—All electrical connections must be kept clean, free from oil, water, etc. The dynamo or spark coil should never be taken apart—all necessary adjustments can be made from the outside. Care should be taken not to short-circuit the batteries. Switches should be left "off" when the batteries are not in use. The wires should be inspected frequently to detect grounding, as this is often the cause of fire. Dry batteries are to be stowed in a box, and taken out of the boat and stored in a dry place when boat is not to be used for some time.

86. Care of engine of power boats.—The engine should be kept covered in bad weather. In cold weather water jackets and pump, when not in use, should be drained to prevent freezing. After draining off the water the engine should be run a few minutes to thoroughly dry out the jackets, etc.

When laying up for the winter, cover all bright parts of the engine with heavy oil or grease—vaseline is excellent for this purpose. Pour half a pint of heavy lubricating oil in each cylinder on top of piston, turning the engine over a few times so as to spread it.

The engine should not be run if missing, pounding, or heating, without prompt attempt to remedy the trouble. No emery should be used on the engine. The time of ignition should, if necessary, be changed gradually and the engine should be slowed down before reversing. Exhaust ports, pipes, and mufflers must be kept clean.

Only good gasoline engine cylinder oil should be used. The engine should not be run with a smoking exhaust, but the supply of oil or gasoline diminished. Oilers and grease cups should be kept full, clean, and in good working order. The oil cups should be boiled in potash occasionally to clean them.

The engine should not be allowed to lay for a long period without turning over. It should be turned over by hand every day, and run

under power for one-half hour each week, and then thoroughly wiped and cleaned up after each run, and all parts examined for loose bolts and connections, and all grease and oil cups filled, ready for instant use. When engine does not start immediately upon first turn, it should not be tampered with, but care should be taken to see that all connections and valves are in proper position, then prime, and continue to turn engine until it starts. Gasoline engines frequently require considerable cranking when cold, and much damage is often done by attempting readjustment.

87. Regulations for equipment of power boats.—The regulations issued by the Department of Commerce governing the equipment of power boats must be strictly observed.

88. Cleaning bilge.—Care must be taken to prevent an accumulation of water, oil, and gasoline in the bottom of the boat. The bilge should be cleaned out frequently.

89. Operation of gasoline engines in boats.—In starting:

- (a) See plenty of oil and gasoline in tanks.
- (b) Oil engines all around.
- (c) See ignition circuit in order, also spark plug.
- (d) Set timer so explosion occurs late.
- (e) Set carburetor a little more open than usual running mark and open all valves to fuel tanks. Test carburetor.
- (f) Turn on oil.
- (g) Turn engine over with relief valves open and note if explosion occurs at proper time in all cylinders.
- (h) Close relief valves and turn engine over through one cycle. It should start running.
- (i) Set carburetor and timer on proper position.
- (j) When engine is in operation the circulating water must be turned on.

To stop engine.—Throw out ignitor switch; this leaves the engine charged with an explosive mixture and it is sometimes possible to start again by simply throwing in switch.

Turn off oil, gasoline, and circulating water.

Troubles.—(a) Failure to start: Fuel mixture too rich, mixture too lean, carburetor or needle valve plugged up.

(b) Ignition: Broken connections, spark plug dirty or short-circuited, vibrator improperly adjusted.

(c) Engine: Leaky piston or exhaust valves or leaky crank case, loss of compression.

(d) Weak explosions: Ignition set too late, loss of compression, not enough fuel, weak spark.

(e) Exhaust passage explosions: Leaky exhaust valves, too rich a mixture.

(f) Slowing down and stopping: Overheating due to insufficient supply of water or oil, weak mixture, loose connections.

(g) Smoky exhaust: Too much lubricating oil.

90. Handling AGA buoys.—

1. Buoys when received should be marked with brass tags, showing dates received.

2. Buoys should be thoroughly cleaned and painted inside and outside at least once a year to prevent corrosion and weakening of plates.

3. To charge buoys, see that tank pockets are perfectly dry, and that fender blocks in pockets are resting evenly on bottom; place buoy in proper position to receive tanks, set tanks in pockets, and wedge firmly. Make connection between tank valves and stationary gas connections. In making connection, always use a new washer; open valve on top of tanks; test all connections with soap water for leaks and replace tank pocket covers, using care that gasket is in good condition to make tight joint. A little graphite and oil on pins and threads of tank pocket drop bolts will prevent them from corroding fast. If any gas connections are located inside buoy body, they should occasionally be tested for leaks. No naked lights or fire of any kind should be used around when testing these buoys, especially in buoy body or tank pockets.

4. To light lantern open tower cock located in angle leg of lantern frame, throw back hood of lantern, allow gas to flow through lantern to expel air. When gas is sufficiently strong, light lantern. Fan gas out of lantern with hand or cap, *keeping face away from over top of lantern when lighting*. Adjust pilot flame by means of small screw on burner column to a very small blue flame. If in bright sunlight, it will be necessary to shade pilot with hand in order to see flame.

See that burner tips are clean and in good condition and that there are no leaks around same, that light is of proper size and shape, and that there are no smoke tails. Any trouble from flame is usually due to faulty burner tips.

5. Turning left-hand screw on side of flashing chamber to the right shortens both light and dark periods; turning to left lengthens periods. Light periods can be further reduced by increasing size of attachment plate on diaphragm. Dark period may be lengthened or shortened independent of light period by manipulating right-hand screw on side of flashing chamber.

6. Lanterns which are to be operated as fixed lights are fitted with an additional by-pass valve located over flashing chamber.

7. After overhauling lanterns or changing characteristic of lanterns, they should be tested for 48 hours before being placed in service.

8. Never light lantern when it is lying in horizontal or inclined position, as heat is liable to crack lens.

9. Never attempt to open lantern when it is lying in horizontal position, for lens is held in position by clamp attached to hood of lantern, and if opened in this position the lens will drop down on frame. Lenses should always be removed before buoys are handled, especially on 375 and 500 millimeter lanterns.

10. To obtain best results, proper gas pressure should be maintained in flashing and reducing chambers—reducing-chamber pressure, 18 inches water; flashing-chamber pressure, 2 to 3 inches water, according to size of burner; the largest burners require lowest pressure. The pressure regulates the efficiency of flame. At proper pressure flame will be full with curved top and corners slightly raised; with excessive pressure, flame will blow and smoke; with insufficient pressure, flame will not form proper shape, will be low in center, and will smoke.

Except where specially authorized, the following standard sizes of burners shall be used in various lanterns: $\frac{1}{2}$ -foot burner in 200-millimeter lantern; $\frac{3}{4}$ -foot burner in 300-millimeter lantern; 1-foot burner in 375-millimeter lantern; $1\frac{1}{4}$ -foot burner in 500-millimeter lantern.

91. Handling Pintsch gas buoys.—

1. Buoys when received should be marked with brass tags showing dates received.

2. Buoys should be thoroughly cleaned and painted at least once a year to prevent corrosion and weakening of plates.

3. *To fill buoys.*—Remove cap from filling valve; install gauge on buoy or gas tank or on both; open filling valve on buoy, then valve on tank; allow gas to flow until pressure has equalized; then start compressor and fill buoy to 12 atmospheres. Close valve, disconnect hose, and test around valve stems and connections with soap water for leaks. Buoys should not be filled beyond this pressure. In filling from high-pressure tanks be sure that valve on buoy is opened before the one on tank. If flow of gas from high-pressure tanks stops on account of frost accumulation from expansion of gas, close and open tank valve a few times or pour boiling water on the valve, which will clear openings.

4. *To light buoys.*—Throw back hood of lantern, open gas valve at base of lantern and on buoy, and allow gas to flow for a few minutes to allow air to work out of lantern. As soon as flow of gas is sufficiently rich to ignite, light pilot flame and adjust by means of small set screw on burner base to a height of one-fourth inch and light flame by similar set screw to a height of $1\frac{1}{2}$ inches. Care should be exercised that there are no leaks around burner, in internal lantern connections, or pipe connections.

5. Flat-flame lanterns properly adjusted should burn five-eighths foot of gas per hour if burning continually; mantle lanterns, $1\frac{1}{2}$ feet.

6. Spreading toes on diaphragm post increases both light and dark periods. Closing-in toes on diaphragm post decreases both light and dark periods. Light periods can be further reduced by installing diaphragm ring with smaller hole in center. Dark periods may be separately increased by operating right-hand gas screw on outside of flashing chamber.

7. To operate lantern as flashing light have right-hand screw open and left-hand screw closed; this passes gas through flashing chamber. To operate as fixed light close right-hand screw and open left-hand screw; this by-passes gas direct from inlet to burner outside of flashing chamber.

8. After overhauling or changing characteristics of lanterns, they should be tested for 48 hours before being placed in service.

9. Care should be exercised in use of mantle lanterns that burner tip, which in this type of lantern controls the gas consumption, is of proper size and that same does not become enlarged. Excessive consumption of gas produces improper mixture, carbonization, and breaks mantles. See that the burner nozzle is tight at all times to prevent vibration and the breakage of mantles. Before applying mantle see that all the burner parts and gas passages are clean. In applying mantle take cover off box and screw mantle on burner nozzle before removing box; when mantle is screwed up as far as it will go, remove box by a straight steady pull. Be careful at all times not to touch the mantle and never open lantern after mantle has been burned, if it can be avoided.

10. Never light lantern when it is lying in horizontal or inclined position, as the flame is liable to injure lens.

11. To obtain best results proper gas pressure must be maintained in flashing and reducing chambers—reducing-chamber pressure, flat-flame lantern, 4 inches water; flashing-chamber pressure, flat-flame lantern, 2 inches water; reducing-chamber pressure, mantle lantern, $1\frac{1}{2}$ pounds; flashing-chamber pressure, mantle lantern, eight-tenths of a pound.

12. The tips of flat-flame burners should be set so that the two holes are parallel to the pilot light, the gas being thus thrown or deflected directly into the pilot flame and insuring prompt ignition and preventing the raising of the height of the pilot light.

92. Tests of Pintsch gas buoys and tanks.—

1. Water-pressure tests must be made every three years, as outlined below. Buoys that are in use in salt water must be kept properly cleaned and painted; otherwise they will deteriorate to a dangerous extent between tests. Buoys or tanks which may have been subjected

to accidents, rough usage in transportation, or about which there may from any cause be a doubt as to their safety in service, must be tested before further use. The gauge used in testing must be correct.

2. Do not allow empty buoys or tanks to have less than one-half atmosphere of pressure, to prevent explosive mixture of gas and air, until immediately before testing.

3 (for buoys). Pump out all gas possible, remove counterweight and manhole cover, clean out inside of buoy, install testing plate in place of manhole plate. This testing plate shall consist of a piece of 1-inch steel plate, drilled for bolt holes to match buoy, machined on inside face, with a 1-inch pipe tap hole in center for connecting test pipe. Attach hose and gauge.

3 (for tanks). Pump out all gas possible, remove regular head, clean out inside of tank, and attach testing head, which is similar to plate described for buoys, but provided with 2 holes, a 1-inch inlet for water and a $\frac{3}{8}$ -inch outlet for gas or air extending by internal pipe to the upper side of the tank, then attach hose and gauge.

4. Open outlet valve and fill buoy or tank with water. Buoy or tank should be placed in such position as will permit all gas or air to be blown out when being filled with water. Unless this is done a gas pocket will be formed, which may result in explosion. Buoys should be placed with the outlet valve uppermost, and tanks should be placed on an incline with the internal pipe uppermost.

5. Close outlet valve when buoy or tank is full of water and pump in water to a pressure 50 per cent more than the working pressure used in the buoy or tank. Examine carefully for leaks.

6. After completion of test, disconnect testing apparatus, open valves, remove testing head, and allow buoy or tank to drain thoroughly. Clean and dry out interior thoroughly.

7. Replace permanent manhole plate and for buoys also counterweight.

8. If air pressure is available, subject buoy or tank to an air pressure of 100 pounds per square inch for the purpose of testing joints that have been remade. During this test go over all parts of buoy or tank with soap water.

9. Blow air out of buoy or tank with gas. Charge three times with gas to a pressure of one atmosphere, and blow out each time, so as to free the gas from air as much as practicable.

10. Charge buoy or tank with gas to a pressure of 12 atmospheres, go over with suds all parts where joints have been broken. Temperature changes will affect pressure, so that small leaks can not be readily detected by observing gauge readings.

11. Keep a record of the entire test, noting the serial number stamped on the buoy or tank, or other definite means of identification.

93. Operation of Pintsch gas buoys.—The following instructions should be observed in connection with the flashing apparatus of Pintsch gas buoys:

1. The lanterns should be tested at least 48 hours before putting into service.

2. All valves should be in line and seat properly.

3. The pressure of the pot should be kept constant.

4. The nozzles should be kept clean, but must not be reamed out in the cleaning.

5. If there should be a lengthening of the light period or flash it is probably due to some defect in the flashing-chamber adjustment or a clogging of the gas tip.

A lengthening of the dark period is probably due to either a loss of pressure in the regulator or a leak in the piping or at the inlet flange.

6. A short light period is probably due to either a leak at the gas tip or too large an orifice which may have been caused by cleaning same with too large a needle.

94. Transportation of high-pressure Pintsch flasks on tenders.—All high-pressure flasks must be carried in the open air on tenders to avoid the danger of fire or explosion by escaping gas coming in contact with lamps or open fires.

95. Transportation of gas containers by common carriers.—"Containers shipped as 'empty' (except in carload shipments to be unloaded by consignee) must have the old red, yellow, white, or green labels removed or completely covered by a square white label measuring not less than 6 inches on each side and bearing thereon the word 'empty' in letters not less than 1 inch high." Gases under a pressure exceeding 25 pounds per square inch are classed as compressed gases, and containers should not be shipped as empty when they contain gas under a higher pressure. On bills of lading covering shipment of gas containers, unless containers are specifically described as "empty" or "filled," the pressure of gas shall be stated. Red labels should be used on containers returned for recharging when they are shown to contain gas as determined by gauging. When the difference in freight or express rates makes it economical to do so, any gas remaining in tanks exceeding 25 pounds pressure should be properly blown off before being shipped for recharging and white labels used. Containers shipped as empty must have valves properly closed.

96. Painting.—All painting, application of washes, including the necessary cleaning, scraping, or chipping at light stations, shall be done by the keepers, except when otherwise ordered by the inspector.

Both the interior and exterior of all structures at light stations must be kept clean by frequent scrubbing and be properly preserved by the application of paints and washes.

No parts will be painted to give them a clean appearance when there is ample paint to protect the parts and same are dirty or dingy in appearance. They shall be scrubbed, which will be done as often as necessary, and no paint shall be applied until that existing is worn thin. This applies to the exterior of buildings and towers as well as to the interior. In cases where the paint is at present excessively thick, cracked, peeling, or blistered, the same shall be scraped off and surfaces sandpapered before any more paint is applied. When a blow torch is used, care shall be taken regarding fire risks, and the torch must not be inverted while lighted.

Roofs, etc.—All tin or galvanized-iron roofs, gutters, and leaders should be painted once each year. Before painting, all loose or blistered paint should be scraped off and all parts brushed with wire brushes. Then all bare spots should be painted two coats of red-lead paint and, when dry, the entire surface painted with one coat of brown metallic paint. All exposed ironwork should be painted once each year. Before painting the surface should be carefully examined to see if there are any blisters or any rust forming under the paint. If so, the entire surface thus affected should be sealed to the bare metal with scaling hammers, then painted with two coats of red lead and, when the red lead is dry and hard, with one coat of the color required by the regulations. If rusty spots are observed to be forming between times of annual painting, such spots should be given attention in the above manner at once. Where drinking water is obtained from roofs, special instructions will be given by the inspector.

Washes.—Before applying a new coat of wash, all loose or peeling sections of the preceding coats should be scraped off. Surfaces should be scraped when necessary to keep the wash from becoming excessively thick.

Windows.—All window sashes must be kept well puttied. When it is found that the old putty is cracked it should be entirely removed and sashes allowed to become perfectly dry, after which they will be primed with white-lead paint and, when paint has dried sufficiently to become sticky, the putty may then be replaced and paint and putty allowed to harden together. When putty becomes hard it may then be painted. In so doing care must be used not to get paint on the glass and make a ragged appearance.

Boats.—Care must be exercised in the painting of boats to see that all loose and cracked paint is cleaned out of the bottom and that they are well cleaned and dry before painting.

Brass work.—The painting of any brass work or apparatus is prohibited.

Machinery.—Fog-signal engines or other machinery shall not be painted except by special permission of the inspector. New machinery shall not be painted.

Hardwood floors in dwellings should not be painted except by special permission of the inspector, but must be kept thoroughly clean and properly coated and protected by shellac or varnish. Work benches ordinarily should not be painted.

Scrubbing and cleaning.—To clean painted woodwork or other painted surface, scrub with clean, fresh water and soap. If necessary, a small amount of sal soda, ammonia, or washing compound may be put in the water. After scrubbing, wipe off with clean water and cloth.

Paint board.—Keepers will be furnished, when practicable, with a sample paint board carrying authorized colors and the standard shades with which they are concerned, with instructions for mixing them. Bright and glaring colors must not be used in painting interior walls.

Preparation of work for painting.—Paint will not adhere to nor dry upon wood or metal which is not perfectly clean and entirely free from moisture, dust, soot, and grease. The surface to be painted must be thoroughly dry, and no painting should be done in rainy or foggy weather or just after a frost. Dust and soot must be removed by brushes and cloths or towels and by washing with hot soft water and soap.

To remove paint from woodwork.—Mix soft soap, 2 ounces, and potash, 4 ounces, in a small quantity of boiling water with quicklime, one-half pound, to form a paste; apply hot and let it remain for one day; or use some form of prepared paint remover.

To prepare new tin work.—All traces of oil, grease, and rosin must first be removed, and to secure a clean surface it may be washed with benzene. If light rust has set in, apply sandpaper, dust off, and give a coat of boiled linseed oil before proceeding to paint.

To prepare new galvanized iron.—To make paint adhere to galvanized iron, its surface should be allowed to weather naturally or roughened by washing with vinegar or diluted muriatic acid applied with a wide soft brush. When dry the surface is ready for the first coat of paint. All traces of the acid should be removed.

To prepare plastered walls.—The walls must be thoroughly dry and brushed free from all dust and loose particles of mortar. Then prime with two or three coats of linseed oil or red-lead priming and when they are dry the colored finishing coats can be put on.

To prepare brick work.—In order that a good piece of painting be obtained it is necessary that the walls be absolutely dry and free from moisture and that the suction of the brick work be stopped. If the bricks are inclined to be soft at least one week of dry weather should elapse, but better still painting should be deferred until well into a dry spell. Give the wall a good brushing with a stiff corn broom in order to remove dust, loose sand, etc., before priming,

which should be of raw oil with very little pigment in it and when dry putty up. Use pure white lead in the second coat, thinning with two parts raw oil and one part turpentine, adding a little drier as required; rub well in. Then the finishing coat, flat or glossy as desired, but if glossy use good boiled linseed oil. Not less than three coats should be applied. If the walls have already been painted and the paint is scaling off, see that the walls are well scraped and allowed to stand during the hot months in order that all moisture can evaporate before beginning to repaint.

To prepare new woodwork.—In unpainted woodwork kill all knots, sap, and pitch streaks with a coat of clear shellac dissolved in alcohol, or otherwise they will cause yellow stains in the finished work. Bad knots should be cut out and a piece of good wood inserted in their places. After treating the knots, etc., a thin priming coat of paint is applied. Raw linseed oil may be used in priming new woodwork. As the object of the priming coat is to fill the pores of the wood, it should be carefully applied; a poor one is sure to give unsatisfactory results. All nails should then be set in to a depth of one-eighth inch or more, and the nail holes, cracks, joints, etc., should be well puttied. Then rub down with sandpaper and dust.

Mixing paints for inside use.—If the paints are ready mixed, use as stated above. If not ready mixed, take the necessary quantity of paint from the can or keg and mix in a bucket with boiled linseed oil until it is of the consistency of cream, then put in japan drier or other drier in the proportion of 1 part of drier to 32 parts of paint and mix the paint, oil, and drier well together, when it will then be ready for immediate use. When the paint in the bucket becomes thicker than cream it must be thinned by adding small quantities of spirits of turpentine, and it may be necessary to add at the same time a very small quantity of boiled linseed oil to increase its drying qualities. For white paint, mix white lead and white zinc in equal parts with spirits of turpentine to form the consistency of cream. If the paint thickens, then thin with turpentine. Black paint may be prepared with dry lampblack mixed with damar or coach makers' varnish and then thinned to the consistency of cream with boiled oil and spirits of turpentine. A gloss may be given to ready-mixed black paint by adding damar or coach makers' varnish.

Mixing paints for outside work.—Paints for outside work are to be mixed with boiled linseed oil and the necessary quantity of japan drier. No spirits of turpentine is to be used in mixing paints for outside work, except in very small quantities. When painting in cold weather is necessary, turpentine may be used as directed by the inspector. Particular care should be taken in mixing paints for outside work to stir the mixture thoroughly. For outside white paint, mix three and one-half parts of white lead and five and one-half

parts of white zinc with boiled linseed oil to the consistency of cream, adding not over one-half pint japan drier and one-fourth pint of turpentine to the gallon of oil. For outside lead color, use lampblack in oil, using above formula for white. For outside black paint, mix lampblack in oil with boiled linseed oil and the necessary quantity of japan drier. For outside brown, mix brown metallic, if in paste form, with boiled linseed oil to proper consistency, using not over one-half pint japan drier and one-fourth pint turpentine to 1 gallon of oil. Ready-mixed brown metallic contains driers necessary.

Methods of producing colors.—Gray or lead color: To white paint ground in oil, or ready-mixed paint, add small quantities of lamp black, or black paint ground in oil until the desired shade is obtained. Straw or buff color: To white paint ground in oil, add in small quantities at a time chrome yellow, or yellow ochre, until the desired shade is obtained. Brick color: Mix venetian red and yellow ochre. Oakwood color: To white paint add yellow ochre. Portland straw color: Mix umber, yellow and white paint. Various colors may also be produced by the use of pure paint materials combined with tinting colors put up by various paint manufacturers. Red lead for iron and buoy work: Wet the dry red lead with water, first allowing it to stand 24 hours, then drain off the water. Mix 100 pounds red lead with 3 gallons boiled linseed oil. Add 10 pounds venetian red (paste form) to the red lead after it has been mixed with a small quantity of the oil. Stir thoroughly and add balance of the linseed oil. Stir occasionally during use. If red lead in paste form is used, break up the paste by the addition of pure raw linseed oil, a little at a time, stirring thoroughly. Add a small quantity of japan drier as required. About $2\frac{1}{2}$ to 3 gallons of raw linseed oil and 1 to $1\frac{1}{2}$ pints of japan drier will be required to each 100 pounds of red-lead paste.

Use and care of brushes.—Paint brushes are round, oval or flat, and their flag ends set either flush, slightly rounded, or chiseled to suit the kind of work for which they are intended. The large paint brushes are used for priming and painting over large surfaces which require considerable quantities of paint. The small brushes are similarly used for smaller surfaces. Separate brushes should be used for each color. If there is a shortage of brushes and it is desired to use them for a different color, wash them in linseed oil or turpentine and then with soap and water. The oil or turpentine used for washing should be saved for mixing paint of the same color. It is important to properly swell a new brush before putting it to use, but under no circumstances should it be put into water to soak for this will cause the brush to always work flabby and if the bristles are of fine grade the brush will twist out of shape. The best method of swelling the head of the brush that has dried out is to separate the

bristles carefully and pour a tablespoon full of water on the brush end of the handle and then stand the brush with the bristles up until the water has been absorbed. This will swell the head and make it as firm as when made. Brushes which have been used must not be left to dry with the paint in them. They must be kept soft by immersing them in enough linseed oil to cover the bristles to within one-half inch of the binding only. Place sufficient linseed oil in a can, pail, or jar and hang or suspend the brushes in the oil, the bristles to be free of the bottom. Brushes standing in water with bristles and ferrules wholly immersed will soon be unfit for use. When through using brushes, and they are to be laid away for some time, they should first be washed in turpentine, then with soap and water until all paint is removed, and then thoroughly dried.

Care of paints.—Keep in a dry place. Keep driers or varnish in tins or bottles. The paint remaining in a partially empty keg or pail should be covered with oil and a cover placed over the same. Never leave paint to dry or exposed to the air or weather.

Instructions for painting.—Paint should be put on by strokes parallel with the grain of the wood, and long, smooth pieces like window and door casings should be finished by drawing the brush carefully along the whole length if practicable, so that there may be no breaks in the lines or by smoothing on to the painted surface as work progresses. If the brush is held too obliquely to the work it will leave the paint in thick masses wherever it is first applied after being dipped into the pot and the surface will be daubed but not painted. A second coat should not be put on until the one previously applied has become thoroughly dry and hard, which will never be the case so long as it is sticky in the least to the touch. Each coat should be of the same thickness throughout, otherwise the work when completed will have an unfinished and slovenly appearance. Paint put on too thin after priming will crack in drying; if put on too thick, it will blister, wrinkle, and peel off. In using the brush where there is sufficient space, draw long strokes to extend the color in a smooth and uniform manner. Where the space is contracted or rough, the paint should be laid on in dabs for the purpose of getting it into the recesses and places where the surface is unequal.

Colors of lighthouse structures.—Outside colors, unless otherwise specially authorized heretofore or hereafter by the Commissioner:

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|---|---|
| (a) Wooden structures | Dark red, metallic brown, or white, with red or lead-colored trimmings. |
| (b) Towers | White. |
| (c) Lanterns and gallery rails | Black. |
| (d) Iron structures (other than towers) | Brown metallic. |

- | | |
|---|---------------------------|
| (e) Shutters | Red, green, or brown. |
| (f) Iron walks, rails, and steps | Brown metallic. |
| (g) Wooden walks, rails, and steps | Lead color. |
| (h) Stone and brickwork (when authorized) and rough board work. | Whitewash or white paint. |

Inside colors:

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| (a) Interior of lanterns, and generally for all interior woodwork except hardwood. | White (with the exception of blank panes, which should be dull black). |
| (b) Floors, staircases, and walls, when authorized to be painted (hard pine floors and hardwoods generally are not to be painted). | Grained or lead color. |
| (c) Iron staircases and railings, and interior ironwork in general, pedestals and service tables. | Brown metallic. |
| (d) Walls, cellars, and outhouses, when painting has not been authorized. | Whitewash. |
| (e) Plastered walls | Light sea green, drab, or cream-colored transparent oil paint, or reliable cold-water paints of the same tints. |

Interior walls and ceilings.—Where practicable the interior walls and ceilings of houses shall be painted or washed regulation tints instead of being papered. A dull finish is preferable.

Putty.—If it is necessary to make it, take four parts of pulverized Spanish or gilders' whiting to one part of raw linseed oil and work, and beat it up into a paste. If wanted as a quick-drying putty, use boiled linseed oil. When too hard for use it may be softened by mashing and rolling in the hands and by the addition of a little linseed oil. Keep put up in bladders protected from the sun and weather or in friction-top tin cans covered with linseed oil.

Coal tar and asphaltum varnish.—These materials must not be used for painting lanterns, lantern decks, and steel structures generally.

Whitewash.—The following recipe for whitewashing has been found by experience to answer on wood, brick, and stone nearly as well as oil paint, and is much cheaper: Slake half a bushel of unslaked lime with boiling water, keeping it covered during the process; strain it and add a peck of salt dissolved in warm water; 3 pounds of ground rice put in boiling water and boiled to a thin paste; half a pound of powdered Spanish whiting and a pound of clear glue dissolved in warm water; mix these well together, and let the mixture stand for several days. Keep the wash thus prepared in a kettle or portable furnace and when used put it on as hot as possible with painter's or whitewash brushes.

The following formula for mixing whitewash, when properly made and put on, gives a white that does not easily wash or rub off, viz: To 10 parts of best freshly slaked lime add 1 part of best Portland cement, mix well with salt water and apply quite thin. Whitewash must never be used on ironwork.

Cement wash for outside of lighthouses.—Take fresh Portland cement 3 parts, clean sand 1 part, and mix them thoroughly with fresh water. With the approval of the inspector neat cement, without the admixture of sand, may be used in special cases. This will give a gray or granite color, dark or light, according to the color of the cement. If a brick color is desired, add enough venetian red to the mixture to produce that color. The cement, sand, and coloring matter must be mixed together. If white is desired, the walls when new should receive two coats of cement wash and then whitewash. After the work has received the first coat, a single coat every three or four years will be sufficient.

It is best to thoroughly dampen the wall with clean fresh water and follow immediately after with the cement wash. This course will prevent the bricks from absorbing the water from the wash too quickly and will give time for the cement to set. Care must be taken to keep all the ingredients of the cement wash well stirred during the application of it. The mixture must be made as thick as it will admit of to be conveniently put on with a whitewash brush.

Varnishing.—In using varnish great care should be taken to have everything quite clean, washing it if necessary. The cans should be kept corked, the brushes free from oil and dirt, and the work protected from dust or smoke.

Varnish should be applied in very thin coats, laid on in the direction of the fibers of the wood and sparingly at the angles.

Good varnish should dry so quickly as to be free from stickiness in one or two days. Its drying will be greatly facilitated by the influence of light, but dampness and drafts of cold air must be avoided.

No second or subsequent coat of varnish should be applied until the last is permanently hard, otherwise the drying of the under coat will be stopped.

The time required for this depends not only upon the kind of varnish but also upon the state of the atmosphere.

Under ordinary circumstances spirit varnishes require from two to three hours between every coat, turpentine varnishes require six to eight hours, and oil varnishes still longer, sometimes as much as 24 hours.

Oil varnishes are easier to apply than spirit varnishes, in consequence of their not drying as quickly.

The surface of natural wood which is to be varnished should be "filled" before the varnish is applied to prevent it from being wasted by sinking into the pores of the wood.

Fillers are usually made under patents, and their exact composition is not known. Any gelatinous substance or glue may be used. Flour and starch mixed with water, benzene, or turpentine are sometimes used; but the use of such mixtures is not permitted, as they make the wood damp, producing mildew, which prevents the varnish from adhering properly.

Varnish applied to painted work is liable to crack if the oil in the paint is not good; also, if there is much oil of any kind in the paint, the varnish hardens more quickly than the paint and forms a rigid skin over it which cracks when the paint contracts.

The more oil a varnish contains the less liable it is to crack. One pint of varnish will cover about 16 square yards with a single coat. Under no condition should spar varnish be used for interiors.

PART II.

LIGHT KEEPERS.

97. **Responsibility of keeper in charge.**—The keeper in charge of a light station shall be responsible for the proper execution of all the duties of the station, whether performed by himself or by his assistants, and for the cleanliness and good order of the station.

98. The official title of the light keepers at a station shall be keeper (employee in charge), first assistant keeper, second assistant keeper, third assistant keeper, etc.

99. The term "light keepers" shall include the keeper and all assistant keepers at a station.

100. **Qualifications of light keepers.**—Besides the requirements as to physical ability, the civil-service requirements as to experience and fitness include ability as a waterman or boatman accustomed to handling and pulling sail and motor boats in all kinds of weather; and in certain cases ability to properly handle and care for fog-signal apparatus and machinery. Ability to read and write is required in all cases.

101. In the absence of the keeper his duties will devolve upon the senior assistant keeper present.

102. **Weekly inspection.**—Keepers will make a personal weekly inspection of the station, including quarters of all assistants and laborers. This inspection of quarters will be made in the presence of the subordinate concerned at a reasonable hour, and record made of condition in the journal.

103. **Light stations must never be left unattended.**—Either the keeper or an assistant must always be present on duty. At stations having no assistant, the keeper must arrange for some competent person to take charge during his absence, which should not extend beyond sunset, except in an emergency or unless authorized by the inspector.

104. **General provisions regarding leave.**—Stations with quarters: Keepers are not considered absent from duty when engaged in regular routine of station, such as getting supplies, mail, etc., and attending church, except where such work requires a trip of several hours' duration. In the latter case an absence of over six hours in the daytime, or any absence at night, shall be noted on the journal and reported monthly as provided for on Form 65.

Stations without quarters: A keeper at his authorized home or en route between the light structure and his home, while off watch, shall

not be considered as absent from the station. Absences of any other character will be reported as prescribed in the preceding paragraph.

At isolated stations, with or without quarters, all absences of whatever nature will be noted on the journal and reported to the inspector on Form 65.

Keepers leaving a station temporarily must notify the senior assistant present of their departure, return, probable duration of absence, and any other matter necessary to an intelligent execution of their duties.

Keepers will require assistants to obtain permission before leaving the station, to report their departure, return, and, if practicable, directions for reaching them in an emergency.

All cases of sickness or other disability preventing a proper performance of duty will be reported as "absence caused by sickness, etc."

Special or doubtful cases not covered by these regulations will be referred to the inspector for decision.

105. **Leave and shore liberty, keepers and assistant keepers.**—For the purpose of granting shore liberty and annual leave to keepers, light stations will be divided into two classes, and the following regulations, which have been approved by the department, are to be observed in granting shore liberty or leave of absence to keepers of stations:

1. Class I includes isolated stations where families do not reside and exceptional cases set forth in paragraph 3, and keepers at such stations may be allowed shore liberty not to exceed 72 days in a calendar year, or at the average rate of 6 days per month for coast districts and lake stations in operation throughout the year, and not to exceed at the average rate of 3 days per month for lake districts at stations not in operation during the closed season of navigation. Shore liberty includes annual leave, sick leave, Sundays, and holidays, and time consumed in coming from and returning to station, except as set forth in paragraphs 4 and 10.

2. Class II includes shore stations where quarters for families are provided, except as set forth in paragraph 3, and, when practicable, keepers at such stations may be granted 30 days' leave per annum, exclusive of Sundays and holidays, but inclusive of sick leave.

3. In exceptional cases the unusual remoteness or the unhealthfulness of location of certain stations should be considered in classifying them.

4. When light keepers are on shore liberty or annual leave and for any reason are unable to report to their stations through no fault of their own within the time allotted, they should promptly notify the district officer and request instructions; and if assigned to duty by

the district officer, the time consumed in performing the assigned duty should not be counted against their shore liberty or annual leave.

5. At stations where two keepers are authorized, neither keeper shall be absent more than four days without providing at his own expense a substitute satisfactory to the inspector. Such absences, however, may be limited at certain stations to not more than two days upon the recommendation of the inspector by special letter in triplicate with the approval of the Commissioner. When a keeper is away from his station on authorized leave of absence the pay and subsistence of his substitute, in case it is necessary for him to employ one, shall be a matter of personal arrangement between the keeper and the substitute.

6. At stations where three or more keepers are authorized, a keeper may be granted shore liberty with pay without having to furnish a substitute, provided that the remaining keepers are, in the inspector's opinion, able to satisfactorily care for the station for the period of authorized shore liberty.

7. No shore liberty or annual leave shall be granted to keepers of light stations during the stormy season, except in cases of emergency.

8. Shore liberty or annual leave may be temporarily suspended or reduced by the inspector, if upon inspecting a station its condition is found to be unsatisfactory.

9. Unused shore liberty or annual leave shall not be carried over to the next calendar year.

10. Shore liberty or annual leave shall not be granted a keeper in excess of the amount accrued at the time leave is desired, except when the best interests of the service will be conserved, or in especially meritorious cases. Deduction shall be made from the salary of a keeper leaving the service for the number of days of shore liberty or annual leave he may have had in excess of the accrued amount.

11. A record shall be kept at each station in the back part of the journal showing the number of days of shore liberty or leave of absence each keeper has had each month for the year ending December 31. This record shall be examined when the station is inspected.

12. At such isolated stations as inspectors specifically recommend, keepers may be allowed by the Commissioner not to exceed one day as actual and necessary time of transit each way in addition to the shore liberty and annual leave allowed under the regulations. (Dept. letters, July 9 and Oct. 5, 1912, and Jan. 10, 1913.)

13. Special regulations regarding leave have been authorized by the department for certain distant light stations in Alaska.

Application for leave of absence must be made on Form 76 and in accordance with instructions thereon.

106. Laborers in charge of lights who are only employed upon lighthouse duties for a portion of their time each day are not considered entitled to leave of absence with pay.

107. No sick leave shall be granted by inspectors unless they are satisfied that the applicants are actually too sick to appear for duty, and they may require that a physician's certificate be supplied for every absence, however short.

108. Leave during closed season.—Employees in districts where navigation is closed during the winter season may be granted leave of absence in excess of the accrued rate from January to March in each year, when their services can be spared, with the understanding that should such employees leave the service before the end of the calendar year they shall refund salary equivalent to the leave taken in excess of that which accrued up to the date of their separation.

109. There is no general authority to grant employees leave with pay on election and registration days, State holidays, etc., unless they are under the regulations entitled to leave with pay, in which case their absence from duty would be charged to such leave.

110. Any abuse of leave of absence by any person in the Lighthouse Service shall be reported to the Commissioner by the inspector with recommendation, and further leave refused until authorized by the Commissioner.

111. In cases of sickness or other disability light keepers must provide efficient reliefs, and when the disability is likely to be of long duration prompt report of the fact must be made to the inspector. All cases of sickness or other disability interfering with the regular and full performance of the keepers' duties must be noted on the journal.

112. Watches.—At stations having assistant keepers watches must be kept and so divided that an equal share of work and desirable hours of watch shall fall to the keeper and to each assistant. Watches shall be stood in such place and manner as to give continuous and the best possible attention to the light and the fog signal when in operation.

At stations having no assistant the keeper must not leave the light for at least half an hour after lighting, in order to see that it is burning properly, and must visit the light at least twice between 8 p. m. and sunrise, and on stormy nights the light must be constantly looked after.

113. Length of time to exhibit lights.—Lights must be exhibited punctually at sunset and kept lighted at full intensity until sunrise, when the lights will be extinguished and the apparatus put in order without delay for relighting. When not in use, the illuminating apparatus must be covered, and the lantern curtains hung.

114. At stations where navigation is closed by ice in the winter, and in the absence of definite instructions from the inspector, lights may be extinguished when navigation ceases, but must always be shown when it is at all possible for vessels to benefit by them. The time of discontinuance and of relighting must be promptly reported. Keepers of isolated stations, when in doubt, should be governed in exhibiting their lights by the action of those less isolated.

115. Cleanliness of station.—Light keepers must keep their premises clean and well whitewashed; grounds in order; all the inside painted work of the lanterns well washed. Spare articles on hand must be examined frequently, kept clean and in order for use.

116. Property returns for light stations.—A property return shall be prepared for each light station by the keeper, showing the property on hand at his station on June 30 of each year and the property received and expended during the fiscal year. One copy must be forwarded to the inspector not later than August 1. An inventory must be taken and the property reported in the return must be checked by actual count, and all discrepancies must be explained in a letter attached to the return, or by certificates for lost property. For use in making up the property return and examining the same, there must be kept at each station a file of all invoices or bills for property received. Account must be kept of all supplies expended, either by memorandum receipts or in a memorandum book.

The property records at the station shall from time to time be subjected to examination at the station, to verify their correctness, and the property itself checked against the records, and the annual return will be verified in the district office.

117. Erection of buildings.—Keepers shall not erect large buildings of a permanent character on lighthouse premises, except those which may be authorized. Keepers may erect, at their own expense, minor buildings, such as henhouses. Approval must first be obtained, however, from the lighthouse inspector, as to the location, size, exterior appearance, disposition upon the removal of the keeper, etc.

118. Salutes.—A vessel displaying official flags indicating the presence on board of officials or persons entitled to such courtesy shall be saluted with three strokes of the bell, or three blasts from other signal, when practicable, upon its departure from the station or in passing. Bells having no inside clapper should have connecting rods detached before saluting with the striker.

119. Boats.—Boats shall be marked and known by their official numbers assigned by the inspector. Boats shall be used for official purposes only, which shall be construed to include all work connected directly or indirectly with the care and maintenance of the station and the personnel thereof.

Station boats must never be used for heavy freight or by working parties, except under the supervision of the keeper.

Keepers and assistant keepers will be held responsible for the proper care of station boats while ashore for supplies, liberty, or other official purposes.

120. Painting of boats.—All boats of stations or depots shall be painted lead color inside and out, with their official number painted on each bow under the letters "U.S.L.H.S." The numbers and letters on such boats shall be in black, of suitable proportions, 3 inches high.

121. Keyboard.—When practicable, a keyboard will be kept in a safe and accessible place where all official keys must be hung by light keepers when absent from station.

122. Necessary supplies will be issued daily by the keeper in the presence of an assistant, if practicable. The exact quantities thus expended must be entered immediately in the record for entering expenditures.

123. The 5-gallon brass cans shall be used for the daily issue of kerosene and must be completely emptied and cleaned before refilling. In refilling, pour off gently all except about 1 inch of the oil from the transporting can into the brass can. The remaining inch of oil in the transporting can is to be then drawn off in a can kept for the purpose and set aside for use in the hand and table lamps.

124. In drawing oil from the brass can for the daily consumption in the lens lamp, again set aside the last inch of oil in the bottom of this can for use in the hand or table lamps. With oil vapor lamps, the additional precaution must be taken of passing the oil through the filter the day before and setting aside the last layer of oil in the bottom of the filter for use in the hand or table lamps.

Oil must never be siphoned from the transporting cans or any other method of emptying employed than pouring off. The oil must be strained when poured off and again when poured into the lamp.

125. Precautions against fire.—Every precaution must be taken against fire. Fire buckets, when provided, must be kept filled with water, and other apparatus accessible, and in a fixed place.

Liquid chemical fire extinguishers must be kept charged, have attached tags showing date of charging, must be recharged at least once every year, kept in a fixed and easily accessible place, and the personnel instructed in their use.

Ashes or sand must be kept available for use on burning kerosene, gasoline, etc.

Should oil or gasoline become ignited, the best means of extinguishing it is by the use of the liquid chemical fire extinguishers, being sure to direct the stream at the base of the fire. In the absence of a patent extinguisher, sand, earth, or ashes should be used. A heavy woolen blanket thrown over the fire will also tend to smother it.

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Station boats must never be used for heavy freight or by working parties, except under the supervision of the keeper.

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121. Keyboard.—When practicable, a keyboard will be kept in a safe and accessible place where all official keys must be hung by light keepers when absent from station.

122. Necessary supplies will be issued daily by the keeper in the presence of an assistant, if practicable. The exact quantities thus expended must be entered immediately in the record for entering expenditures.

123. The 5-gallon brass cans shall be used for the daily issue of kerosene and must be completely emptied and cleaned before refilling. In refilling, pour off gently all except about 1 inch of the oil from the transporting can into the brass can. The remaining inch of oil in the transporting can is to be then drawn off in a can kept for the purpose and set aside for use in the hand and table lamps.

124. In drawing oil from the brass can for the daily consumption in the lens lamp, again set aside the last inch of oil in the bottom of this can for use in the hand or table lamps. With oil vapor lamps, the additional precaution must be taken of passing the oil through the filter the day before and setting aside the last layer of oil in the bottom of the filter for use in the hand or table lamps.

Oil must never be siphoned from the transporting cans or any other method of emptying employed than pouring off. The oil must be strained when poured off and again when poured into the lamp.

125. Precautions against fire.—Every precaution must be taken against fire. Fire buckets, when provided, must be kept filled with water, and other apparatus accessible, and in a fixed place.

Liquid chemical fire extinguishers must be kept charged, have attached tags showing date of charging, must be recharged at least once every year, kept in a fixed and easily accessible place, and the personnel instructed in their use.

Ashes or sand must be kept available for use on burning kerosene, gasoline, etc.

Should oil or gasoline become ignited, the best means of extinguishing it is by the use of the liquid chemical fire extinguishers, being sure to direct the stream at the base of the fire. In the absence of a patent extinguisher, sand, earth, or ashes should be used. A heavy woolen blanket thrown over the fire will also tend to smother it.

Fires or lights in buildings must never be left unattended.

Smoking is prohibited in all buildings belonging to the Lighthouse Service, except in living quarters.

Open lights must never be taken into rooms used for storing oils, paints, gasoline, or other inflammable materials.

Only safety matches, or those furnished by the Lighthouse Service, will be allowed on lighthouse premises.

Oily waste, rags, and other means of spontaneous combustion must be promptly destroyed.

126. Fire drills at depots.—Fire drills shall be required at depots where combustible property is stored at least once a month, and each drill shall be noted on the keeper's monthly report or other proper record.

127. Storehouses, oil houses, and other buildings at depots and light stations where lighthouse property is stored shall be kept locked, except when being entered on official business.

128. Uniforms (see also paragraph 47).—Regulation working clothes shall be worn when engaged in dirty work.

Regulation aprons shall be worn when cleaning lamps and lenses.

129. Subsistence.—Each appointed light keeper is by law entitled to receive one ration per day, or in the discretion of the Commissioner, commutation therefor at the rate of 30 cents per ration. Such provisions as are contracted for by the inspector may be furnished in kind to stations where, in the opinion of the inspector, it is for the best interests of the service. Where rations in kind are delivered, the contract cost will be deducted from the allowance of 30 cents per day and the difference paid as a commutation. Where no ration in kind is issued, the allowance of 30 cents per day will be commuted.

A keeper or assistant keeper is not entitled to the ration allowance during any period for which he may be suspended from pay and duty, nor while he is transported under orders on a lighthouse vessel, his subsistence being furnished on the vessel, nor while on other official duty away from station during which actual expenses for subsistence are received.

130. Fuel and gasoline allowances.—A fuel allowance will be made to a light station only as may be authorized by the Commissioner. No fuel allowance will be made to the keepers of light stations where no quarters are furnished by the Government.

Each station to which a Government power boat is assigned shall have an authorized allowance of gasoline or other fuel to be based on the reasonable requirements of the official business of that station.

These allowances are not to be considered as either a perquisite or an emolument, but solely to facilitate the work of the service. The amount authorized shall be considered as simply a limit to the quantity to be used for official purposes connected with the station.

If accumulations of these supplies result, they must be indicated clearly in requisitions and must be used up the following year and taken into account when filling such requisitions.

The supply of gasoline furnished by the Government must be used for official business only and not for any other purpose.

131. Board and lodging.—Employees called upon by the inspector to furnish board and lodging to working parties shall receive just and reasonable compensation for same. When practicable, notice in advance of the size of party and the probable dates of its arrival and departure will be given.

The keepers of light stations are required to give such assistance as they can to officers and to working parties connected with the Lighthouse Service.

132. Visitors.—Visitors must be received with courtesy, and may be admitted in limited numbers to lighthouse reservations and light-houses at prescribed hours which will not interfere with the work of the service.

Visitors while on the reservation shall be accompanied by an employee, and must not be allowed to touch any part of a lens or other apparatus, or deface or injure any part of the equipment, buildings, or grounds. Children must not be admitted unless accompanied by adults.

Intoxicated or boisterous persons must not be admitted nor unseemly conduct of any description allowed.

Employees are forbidden to accept gratuities.

Keepers shall see that a copy of the "Rules for Visitors," Form 119, is posted at or near each entrance to the reservation or at some other convenient place where it can be seen by visitors, as well as in the tower and in the fog-signal house, if any.

Keepers shall strictly enforce the regulations in regard to visitors, and will be held accountable for damage caused by them to light-house property.

The power machinery and other apparatus must not be started for the purpose of showing visitors the operation of the light or the fog signal, etc.

133. Commendation.—Letters of commendation may be issued to employees for especially meritorious or heroic services. Such letters shall remain the personal property of the employee concerned, the receipt being noted in log book or journal and a copy placed in the records of the inspector's office.

134. Efficiency stars and flags.—Keepers in charge of light stations who have attained a high efficiency as shown by inspections made during the fiscal year shall be entitled to wear the inspector's efficiency star for the succeeding fiscal year.

Light keepers who have been authorized to wear the inspector's efficiency star for three successive years shall be entitled to wear in lieu thereof the Commissioner's efficiency star.

The inspector's efficiency star shall be of gilt and the Commissioner's efficiency star of silver. Stars shall be worn in the manner prescribed in the Regulations for Uniforms.

The light station in each district attaining the highest general efficiency during a fiscal year shall be entitled to fly the "efficiency flag" during the succeeding fiscal year.

The efficiency flag shall be the regulation Lighthouse Service flag, and shall never be displayed above or on the same staff as the national colors.

These emblems shall apply to light stations only.

Keepers awarded stars, and stations receiving the flag, shall retain them during the year for which awarded so long as they maintain the proper standard of efficiency, and if not maintained the emblems shall be taken away.

The display of unauthorized flags on lighthouse reservations is prohibited.

135. **Women and children at isolated or offshore stations.**—No women or children will be allowed to reside at isolated or offshore stations, unless by special permission of the Commissioner, previously obtained.

136. **Improper use of dwelling and structures.**—No light keeper's dwelling or lighthouse structure shall be used as a pilot station nor as a boarding or lodging place for pilots, or other persons not in the Lighthouse Service, except by special authority of the Commissioner.

137. **Officers of the Coast and Geodetic Survey, with instruments,** may be permitted to make observations at lighthouses when engaged on official business, with the understanding that no interference with or expense to the Lighthouse Service will be created thereby.

138. **Clean lens and lantern daily.**—To clean lens, wipe with soft linen cloth and finally polish with a thoroughly dry buff skin. Remove oil or grease with a linen cloth moistened with diluted ammonia or other authorized wash. Never use a skin which has been wet or damp.

Carefully protect all material used for cleaning lens or lantern glass from grit of any kind.

139. **To prevent frosting of lantern glass** rub small quantity of glycerin over surface with linen cloth, repeating as necessary.

140. **To clean reflectors** dust with soft cloth, rub with buff skin lightly dusted with authorized powder kept in a double muslin bag, then rub lightly with a second buff skin and finally with a third by

passing over reflector with a light quick circular stroke. Stove gas will tarnish reflectors.

141. **Soiled chimneys** should be rubbed with a rag or soft wood dipped in oil. If still discolored, rub with a wet cloth and soda or common salt; afterwards cleanse in warm water, as adhering salt will cause breakage.

142. **Dampened cloths and hand brushes** should be used in general cleaning about lantern to prevent dust.

143. **Storing cleaning utensils.**—The lantern must never be used to store cleaning utensils, etc. They must be kept in the service room or watch room.

144. **Broken lantern glass** must be promptly replaced. After cutting, the edges of a glass should be ground level and smooth by rubbing on a cast-iron plate covered with sharp wet sand or with a block of coarse carborundum. To avoid breakage from oscillation about one-sixteenth of an inch must be left on all sides between the glass and its frame. The glass must be rested on thin sheets of lead or soft wood.

145. **Revolving clockwork** must be kept clean, and well oiled after removing old and gummy oil. Clock oil only should be used on the works, a cloth greased with clock oil on the iron or steel parts. The use of a salted grease is forbidden. The foot of the fly shaft must be watched to prevent cutting or wearing. The weight when not in use is to be kept on its rest.

146. **The chariot or carriage** of a revolving lens must be kept clean and the roller bearings well oiled. When necessary to remove the rollers, do so one at a time. In replacing rollers, put back on same shaft or pin from which removed without changing the number of washers.

If the lens revolves on ball bearings, the groove or track in which the balls run and the balls must be kept absolutely clean. The balls must be removed whenever necessary, and parts in rolling contact wiped dry and clean, and then the smallest quantity of clock oil used sufficient to keep them from rust. Ball bearings should generally be cleaned once a week, unless conditions are exceptionally dusty or dirty. In mercury float installations, where the balls are entirely inclosed, cleaning once a month is generally sufficient.

If the lens revolves on a mercury float, see that the float turns freely in the tank without rubbing against it, and that the mercury is kept at proper level and free from dirt or oil.

147. **Smoked glasses.**—Keepers and others when attending and regulating high-power lights should wear blue or smoked goggles at all times, in order to avoid the injurious effect of such lights on the eyes.

148. Oil-vapor lamp fittings should not be discarded if they can be cleaned and continued in use. When discarded such articles should be preserved until inspected by the inspector or his authorized representative.

149. Machinery and apparatus.—Instructions for the operation of all machinery and apparatus will be furnished to each station to cover the individual equipment of that station.

150. Record books.—The following record books must be kept as a part of the official records of light stations:

Journal.—This book will be kept at all stations having resident keepers.

Watch book.—This book will be kept at all stations having one or more assistant keepers.

Fog-signal record book.—This book will be kept at all stations having fog signals.

The above books must be kept in accordance with the printed instructions thereon.

Expenditure and receipt book.—A record of expenditures and receipts shall be kept at all stations. This record may be kept in rough on a copy of Form 30 or as otherwise directed, but all invoices of articles received, copies of survey of property (Form 25), certificates of lost property (Form 28), copies of expenditure report (Form 34), and copies of the annual property return (Form 30) must all be kept on file at the station in a systematic manner, separately for each fiscal year, and so as to be readily accessible to inspecting officers.

151. No alteration or addition will be made in any official record, except by the keeper, who must initial same, adding an explanatory note, if necessary. Erasures must not be made.

152. No entries or signatures shall be permitted in any of the official record books of the station, except by light keepers or officials of the Lighthouse Service.

153. Reports and returns.—Keepers shall submit the following reports and returns, carefully following the instructions on the printed forms:

Weekly—

Report of vapor lamp (Form 78) (to be submitted for stations having vapor lamps as long as considered desirable by inspector).

Monthly—

Report of light station, depot, or light vessel (Form 65).

Report of fog signal (Form 66) (to be submitted for stations having fog signals).

Quarterly—

Report of principal supplies at stations (Form 34).

Annual—

Keeper's annual property return (Form 30).

Keeper's annual requisition (Form 30).

Receipt for annual supplies (Form 27).

When occurring or required—

Special or emergency requisition (Form 95).

Receipt for supplies (Form 27).

Survey of public property (Form 25).

Certificate of lost property (Form 28).

Transfer of property (Form 30).

Damage to or irregularity in working of illuminating or fog-signal apparatus (special letter).

Storm damage to grounds, buildings, or protective works.

Misconduct or inefficiency of subordinates (special letter).

Life-saving or aid to persons in distress (special letter).

Information as to defects in any other aids to navigation, visible from station, or coming to knowledge of keeper, as, for instance, neighboring light out or dim or buoy out of position (special letter or telegram), and also notify tender, if in vicinity, or other keeper.

Other occurrences worthy of report (special letter).

154. Monthly or special reports on the condition of stations, when recommending repairs or alterations, shall be explicit as to all necessary details.

155. Special reports of damage to lens or signal, machinery, or appurtenances, shall give cause, parts damaged, and detailed information to expedite renewal of same.

PART III.

FOG SIGNALS.

156. These instructions apply to all stations and vessels equipped with fog signals, and are in addition to the other instructions for light stations and light vessels, respectively.

157. Responsibility for fog signals.—The keepers of stations and masters of vessels provided with fog signals will be held to a strict accountability for the sounding of the signals during the whole time that weather conditions make the signal useful to navigation. It is especially to be borne in mind that it is better to sound the signal too much than too little. Keepers and masters will be held responsible for the proper care of, attention to, and management of fog signals, and of all machinery connected with these signals.

158. Sounding of fog signals.—Fog signals must be sounded when a given object can not be seen a distance of 5 miles, unless special authority is given by the Commissioner, and submarine signals when fog appears on the horizon. Fog signals must also be sounded whenever the fog signal of a passing vessel is heard.

159. Promptness in sounding fog signals.—At every station provided with fog signal, a close watch must be kept for the approach of fog conditions, and every effort must be made by the keeper or master to sound the fog signal at once on the actual approach of fog. The fog-signal machinery and apparatus must at all times be kept in a thorough condition of repair and preparation for use on the shortest notice, and when weather conditions warrant all preliminary preparations must be made for sounding the signal.

160. Explanation of failure to sound fog signal.—Whenever a fog signal is not sounded for the entire interval during which weather conditions require sounding of signal, a full explanation must be entered in the journal and report, and if necessary, a special report must be sent promptly to the inspector.

161. All machinery must be inspected and turned over daily by hand or other power. The employee in charge must make a careful examination and inspection of the entire fog-signal apparatus before putting it into operation, and must see that it is in complete and satisfactory working order. When the machinery is not in operation, it must be covered with a tarpaulin or canvas cover, and when neces-

sary, must be cleaned and wiped off. Fog signals operated by oil engines, or otherwise than by steam, will be worked at full pressure at least 15 minutes each week.

Steam fog signals will be operated at full pressure at least 15 minutes each month.

All parts of apparatus after a run must be thoroughly oiled and cleaned and examined for loose bolts, nuts, or other defects, and all oil tanks and oil and grease cups filled ready for starting immediately when required.

The weekly and monthly tests prescribed shall be noted on the fog-signal record (Form 302) and reported on the monthly fog-signal report (Form 66), in the "Remarks" column.

162. Accidents to be reported.—In case of accident to or trouble with any part of the fog-signal equipment, which can not be repaired by the employees of the station or vessel, an immediate report must be made to the inspector, giving such information as will enable that officer to provide the necessary assistance and materials for putting the fog signal in good working order in the shortest time.

163. Duplicate fog-signal plants.—When any part of the plant or equipment is in duplicate, each set should be given an equal amount of usage.

164. Cleanliness and care.—The space occupied by the machinery must be kept clean, and all parts of the apparatus must be kept well oiled and free from dust, dirt, and rust. No dirty waste, cotton, or woolen rags or oily cloths shall be left in boxes, corners, or elsewhere, to ignite by spontaneous combustion; but when wiping off is finished such articles shall be thrown into buckets of water for washing or, if unfit for further use, shall be promptly burned in a safe manner.

165. Engines in operation.—Whenever fog-signal engines are in operation, a competent person must be in attendance at all times.

166. Fog-signal records.—In order to secure uniformity in the operation of fog signals and the preparation of Forms 302 and 66, the following instructions must be carefully observed:

(a) The time entered in the "Time commenced" column should be the time that the proper object or distance used as a guide can no longer be seen on account of fog, snow, or smoke. The time entered in the "Time ended" column should be the time when the proper object again becomes visible.

(b) The time entered in the "Time started" column should be the time that the fog signal is started sounding. In the case of whistles, sirens, trumpets, etc., where it is not possible to start this signal immediately, the bell or other emergency signal should be started at once, and the time of starting such emergency signal noted in the

"Remarks" column. The time entered in the "Time stopped" column should be the time when the fog signal is stopped by the keeper.

(c) If there is any unusual delay in starting the fog signal promptly when the stated objects can not be seen, proper explanation of the delay must be given in the "Remarks" column and reported at once to the inspector.

(d) Subject to the orders of the inspector for particular stations or vessels, the appearance of fog on the horizon, haze, or other indication of thick weather should be noted in the "Remarks" column as soon as observed and the submarine bell started immediately and time entered in proper columns.

(e) In the case of steam fog signals, during the foggy season and subject to the inspector's orders, banked fires should always be kept on one boiler except in the rare cases where only a single boiler is provided, and any job of repairs to fog-signal machinery that can not be accomplished at once by the employees of the station or vessel should be reported immediately to the inspector.

PART IV.

ALL LIGHTHOUSE VESSELS.

167. All vessels of the Lighthouse Service shall be kept in a condition of thorough efficiency and cleanliness, prepared for the duty to which they are suited.

168. The officers of lighthouse vessels shall be known as "deck officers" and "engineer officers."

169. Familiarity with waters.—The commanding officer and all deck officers must be familiar as pilots with the navigable waters of the entire district in which employed. Commanding officers will furnish any information or instruction desired by the deck officers for this purpose and will report any officer not complying with the instructions of this paragraph.

170. Licenses from Steamboat-Inspection Service.—All officers, except cadet officers and cadet engineers, on lighthouse vessels having means of self-propulsion must be licensed by the United States steamboat inspectors, which license shall cover their position and the waters in which their vessels navigate.

171. An officer who departs from his orders or instructions under any circumstances, or takes official action at the request of any person, must do so upon his own responsibility and immediately report the circumstances to his superior officer.

172. Responsibility for safety of vessel.—The officer in command of a vessel of the Lighthouse Service is responsible for its safety and proper navigation, and no other officer or employee of the Lighthouse Service shall interfere with the officer in command in such manner as to affect his responsibility for the safety of the vessel while he remains in command thereof.

The officer in command shall at all times maintain his vessel in a seaworthy condition, so far as lies within his power, and shall promptly report to the inspector all defects that may exist, also all deficiencies in fuel, oil, or other needed supplies, so far as these affect or are necessary for the safety and preservation of the vessel.

The largest scale chart shall be used in approaching land, and the greatest care shall be used in navigating and in anchoring in dangerous localities, particularly in unsurveyed areas, making due allowance for the range of tide and uncharted dangers.

173. In the absence or disability of the commanding officer, all his duties shall devolve upon the senior deck officer present. Should

there be no deck officer present, the duties of the commanding officer shall devolve upon the senior engineer present.

174. The officer of the deck is the officer on watch in charge of the ship. Every officer or other person in the ship, whatever may be his rank, who is subject to the orders of the commanding officer, shall be subordinate to the officer of the deck.

The officer of the deck shall remain in charge until regularly relieved, and shall not engage in any occupation which may distract his attention from duty.

175. The officer of the deck shall, before taking charge, make himself thoroughly acquainted with the position of the vessel with reference to vessels in sight, and to any land, shoals, or rocks that may be near; with the general condition of the weather, the course, speed, condition and amount of sails set, if any, all unexecuted orders, and the orders of the commanding officer; with the condition of the running lights, and any other appliances required by law to be in operation on at hand in order to prevent collisions; and with the condition of the force on deck available for duty, and the general condition of the vessel.

176. Loss of ship.—In case of the loss of the ship, the commanding officer shall remain by her with officers and crew as long as necessary and save as much Government property as possible. Every reasonable effort shall be made to save the logs and other valuable papers.

Each officer and member of the crew shall be assigned to a station, and the boats shall be properly provisioned for use in case it becomes necessary to abandon the ship. The commanding officer shall be the last person to leave the ship.

177. Duties of officer ordered to command vessel not yet in commission.—An officer who has been ordered to the command of a vessel not yet in commission shall at once make a thorough personal examination of her, and inform himself as to her condition and state of preparation for service.

He shall pay particular attention to the equipment and ascertain if there are any defects in her outfit and stores, including machinery, boilers, pumps, water-tight doors, bulkhead gates, valves and cocks, access to bottoms and bilges, ventilation, fire-extinguishing and distilling apparatus, spars, sails, rigging, and implements, navigation supplies and instruments, provisions, and medical outfits.

He shall cause to be examined all spare parts of machinery and other spare articles, and ascertain if they are suitable for the purpose intended. He shall satisfy himself that the boats are tight, and that their outfits, and the hoisting apparatus, are efficient.

He shall make requisition for such articles as are required to render her efficient.

178. Assuming command of vessel in commission.—If, when an officer joins the vessel to which he has been ordered, she is already in commission, he shall proceed, after taking command, as though the vessel had just been commissioned. The commanding officer about to be relieved shall transfer to him every article in his keeping that pertains to the commanding officer, and afford all the information possible that will be of service in the administration and command of the vessel.

An officer, upon assuming command of a vessel when she is commissioned, becomes responsible for the discipline on board.

179. Inspection upon transfer of vessel.—The commanding officer about to be relieved, shall, before the transfer is effected, make a thorough inspection of the vessel in company with his successor. He shall point out any defects and account for them, and explain fully any peculiarities of construction or arrangement of the vessel. A statement, in quadruplicate, of the inspection shall be drawn up, and if satisfactory, signed by the relieving officer. If not satisfactory, he shall state in what particular it is not so, and the officer relieved shall make such explanation as he may deem necessary, each over his own signature. One copy of this statement shall be forwarded to the Commissioner, through the inspector, one to the inspector, and one shall be retained by each of the commanding officers. The statement shall be submitted on Form 39. If necessary, additional sheets may be used, to be attached to the form, for the preparation of any part of the statement that may not be covered by the form.

180. Delivery of orders, records, etc., upon transfer of vessels.—The commanding officer about to be relieved shall deliver to his successor all general instructions and regulations received for his guidance in command of the vessel, and such other official correspondence, documents, and information concerning the vessel and personnel as may be of service to his successor. He shall also fully inform his successor of the status of all orders, if any, remaining unexecuted at the time of his relief, and shall immediately forward to the inspector a detailed written statement, in duplicate, covering the same, one copy of which will be returned by the inspector to the officer succeeding, with proper indorsement. Under no circumstances shall he carry away the original records of his official correspondence, original letters, documents, or papers concerning the vessel or her officers and crew, or any property or outfit pertaining to the vessel. He shall sign the log books, and all other papers requiring his approval, up to the date of his relief.

181. Watch and division of work.—A proper watch and division of work among officers and crew shall be required. A regular watch must be kept at all times. In bad weather, if at anchor, a spare

anchor must be ready for letting go and a sufficient watch on hand to meet any emergency.

182. A weekly inspection of the vessels under their command will be made by commanding officers, noting the result in the log, and taking immediate steps to correct, or report to the inspector, any unsatisfactory conditions existing.

The commanding officer shall see that an examination and operating test is made once a week of all cocks, valves, slides, doors, outlets, hatches, etc., pertaining to the pumps, water-tight compartments, and ventilating apparatus.

183. Offenses by crew.—The commanding officer shall, if possible, investigate in person all offenses by the crew. The investigation shall not be delegated to any other officer, unless in case of illness or absence from the ship.

184. Requests or statements of crew.—The commanding officer shall, under reasonable restrictions as to time and place, receive and consider any statement that any member of the crew may desire to make.

185. Record books.—The following record books shall be kept as part of the official records of lighthouse vessels:

Deck log.—A deck log shall be kept on all lighthouse vessels to which personnel complements are assigned.

Steam log.—A steam log shall be kept on all lighthouse vessels having a personnel complement and propelling machinery.

Record of fog signal.—A record of fog signal shall be kept on all light vessels having fog signals.

The above-named books shall be kept in accordance with the printed instructions therein.

186. Radio apparatus.—Officers on lighthouse vessels on which radio outfits are installed shall familiarize themselves with the installation and operation of the plant.

187. Radio operators are considered strictly subordinate to the commanding officer and engineer officer in charge and shall assist in necessary repairs to the electrical outfit of the vessel and in other work when called upon by their superiors.

188. Shipping of crew.—The crews of lighthouse vessels may be shipped by the commanding officers under the direction of the inspector. Service cards (vessels) shall be promptly forwarded to the inspector for all changes affecting pay status, etc., of nonappointed employees.

189. Preference shall be given in the employment of crews of lighthouse vessels, first to citizens of the United States, and second to those who have legally declared their intention to become such citizens. An alien shall be employed only when it is impracticable to obtain a suitable man who is a citizen of the United States, or one who has legally declared his intention to become a citizen.

190. Visitors.—All officials who come on board or leave the ship shall receive the honors to which they are entitled.

All persons coming alongside or visiting the ship shall be courteously treated.

Unless prevented by urgent duty, the commanding officer shall be at the gangway to receive, and shall accompany to the side, all officials or distinguished visitors.

191. Regulations for safety of life.—Regulations promulgated by the Secretary of Commerce pursuant to law, to provide for safety of life on navigable waters, shall be enforced.

192. Pilot rules.—A strict compliance with the pilot rules of the Steamboat-Inspection Service is required of all employees in charge of vessels or boats.

193. Violations of navigation and inspection laws.—Commanding officers shall report to collectors of customs and local steamboat inspectors such violations of navigation and inspection laws as may come within their observation.

194. Number of officers and crew.—In no case shall a greater number of officers and crew be employed aboard a vessel than the number authorized.

195. Temperature and ventilation.—Every precaution must be taken to keep the vessel dry, well ventilated, and at suitable temperature. In seasonable weather wind sails will be set and awnings spread.

196. Property returns for vessels.—A property return on the proper form shall be prepared by the commanding officer of each vessel showing the property on board as of December 31 of each year and the property received and expended during the calendar year. One copy must be forwarded to the inspector not later than January 31 next following. An inventory shall be taken, and the property reported in the annual return shall be checked by actual count, and all discrepancies must be explained by suitable notes in the property return or in a letter attached to the return or by certificates for lost property. For use in making up the property return and examining the same there must be kept on each vessel a file of all invoices or bills for property received on board. Account must be kept of all supplies expended, either by memorandum receipts or in a memorandum book.

The property records of vessels shall from time to time be examined on the vessel to verify their correctness, to be arranged for by the inspector or his representative, and the annual return must be verified in the district office.

197. Examination and inventory of stores and equipment.—The commanding officer shall, each quarter and oftener if necessary, cause all spare articles, stores, cables, hawsers, and sails to be examined in order to prevent deterioration and insure their efficient condition.

At this quarterly examination particular attention shall be paid to the chain cables. They must be scaled and cleaned of rust and other foreign matter. The shackles, shackle bolts, forelock pins, and swivels will be carefully examined and put in order, and such parts as require it will be coated with blacking, tallow, or white lead.

198. Quarters and messes.—The officers and crews are required to live on board the vessel to which they are attached.

Only regularly authorized messes shall be permitted on board any lighthouse vessel.

Officers shall mess in the quarters set apart for them. Meals shall not be taken in rooms or at other places than at the regular mess table except in case of sickness or when the proper navigation of the vessel requires the presence of the commanding officer in closer proximity to the bridge or pilot house.

Passengers shall be messed in accordance with orders given by the inspector.

199. Subsistence of officers and crews of vessels.—The allowances for subsistence for officers and crews of vessels of the Lighthouse Service are not to exceed the properly authorized rates.

The commanding officer of each commuting vessel shall open a bank account for the deposit of all funds coming to him on account of the messes and shall make all payments by check. In case of payments for fresh supplies, for which cash payment is demanded, the commanding officer may draw check payable to himself.

The messes of vessels on which subsistence is commuted shall accumulate a reasonable surplus of supplies to cover emergencies, due to excess consumption, loss, or spoiling, etc., in order that the vessel may never run short of provisions. It is optional with the mess whether it enters into contract for purchasing provisions. A report of the condition of each mess account must be submitted monthly to the inspector on the prescribed form and in accordance with the instructions thereon.

200. Subsistence of passengers on vessels.—Officers or employees of the Department of Commerce or of the Bureau of Lighthouses, or other official passengers, when on board of any vessel of the Lighthouse Service on official duty will be allowed their subsistence. Reimbursement will be made to the commanding officer by check drawn to his order (by the disbursing agent of the district), upon bill rendered monthly on Form 41, "Bill for meals furnished employees," certified by the persons subsisted.

Payment for subsistence of unofficial passengers shall be made either by the passenger or by the person in the Lighthouse Service whose guest such passenger is. All passengers, either official or unofficial, shall receive only the customary food of the mess in which subsisted. The allowance for official passengers and the charge for

unofficial passengers shall be at the same rate as fixed for the mess in which such persons are subsisted, unless the actual cost of subsistence of unofficial passengers exceeds that amount, in which case the actual cost shall be charged.

201. Record of passengers.—The names of all passengers messed or carried on lighthouse vessels shall be entered in the ship's deck log and reported on the proper forms.

202. Allowance when absent from vessels.—Officers or crews of tenders and light vessels when absent from their vessels on other than official business for a longer period than two meals will not be allowed subsistence for themselves or for the benefit of the messes to which they belong during such period.

203. Cooking and mess utensils.—All cooking and mess utensils must be kept clean.

204. Welfare of crew.—Particular attention shall be paid to the welfare and health of the crew. Food shall be properly cooked and served at regular hours and include a liberal quantity of fresh provisions, particularly fresh meat, onions, and potatoes. Water shall be of good quality and in liberal quantity.

205. Vaccination.—All officers and men employed on lighthouse vessels shall, so far as practicable, be inoculated with antityphoid vaccine. Officers of the Public Health Service are authorized to administer antityphoid vaccine to all seamen who present themselves for the purpose.

206. Receipt for supplies.—Commanding officers shall be responsible for the correctness of quantities and quality of all fuel, provisions, and other articles received for the vessels in their charge, as receipted for or certified by them. When coal is received the commanding officer shall see that it is correctly weighed and measured. Bills and receipts for coal must be signed by both the commanding officer and engineer of vessels. Bills for provisions on vessels which commute subsistence must be checked and certified in accordance with instructions on Form 72, "Statement of mess account."

207. Accountability for supplies.—Provisions and stores of all kinds furnished for the use of the vessels, officers, and crews must be expended under the direction of the commanding officer who shall be held to a strict account for them, and he shall be required to make returns accordingly and shall require from all under his command a rigid compliance with the regulations in relation to the receipt and expenditure of public stores.

Loss, waste, or excessive consumption or expenditure of provisions and outfits shall be chargeable to the commanding officer.

208. Frequent inspections of the food and method of serving to the crew shall be made by the commanding officer or an officer represent-

ing him, and prompt steps taken to remedy any deficiency in quantity or quality.

209. Supplies carried by crew.—Supplies intended to be carried by the crew shall be in suitable packages for handling. Perishable articles must be protected from the weather and water.

210. Passengers on vessels.—Except in cases of persons rescued from vessels in distress, no persons other than the regular officers and crews of such vessels shall be permitted to take passage on any vessel of the Lighthouse Service, except by authority of the inspector.

211. Boats must be kept hoisted when not in use, and swung inboard during bad weather. Boats must never be hoisted when loaded or filled with water.

212. Provisions and outfits for boats.—The commanding officer shall assign provisions and other articles to boats when they are sent on expeditions.

If a boat is sent away from the vessel at sea, she shall be provided with sails, spars, oars, bucket, water, provisions, compass, lantern, candles, matches, and such other articles as the special occasion or duty demands. A moderate supply of provisions and water shall be kept in all boats at sea.

Boat sails shall be kept in readiness for use. If it is at any time necessary to unbend and stow them below for preservation, they shall be kept in bags, properly marked, with all their gear complete, so that they may be obtained without delay.

Life buoys must be kept in order and constantly in readiness for use.

Fire extinguishers, properly charged, must be kept on power boats.

213. Compasses.—The commanding officer shall keep himself informed of the errors of the standard and steering compasses. He shall forward to the inspector a report of the result every time the deviations are obtained.

The compass errors must be determined for new vessels and checked whenever extensive changes or repairs have been made to the vessel or after the vessel has been laid up for any length of time, and at other times as there is opportunity.

214. Chronometers.—The commanding officer shall wind the chronometers daily at a regular hour and carry out such instructions as may be given from time to time concerning their care, comparison, and rating.

215. Force to remain on board vessels.—Not less than one deck officer, one engineer officer, one-half of the deck force, and one-half of the engine-room force, must be on board at all times when vessels are at anchor or lying at a wharf. On vessels having but one deck officer and one engineer officer one of these must remain on board, and the

inspector may designate such part of the force as shall be kept on board. Commanding officers and engineers in charge shall satisfy themselves that junior officers left on the vessel shall be competent for the duty, and shall be responsible for the official actions of such persons.

216. Absence without authority.—The commanding officer must require all subordinates to obtain his permission before leaving the ship and to report their return. Persons leaving the ship without authority and showing no reasonable intention of returning shall be reported as deserters. Deserters shall be debarred from further employment in the Lighthouse Service.

217. Clothing and bedding shall be inspected once each month, or oftener, if necessary, in order to ascertain if they are clean, properly mended and marked, and of uniform pattern. All mattresses and pillows must have removable covers, which must be removed and washed at least once every two weeks.

Bedding shall be aired weekly. Wet clothing or bedding must be immediately dried.

218. Crew not allowed in galley.—Members of the crew must be kept out of the galley, unless detailed for work there.

219. An inventory, corrected to date, must be kept of all movable articles of equipment.

220. Condemning and removing property.—No article of equipment, supply, or other property of the Lighthouse Service shall be condemned or removed from a vessel without authority of the inspector.

221. Collisions and other accidents.—The commanding officer shall observe every precaution to prevent collisions and other accidents.

The commanding officer shall have entered in the log, and report to the inspector immediately after its occurrence, every instance when the vessel under his command touches the ground, has a collision, a fire on board, any serious accident to hull, spars, machinery, or boilers, or other important events of like nature; he shall forward with the report a statement of all the circumstances attending the accident.

In the event of a collision between a vessel of the Lighthouse Service and a merchant vessel, so serious, or under such circumstances as not to admit of immediate repair with the resources at hand, and therefore likely to involve damages, the officer in charge shall order a board of three officers to ascertain all the attendant circumstances, injuries received by the merchant vessel, probable amount of damages, and which of the ships is responsible for the accident; and the master of the merchant vessel concerned shall be notified of the time and place of meeting of the board and informed that the officers and men of his vessel will be given a hearing by the

board, if such hearing is desired. The report shall be prepared in triplicate; one copy shall be forwarded without delay to the inspector, one retained by the commanding officer of the lighthouse vessel, and the remaining copy given to the master of the merchant vessel, provided that the officers and crew thereof who were witnesses to the collision shall have testified before the board. When repairs have been effected on the spot, a certificate of the fact shall be taken from the master of the merchant vessel and forwarded to the inspector.

If the inspector is present the facts shall be immediately reported to him, and he shall order the board.

If the collision occurs in the waters of the United States and results in the loss of life or damage to persons or property, the commanding officer shall inform the collector of customs and the local inspectors of steamboats of the district in which it occurs and the lighthouse inspector.

If the collision occurs in a foreign port, the commanding officer shall take such measures as may be required by the port regulations, informing the captain of the port, should it be necessary.

The foregoing provisions of this article shall apply, so far as practicable, in all cases of collision by a vessel of the Lighthouse Service with a wharf, float, or other object.

Whenever in consequence of injuries sustained by a lighthouse vessel as a result of a collision between it and a merchant vessel, clearly the fault of the latter, it may become necessary or desirable to libel the latter vessel, it shall be the duty of the commanding officer of the lighthouse vessel to immediately inform the inspector, giving all the facts in the case, including name and owners of vessel and port for which next bound, in order that the Commissioner may be informed and proper action taken before the merchant vessel leaves the jurisdiction of the Federal courts.

222. Precautions against fire, etc.—Fire drills shall be required on vessels at least once a month and each drill shall be noted in the log book. Officers and members of the crews of such vessels shall have regularly assigned stations to be occupied at such drills and in case of fire, which shall be posted on each vessel.

Abandon-ship drills on vessels shall be required once a month and shall be entered in the log.

All doors through water-tight bulkheads on vessels must be tested and closed once a week.

Frequent exercises shall be had, without previous warning, in order to practice the men so stationed at their duties, and the time required fully to perform them shall be entered in the log.

Every precaution must be taken against fire. Lighted lamps, candles, or fires must not be left unattended or in exposed places.

To this end an hourly inspection of the ship between decks shall be made by one of the watch on deck between 8 o'clock p. m. and sunrise.

Open lights must never be used in storerooms, or compartments used for storage of oils, paints, or gas.

Kerosene must be stored separately and only in authorized places.

Gasoline and other highly inflammable material must not be stored below.

Except in emergencies, coal shall not be taken on board in a condition that might render it dangerous. The bunkers containing such coal shall be carefully watched.

Coal after having been received must be kept as dry as possible. Special precautions must be taken to prevent the leakage of water into the bunkers.

When coal bunkers are not provided with permanent ventilators, the plates shall be removed for ventilation at least twice a week, and oftener if convenient, and kept removed for a period of several hours each time.

Coal bags that have been used shall be examined periodically, as fine coal dust remaining in them may produce spontaneous combustion.

Oil, tallow, and cotton waste shall be stowed in metallic tanks, which must be kept as far from the boilers as possible. Waste and other similar materials saturated with oil or grease must be destroyed immediately after use.

Oiled or painted canvas, and other oiled or painted fabrics, must not be stowed below, and when not in daily use must be frequently examined.

Great caution must be used when lights are taken into the paint room.

Private property in the nature of inflammable liquids, oils, or explosives, or other dangerous stores liable to spontaneous combustion, shall not be placed on board.

No inflammable liquid or explosive oil shall be placed on board for ship's use, except such as is permitted by the inspector. Spirits of turpentine, alcohol, and all varnishes and liquid driers shall be kept in metallic tanks or vessels securely stowed on an upper deck; and none of these liquids shall be taken below, except in small quantities for immediate use.

Only safety matches shall be permitted on board, and the necessary precautions to be observed in their use shall be prescribed. Matches shall not be used in storerooms, holds, or orlops.

Precautions shall be taken to guard against fire in the vicinity of the boilers and engines when steam is up, and for at least 12 hours after fires are hauled.

All ventilators and air conduits must be periodically examined and cleaned out, in order to prevent the accumulation of rubbish and lint that might assist to spread a fire.

The instructions for the care and preservation of electric-lighting plants must be carefully followed. The use of electric lights greatly reduces the chances of fire, which with such lights can occur only from defective insulation or an improper use of the plant.

Once a month all oil lamps used for replacing the electric lights in case of an accident shall be lighted and kept burning for a sufficient length of time to insure their being in good order and ready for use.

Men shall be stationed to close the valves in the ventilation conduits whenever the fire alarm is sounded or the signal given to close water-tight doors and valves.

Signals shall be provided to indicate that water-tight doors, valves, and traps must be closed. Care shall be taken that this signal is accessible to the officer of the deck and kept in readiness at all times, both at sea and in port. These signals must be so arranged that the men employed in remote compartments may hear them and not be in danger of being shut in; means of escape must be provided, and those stationed to close doors must also be required to make search for and give warning to men in distant compartments. All tenders must be provided with the signals prescribed by the Steamboat-Inspection rules and regulations of the Steamboat-Inspection Service.

Lightning conductors must be frequently inspected for good condition and proper lead to the water.

Such other proper precautions as may be necessary shall be taken to guard against fire, and all fire-extinguishing apparatus must be kept in order and ready for use. When in dry dock, and the fire pumps are useless, extra and stringent precautions must be taken.

Parts of the ship shall be designated where smoking may be allowed for officers and crew, and, if possible, places shall be provided where all may be comfortable.

Uncovered lights shall never be left unattended in any part of the ship, and covered lights shall always be so secured as to prevent breaking or capsizing. Uncovered lights shall never be used in holds, storerooms, orlops, lockers, bilges, or other places below the berth deck, except to test the air.

All fires used for cooking shall be extinguished at 9 o'clock p. m., unless specially authorized to be continued longer for some specific purpose. When the weather is very warm they shall be extinguished as early as practicable, if by so doing the comfort of the crew is increased.

223. Stranding of vessel.—Officers in charge of vessels will be held strictly responsible in case of damage to the vessel through strand-

ing or striking any rock or shoal, due to inattention to duty or negligence.

Every case of a vessel stranding or touching bottom, whether or not damage results, shall be promptly reported to the inspector and by him to the Commissioner.

224. Bilges must be frequently pumped and kept sweet and clean. All holds and storerooms must be broken out and thoroughly cleaned at least once every six months.

225. Extinguishment of lights at night.—All lights, except those in the cabins, staterooms, and those designated by the commanding officer as standing lights, shall be extinguished at 10 o'clock p. m., unless the time is extended on special occasions.

The lights on the lower decks shall be reduced in number, unless required for the comfort of the crew, before 10 o'clock p. m. All lights in the holds, storerooms, and orlops, and all open lights in the ship, except those in quarters, must be extinguished before 7.30 o'clock p. m.

226. Standing lights at night.—There shall be at all times during the night a sufficient number of standing lights throughout the open parts of the ship to enable the officers and crew to turn out, repair to the upper decks, or to attend to any duty arising from a sudden emergency.

227. Special lights for officers' use in their rooms, after hours, may be permitted by the commanding officer, provided that they do not prevent from sleeping those who may desire rest.

228. Vessels with single electric-lighting plants shall always have on hand in the engine room and at other places throughout the vessel ready for use lamps or lanterns that will give sufficient light for emergencies.

229. The officer in charge shall require quiet to be preserved in officers' quarters after 10 o'clock p. m., except on occasions when a special extension of lights is granted.

230. Lights to prevent collisions.—Special care must be taken to have the lights required by law to prevent collisions at sea and in port kept in order and burning during the night, and there must be on hand, convenient for use, means of relighting or replacing any such light as may be extinguished.

231. A correct deviation table shall be kept for the standard and steering compasses.

A copy of the deviation table for the steering compass shall be kept in the pilot house and deck officers instructed in its use.

232. Examination of moorings.—At every opportunity special attention shall be given to the examination of chains, shackles, moorings of buoys and vessels to prevent their loss by breaking adrift.

233. Injury to moorings.—In case any person attached to any vessel of the Lighthouse Service unnecessarily slips, attempts to slip, injures or destroys any cable or mooring, or willfully or carelessly allows such vessel to go from her station, such action shall be considered cause for dismissal.

234. A keyboard shall be kept in a safe and accessible place in the commanding officer's cabin. All keys shall be properly labeled, and under no circumstances taken from the vessel. Keys not in use shall be kept on the keyboard.

235. Repairs by vessel force.—As far as possible, and when in accordance with the interests of the Government, all repairs to the hull, machinery, spars, boats, and to all articles of equipment and outfit, must be made by the vessel force.

236. Reports of repairs at navy yards.—When a vessel is under repair at a United States navy yard the commanding officer shall forward promptly to the inspector all copies of the weekly reports of such repairs furnished by the authorities of the Navy Department.

237. Official flags.—All vessels when under way shall display the national ensign at the flagstaff during daylight, except when at sea with no land or vessels in sight. When lying at depots, or at anchor near the same, no colors shall be shown, except as mentioned below. On Sundays and national holidays colors shall always be shown, unless the weather be such as to prevent. On appropriate occasions of public mourning, colors shall be shown at half-mast. When shown, colors shall be hoisted at 8 a. m. and hauled down at sunset. At such times all persons in the Lighthouse Service who may be present shall salute the colors. Light vessels shall display colors to all passing vessels of war and vessels of the Lighthouse Service and all other Government vessels.

The Department of Commerce has adopted the following flags for the use of department officials:

The flag of the Secretary of Commerce is a full-rigged ship, in blue, over a lighthouse, in blue, in a white shield on a blue field, with a five-pointed white star in each corner of the flag.

The flag of the Assistant Secretary of Commerce is the same as that of the Secretary of Commerce, except that the colors are reversed.

The flag of the Commissioner of Fisheries is blue, with a white fish in the center with its head toward the hoist. The service flag of the Bureau of Fisheries is blue, with a white fish on a red diamond.

The flag of the Superintendent of the Coast and Geodetic Survey is a white triangle, apex forward, on a blue field. The service flag of the Coast and Geodetic Survey is a red triangle, base down, in a white circle on a blue field.

The flag of the Commissioner of Navigation is blue, with a full-rigged ship in white in the center. The service flag of the Bureau

of Navigation is a full-rigged ship, white, in a red circle on a blue field.

The flag of the Commissioner of Lighthouses is blue, with a white triangle bearing a blue lighthouse. The service flag of the Lighthouse Service is triangular in shape, white, with a red border, bearing a blue lighthouse. The flag of lighthouse inspectors is white, with a narrow blue border, and bearing a blue lighthouse in the center. It will not be used by other officers of the service acting as inspector.

All of the flags above mentioned are rectangular in shape except the service flag of the Lighthouse Service.

The use of the inspector's flag is discretionary with the inspector.

Whenever an official having a flag is on board of a tender, his flag shall be displayed at the main, except that when more than one officer is aboard the flag of the superior only is to be shown.

The service flag, when used, shall be hoisted at the foremast head and shall be displayed on holidays, on occasions of ceremony, when entering port after an extended voyage, and at any other time when the national ensign is hoisted that the inspector may direct. At no time shall the service flag be shown without the national ensign.

Lighthouse tenders when working on buoys in channels or other frequented waters may display a red flag (international signal-code letter B) and a black ball at the fore as a warning to other vessels to slow down while passing.

No other flags shall be shown by vessels of the Lighthouse Service except for the purpose of dressing ship on national holidays and upon proper occasions.

238. Saluting lighthouse vessel.—A vessel flying an official's flag shall be saluted with three blasts of the whistle or three strokes of the bell, and such salute shall be returned in a similar manner.

239. Saluting naval vessels.—Lighthouse vessels, when in the presence of United States or foreign naval vessels, shall follow the motions of such vessels in making colors, striking the bell, half-masting colors, or any similar ceremony.

The same procedure shall be followed when a vessel of the Lighthouse Service is at a navy yard when no naval vessel is present.

240. Use of double bottoms.—The double bottoms of iron and steel ships may be utilized for carrying fresh water for steaming purposes whenever it is desirable. Under ordinary service conditions the double bottoms shall be kept free from water. When salt water is admitted to the double bottoms of a ship, either purposely or accidentally, a report of the fact and the accompanying circumstances must be made to the inspector.

241. When visiting a lighthouse reservation outside their district, commanding officers shall report their arrival and departure to the

inspector of that district, and shall observe all orders and regulations established for the government of the reservation concerned.

242. Care and preservation of iron and steel ships.—The commanding officer shall cause all compartments and mechanical devices for the management and safety of the vessel to be inspected weekly, except double-bottom compartments, which shall be inspected quarterly, unless in special cases a more frequent examination is necessary. Special care is enjoined in the inspection and preservation of the inner bottoms, their vertical bounding bulkheads, keelson, etc., under boiler compartments, the framing, floors, plating, etc., under tanks, together with their foundations, all parts of the vessel's sides and bottom in coal bunkers and under ceilings of hold compartments.

The commanding officer and the chief engineer shall each inspect monthly all compartments, water-tight doors, and mechanical devices for the management and safety of the vessel for which each is specially responsible, and shall make to the inspector after each inspection separate written reports of the condition of the parts of the ship and of the mechanical devices thus inspected.

Whenever a ship is docked the commanding officer and the senior engineer shall make a thorough examination of all valves, strainers, drain plugs and zincs, the rudder and fittings, propellers, propeller shafts, struts, stern tubes, bearing bushings, and all other openings or underwater fittings, also the shell plating, riveting, etc., and the result and condition shall be entered in the steam and deck logs. The commanding officer shall forward to the inspector a report thereon, which shall include a similar report from the senior engineer.

243. Painting bottom.—When a vessel is docked, the bottom shall be thoroughly cleaned and all loose and blistered paint removed by scaling and scraping, but no paint of any kind which adheres firmly and affords protection shall be removed.

In the first, second, third, fifth, sixth, seventh, eighth, ninth, sixteenth, seventeenth, eighteenth, and nineteenth districts, bottoms of steel and iron tenders shall be painted in accordance with the following, unless special authority is obtained from the Commissioner:

1. One complete coat of red lead mixed with pure boiled linseed oil, and, if quick drying is desirable, a small amount of turpentine and drier; this coat must be allowed to become absolutely hard and dry before applying the antifouling. One complete coat of paint shall extend from the bottom of the keel to 18 inches above the water line.

2. One complete coat of antifouling composition.

3. One complete coat of boot-topping composition extending 18 inches above and below the water line

The antifouling and boot-topping compositions shall be those known under the proprietary names of Rahtjen's Red Hand Brand, Holzapfel's, Von Hoveling's or other approved compositions of similar nature, preference being given to the one which has given the best results in the locality in which it is to be used.

In the fourth, thirteenth, fourteenth, and fifteenth districts, the bottoms of steel and iron tenders shall be painted in accordance with the following:

1. One complete coat of red lead.

2. One complete coat of one part red lead and one part white zinc.

The lead and zinc shall be ground separately in boiled linseed oil, then together in boiled linseed oil, and properly mixed.

In the tenth, eleventh, and twelfth districts, the bottom of steel and iron tenders shall be painted in accordance with the following:

1. One complete coat of two parts of red lead and one part of white zinc.

2. One complete coat of antifouling paint.

The lead and zinc shall be ground separately in boiled linseed oil, then together in boiled linseed oil, and properly mixed. The antifouling paint shall be that known under the proprietary name of Peninsular Special Antifouling or other approved paint of a similar nature.

In all districts on the coasts the bottoms of steel and iron light vessels for stations in salt water shall be painted in accordance with the following, unless special authority is obtained from the Commissioner:

1. One complete coat of red lead mixed with oil, and, if quick drying is desirable, a small amount of turpentine and drier; this must be allowed to become absolutely hard and dry before applying the next coating.

2. One complete additional coat of red lead as per foregoing paragraph.

3. One complete coat of antifouling composition.

4. One complete coat of boot-topping composition, extending 18 inches above and below the water line.

The antifouling and boot-topping compositions shall be those known under the proprietary names of Rahtjen's Red Hand Brand, Holzapfel's, Von Hoveling's, or other approved compositions of similar nature, preference being given to that which has given the best results in the locality in which it is to be used. When the former coating of red lead is generally in good condition, after the bottom has been washed and cleaned, the first coat shall be applied only on such parts as may be necessary.

In the tenth, eleventh, and twelfth districts, the bottoms of steel and iron light vessels shall be painted in accordance with the instructions for tenders of these districts.

In cases where the conditions indicate the necessity for special treatment or additional paint, the bureau shall be immediately advised, and the proper instructions will be issued.

244. Docking.—When a ship is docked, the commanding officer and senior engineer shall examine the ship's bottom and report upon its condition and upon the kind of paint used at the previous docking. A copy of his report shall be entered in the deck and steam logs and a joint report forwarded to the inspector. The report shall contain the following data:

1. Date of docking.
2. Date of previous docking.
3. Approximate cruising distance since last docking and average speed.
4. Condition of the ship as to fouling and kind of fouling: (a) At or near the water line; (b) at turn of bilge; (c) near keel; (d) at the entrance and run.
5. Describe carefully the condition of the paint, noting deterioration of any of the paints applied, body of paint remaining, and whether this be anticorrosive, or protective paint only. Note carefully the effect of the fouling upon the paints used, and where different kinds of fouling exists compare the effect of the different ones upon the paint.
6. Corrosion or pitting of bottom: Describe its character in detail, stating definitely the amount of surface affected and where it occurs.
7. Number of coats and kinds of new paint applied, stating definitely the brand of paint and all distinguishing marks to make absolute identification possible, also general areas covered.
8. The atmospheric conditions at time of painting.

Corrosion.—The inspections and examinations provided for in the preceding articles should be the means of detecting any places showing corrosion of a serious nature. When such are discovered, they must, at the first possible opportunity, be carefully scaled, dried, and again coated with anticorrosive material.

The frequent recurrence of corrosion in any particular location or compartment must be followed by special investigation, to determine the cause and the best remedy possible. Unusual cases of this nature shall be made the subject of a special report, giving a detailed statement of the extent and character of corrosion, of the remedies applied, and, as far as discovered, the cause or causes.

The interior surfaces of coal bunkers, being subject to excessive abrasion, are liable to rapid corrosion if not thoroughly protected. As far as practicable, they shall be cleaned at least once every three months, and when the metal is dry, if painting is found to be necessary, such portions as require it shall be touched up with red lead, or other substance previously used in painting these compartments.

The rubber gaskets of water-tight doors, manholes, hatches, air ports, also rim locks, door knobs, etc., must be neither painted, greased, nor oiled; louvres, gauze air screens, screw threads, and zinc protectors on the bottom must not be painted.

An iron or steel unsheathed ship must never be attached to the moorings or chains used for a sheathed ship nor moored close alongside the latter.

Great care must be observed that no loose articles of copper or bronze, filings of the same, copper or brass pipes or fittings, or rust scale are allowed to rest on the bottom in immediate contact with the iron or steel, and that the leaden pipes, strainers, or such other parts in the bilges are kept in good condition.

Bronze screw propellers shall be painted in similar manner as the outside of the hull. Zinc protectors must be placed near them to prevent galvanic action.

Whitewash must never be applied to any of the iron or steel parts of the ship.

An incandescent electric lamp of high power, with a portable connection, shall be used when practicable for examining the condition of double bottoms, the interiors of boilers, and other dark places.

When about to examine, clean, or paint double bottoms or boilers the following cautionary measures must be adopted: They shall be opened up and well ventilated, a connection being made to a fan or compressed-air system, if possible. This done, the purity of air shall be tested before entering by burning a candle on the bottom at least five minutes. Working parties inside must always maintain communication with some one outside; they must also have with them a lighted candle, and withdraw should it begin to burn dimly.

245. Painting of tenders.—Unless otherwise authorized by the Commissioner, tenders shall be painted in the following colors:

Black.—Outside of hull between upper line of boot topping and highest sheer line; ventilators above weather deck and outside of cowls; foremasts from hounds to truck, and mainmasts in wake of smoke discharge from funnel; hoisting engine, windlass, capstan, steering engine, davits (except where outlined against white houses), rudder quadrant (see also under "Red lead"), and similar deck machinery; vessel's name and letters U. S. L. H. S. on ring life buoys; steam cylinders of auxiliary machinery in engine room where not lagged; ironwork of wooden booms and masts; booms from head to 3 feet below center of relief purchase guide sheave; all fittings, piping, etc., within these areas.

Black nonblistering funnel paint.—Funnel, with casing and umbrella, escape and whistle pipes.

White.—Topsides above highest sheer line; all deck houses above coaming plates or sills of main deck; all deck houses on superstruc-

ture deck above sills and coamings; quarters in general where not natural finished; light boxes, exclusive of characteristic color; inside of light and ventilator trunks; sides and ceilings of upper and lower boiler and engine rooms from 42 inches above deck or floors; ring life buoys, handrails, grab rails (if not brass), rail and awning stanchions, rigging turnbuckles, sheer poles, and similar fittings; main engines and auxiliary machinery, except steam cylinders; galley sides and ceiling from 42 inches above floor or deck; all fittings, piping, etc., within these areas.

Metallic brown.—Working surfaces of buoy and main decks, and all fittings; lower engine and lower boiler rooms to 42 inches above lower floor; all fittings, piping, etc., within these areas.

Light lead.—Canvas decks, tops of deck and pilot houses; coamings; holds, including ceilings, storerooms, lockers; upper boiler or drum room to 42 inches above floor or grating; boiler and uptake lagging and clothing; all fittings, piping, etc., within these areas. Inboard side of bulwarks, from deck to height of main rail, bulwark stanchions, waterways, and sills of all deck houses.

Light straw.—Steel foremasts from weather deck to hounds, steel mainmasts from weather deck to height of wake of smoke discharge from funnel; upper engine room and galley to 42 inches above floor; steel booms; all fittings, piping, etc., within these areas.

Vermilion.—Inside ventilator cowls.

Red lead.—Inside ironwork of all framing, floors, etc., in bilges, also foundations for engines, boilers, and auxiliaries in way of and to the upper turn of bilges; all fitting, piping, except copper and brass, within these areas. Rudder quadrants when in such locations as to be subject to excessive corrosion.

Natural finish (varnished).—Wooden foremast from weather deck to hounds; wooden mainmast from weather deck to height of wake of smoke discharge from funnel; wooden booms; flagpoles.

Cement wash.—Inside of trimming and fresh-water tanks, including all fittings, piping, etc.

Polished metal work.—The painting of polished brass, such as valve bonnets, air ports, etc., or other bright metal work, is forbidden.

The above painting schedule refers to new painting to be done; parts recently painted may be deferred until such time as it may be necessary to do the work over.

246. Painting of light vessels.—Light vessels shall be painted of such color and be otherwise distinguished as may be prescribed by the Commissioner, and no change of color or other characteristics will be made without his authority. The interior parts of light vessels shall be painted as far as practicable in the manner prescribed for the painting of tenders.

PART V.

LIGHT VESSELS.

247. Responsibility of master.—The master of a light vessel shall be responsible for the efficient maintenance of the vessel on its station as an aid to navigation, and for its cleanliness and upkeep and the welfare of the crew.

248. Charts and nautical instruments.—All deck officers must be familiar with the use of charts and nautical instruments on board and able to determine the ship's position.

249. Mooring chains.—The inboard ends of mooring chains must be securely fastened to an eye or ring bolt provided for the purpose.

The scope of the riding chain shall be moderate in fair weather and a full scope in heavy weather.

The riding chain must be hove in and examined for defects each month, its condition being noted in the log and reported to the inspector.

To protect the bow from heavy drift ice a shot of chain shall be led from the upper hawse pipe to the riding chain and set taut by veering on the riding chain.

Where directed by the inspector, a spherical mooring buoy shall be shackled into the chain for vessels stationed in deep water.

250. Submarine bells on light vessels shall be kept on deck when not in use, in order that their efficiency may not become impaired as a result of deterioration resulting from galvanic action and to protect such parts as may be affected by the heat of the sun, etc. They should be set in a cradle conveniently located and secured, and inclosed in a neat, canvas-covered, painted box, fitted with louvres or ventilating holes. On the approach of a storm or bad weather they shall be placed overboard in ample time to prevent damage by strains or striking the ship's side. The condition of the bells at the time of the inspection of light vessels will show whether or not these instructions are being carried out.

251. Removing vessel without authority.—Under no circumstances, except those of extreme emergency, shall a light vessel be removed from her station without authority from the inspector.

252. Characteristics of light vessels.—Light vessels shall be distinguished at night by the number, characteristics, and position of the light or lights, and during the day by color, rig, day marks, etc., with the marking name of the station painted on each side. The

marking name shall be as short as practicable to retain the proper identification of the station and shall be painted in the largest size letters practicable to insure the greatest clearness.

No numbers shall be shown on the outside of the hull, but the number shall be cut in the main hatch deck beam.

Light vessels should be referred to in correspondence by their full names and numbers, the same as heretofore.

253. Signal flags on light vessels.—All coast light vessels, especially relief vessels, shall display the international code signal of the station whenever a vessel is approaching or in the vicinity and there are any indications that such vessel is in strange waters or fails to recognize the station, and whenever a vessel asks for the information.

254. Vessel off station.—Vessels off station must be promptly reported to the inspector with reasons and details thereof. Every precaution must be taken to prevent and to immediately detect a vessel dragging off station. Should a vessel have dragged such distance as to mislead passing vessels, both day and night characteristics must be concealed and the fog signal, if any, must not be sounded.

If the vessel is equipped with radio apparatus, messages shall be sent broadcast by the master advising all vessels that the light vessel is off station as soon as the fact is known.

If for any reason a light vessel is dragged, breaks adrift, or is not on proper station at night, if anchored, anchor lights are to be shown, and, if under way, running lights as required by law for other vessels; and by day the international code signal letters QE (lightship is not at anchor on her station) are to be constantly shown, anchored, or under way.

255. Use of propelling power.—The utmost caution and judgment should be exercised by the commanding officer in the use, in stormy weather, of the propelling machinery on a light vessel while riding at the moorings, and, if found necessary, the speed should be carefully controlled at all times by the engineer officer, who should be in constant communication with the commanding officer.

256. Sails must be kept bent during stormy season and frequently loosed to dry in fair weather.

257. Lights must be lighted and hoisted punctually at sunset and kept burning at full intensity until sunrise.

258. Inspections.—The commanding officer must inspect daily at 8 p. m., see the watch set, lights burning properly, and the ship secure for the night.

259. The pump well must be sounded once every watch at night and during bad weather once every hour. Any unusual conditions must be reported at once to the commanding officer.

260. Lightning conductors.—If fitted with outriggers, lightning conductors must be rigged out between sunset and sunrise, and in bad weather at all times.

261. Vessel interfering with light vessel.—No vessel must be allowed to make fast to a light vessel or in any manner to obstruct the visibility of her lights.

262. Boats of light vessels shall be used for official purposes only; they shall not, under any pretense, be detained on shore, or when alongside of a vessel remain in water for a longer time than may be absolutely necessary. When not in use they shall be kept hoisted to the davits, and at night and during stormy weather swung inboard. They shall be kept free of water, and have all ballasts and stores removed before being hoisted up and secured. Commanding officers shall be held accountable for loss of, or damage to, the boats while absent by their order.

Boats of light vessels shall be painted the color of the vessel's hull, with the name of the vessel painted on the bows, in the same color as the name of the vessel itself, and with the number of the light vessel cut into the stem. The serial boat number shall be branded on the inside of the stern.

263. Stopping passenger steamers.—Except in cases of emergency, masters of light vessels shall not stop passenger steamers to put mail or other articles on board. When such emergency arises, the commanding officer shall see that the ship's boat is in charge of an officer of the vessel, and such case shall be reported to the inspector.

264. Leave and shore liberty, officers and crew, light vessels.—Officers and members of crews of light vessels may be granted shore liberty and annual leave in accordance with the following:

1. As far as practicable, two-thirds of the complement of each light vessel must be on board the vessel at all times. Either the master or mate and the engineer or assistant engineer must be on board at all times.

2. During the stormy season of the year shore liberty should be reduced as far as necessary for the safety of the vessel.

3. Shore liberty must be taken at intervals in regular rotation, and no period of liberty is to exceed 15 days, except in cases of vessels on offshore stations similar to Nantucket Shoals and Diamond Shoals, when the period of liberty may be extended to not to exceed 30 days on account of the difficulty and expense of transportation by tender.

4. In no case shall the shore liberty granted any member of the complement of a light vessel exceed 90 days in one year, and all time away from vessel must count as shore liberty, including Sundays, holidays, and time in transit, except that for remote offshore vessels not to exceed one day may be allowed for time of transit each way.

Subsistence will be allowed on vessels of the Lighthouse Service for the time of transit to and from light vessels. Shore liberty shall include annual leave and sick leave.

5. Shore liberty for the complement of any light vessel may be temporarily suspended or reduced by the inspector if upon inspecting a light vessel its condition is not found to be satisfactory, the reduction being whatever is deemed necessary to keep the vessel in proper condition.

6. When any member of the complement of a light vessel fails to return from his shore liberty within the time allotted, excess shore liberty taken is to be deducted from his next period of shore liberty. When any employee of a light vessel on shore liberty can not for any reason return to the vessel on time, the inspector must be promptly notified, reasons for delay furnished, and orders requested. The time of any unavoidable delay shall not be charged against shore liberty, but the employee may be assigned to other duty by the inspector.

7. The approved plan of shore liberty for each light vessel shall be prepared by the district office and entered in the back of the log. A record of shore liberty shall be kept by the master or mate in the back part of the log book, showing the number of days each employee is absent from the vessel each month and reported monthly as provided for on Form 65. This liberty record shall be examined when the vessel is inspected.

8. Unused shore liberty or annual leave shall not be carried over to the next calendar year.

9. Shore liberty or annual leave shall not be granted in excess of the amount accrued at the time leave is desired except when the best interests of the service will be conserved, or in especially meritorious cases. Deduction shall be made from the salary of an employee leaving the service for the number of days of shore liberty or annual leave he may have had in excess of the accrued amount. (Dept. letter July 9, 1912.)

265. Radio operators.—Radio operators detailed from the Navy Department for duty in charge of radio stations on light vessels shall be subject to the general orders of the commanding officer of the light vessel in matters pertaining thereto; and all messages for assistance or of notification in case of danger or distress to vessel whether on or off station shall be sent only by order of the commanding officer. Proper measures shall be taken by the commanding officer for the enforcement of his orders in such a contingency.

266. Reserve provisions.—Light vessels, which because of their isolation or inaccessibility are liable to be cut off from communication for considerable intervals, shall, as authorized by the Commissioner

on the recommendation of the inspector, keep on hand a stock of reserve provisions sufficient to last for 10 days, consisting of 1½ pounds of meat in tins and 1½ pounds of pilot bread per day for each authorized person at station or vessel. Such provisions should be kept separate from the regular mess supplies, and each tin should have the month and year of delivery legibly marked thereon. They are to be used in rotation and replaced, so that none will remain in stock more than two years. The master must make a report at the end of each quarter showing the amount of reserve provisions on hand; and each inspecting officer of the Lighthouse Service who visits isolated light vessels must report as to the carrying out of the regulations relative to reserve provisions.

The cost of reserve provisions will be defrayed from the subsistence allowance of the vessel, but in case of a vessel starting the system a year will be allowed, if necessary, to complete payment of the entire stock.

267. Reports.—The following reports shall be made for light vessels:

Weekly—

Coal and water report (Form 71).

Monthly—

Officers' report of tender or light vessel (Form 44).

Report of light station, depot, or light vessel (Form 65).

Monthly report of light station, depot, or light vessel (Form 65).

Statement of mess account (Form 72).

Report of fog signal (Form 66).

Pay roll.

Annual—

Property return and inventory (Forms 53a, 53b, 53c).

Requisition for supplies (Form 37).

When necessary—

Reporting accidents to the vessels or to the crew (special letter and "Report of Injury," Form C. A.-1b).

Reporting missing aids or aids not functioning properly (special letter).

Reporting the shipping or the discharging of men (Form 42).

Reporting urgent repairs required (special letter).

Reporting unusual observations or occurrences (special letter).

Reporting when vessel is off station (special letter).

Special or emergency requisitions on Form 95.

Certificate of lost property (Form 28).

Transfer of vessel (Forms 53a, 53b, 53c).

PART VI.

LIGHTHOUSE TENDERS.

268. Duties of officer in charge.—Under the orders of the inspector, the commanding officers of lighthouse tenders shall attend to the placing, replacing, changing, or moving of all floating aids to navigation, the delivery of fuel, supplies, construction material, and to such other lighthouse duties as may be required of them, and will promptly report to the inspector each action relative to such aids.

Under the orders and plans for work received from the inspector, the commanding officer shall arrange the work of the tender and carry it out so as to accomplish the results required as expeditiously and economically as practicable. Where details of order of work are left to his discretion he shall make every endeavor to employ the tender in the most efficient manner.

He shall report promptly to the inspector any information obtained of benefit to the service, and he may submit suggestions for increasing the efficiency of the tender or for the good of the service generally.

269. Neglect of duty at stations, etc.—The commanding officer shall promptly report any neglect of duty or irregularity of conduct observed at any light station, light vessel, or depot, visited or passed.

270. Observation of aids to navigation.—A careful inspection in passing will be made of the appearance, position, functioning, and characteristic of all aids to navigation. Any unauthorized deviation therein or indication of neglect shall be promptly reported to the inspector by the commanding officer. In the case of unattended aids, and others if practicable, the defect shall at once be corrected by the commanding officer, if this can be accomplished without interference with more urgent work.

Whenever a buoy is relieved, the correctness of its position, and of the information regarding it in the Buoy List or Light List, shall be verified.

271. Inspector or superintendent on board.—The inspector or superintendent, when on board, shall be kept constantly informed by reports from the officer in charge of the tender of all matters of which they should have cognizance and shall be consulted for orders in matters of laying out the movements or work of the tender.

272. Speed.—Except in an emergency, or when otherwise specifically directed by the inspector, tenders will steam at an economical speed.

273. Piloting vessel.—The officer in charge shall pilot the vessel under his command under all ordinary circumstances, but may, with

authority of the inspector, employ a pilot when necessary. The presence of a pilot will not in any manner relieve the officer in charge of responsibility for the safe navigation of the vessel.

274. Control over personnel of stations, etc.—The officer in charge shall exercise no control over the personnel of a depot or station where the vessel under his command may be moored, unless by the direction of the inspector, except in matters coming under the police regulations of the vessel.

275. Police powers.—Masters of lighthouse tenders shall have police powers in matters pertaining to Government property and smuggling. (Act June 16, 1880, 21 Stat., 263.)

276. Navigation qualifications.—Deck officers must be capable navigators and familiar with the use of all nautical instruments on board, and commanding officers shall assist and encourage them in becoming proficient.

277. Draft of vessel.—The officer in charge shall, immediately before leaving and as soon as practicable after entering port, ascertain the draft of the vessel forward and aft, and enter it in the log book.

278. Soundings.—When under way on soundings, the officer in charge shall have casts of the lead taken as frequently as necessary to verify the position.

When going into or out of a port or approaching an anchorage, shoal, or rock, with or without a pilot on board, he shall keep the hand leads going, if necessary, in order to obtain correct soundings. During thick weather frequent soundings must be taken.

279. Sounding gear and other apparatus.—The officer in charge shall frequently examine the lead lines and other sounding gear and all apparatus used for determining the speed of the vessel and see that they are in order and correctly and properly marked.

280. Stowage of oil on tenders.—The officer in charge shall be careful to have all oil cans properly stowed on board of the tender and to take every precaution to prevent loss or danger from any cause.

281. Buoys and appendages landed for any purpose shall be placed on chocks, giving a free circulation of air, and properly sorted and marked.

282. Standing watch.—When under way, officers in charge of the deck on all lighthouse tenders having bridges will stand their watch on the bridge, and the lookout will be stationed in the bow.

In the event of the lookout not being able to be stationed in the bow, due to bad weather, he will keep lookout from one wing of the bridge.

On all tenders not having bridges the officer of the deck will stand watch in the pilot house.

283. When at sea, and especially when approaching land or in pilot waters, the officer of the deck shall keep himself informed of the

position of the vessel, whether land or lights are in sight, or whether either are likely to be seen, and of all other particulars which may be of use to him in keeping the vessel out of danger. If approaching land or shoals, he shall keep leadsmen in the chains and have the anchors and chains clear and ready for use.

284. Report to commanding officer.—The officer of the deck shall promptly report to the commanding officer all land, shoals, rocks, lighthouses, beacons, buoys, discolored water, vessels, or wrecks discovered; all changes in the weather or shifts of wind; any change in course or speed made by himself; and any marked change in the barometer, force of the wind, state of the sea, or marked indications of bad weather; the display of storm signals on shore; all serious accidents; the movements of passing vessels; and, in general, all occurrences worthy of notice.

285. Changing course.—The officer of the deck shall not, unless to avoid immediate danger, change the course without directions from the commanding officer, and then he will report the change to him as soon as possible.

286. Supplies, repairs, etc.—The commanding officer shall, before arriving in port, cause to be submitted to him requisitions for all supplies and shall immediately upon arrival take the necessary steps to procure needed supplies, in accordance with regulations. He shall also at the same time submit to the inspector reports of all repairs needed, requests for surveys, and all other papers requiring action.

287. Repairs to apparatus.—Engineers and machinists of tenders shall make minor repairs to the fog-signal or lighting apparatus at light stations if such repairs are needed at the time of inspection or when passing and when they can be made without interference with more important work of the tender.

288. Painting of boats.—Power boats and dinghys carried on tenders shall be painted white outside and lead color inside, with the exception of the decks, transom, sheer strake, rubbing fender, covering board, king plank, washboard seats, bulkheads, quarter rounds, etc., which shall be of natural finish.

Cargo boats shall be painted white outside and lead color inside, with the exception of the rubbing fender, which shall be of natural finish.

All boats of tenders shall have the first letter of the name of the tender placed on each bow in brass letters of block type of suitable proportions 6 inches high, and the full name of the tender and the serial number of boat shall be branded on the inside of the stern.

289. Placing and replacing aids.—Light and buoy lists and other official publications of the Bureau of Lighthouses shall be used so far as practicable as a guide in placing all floating aids to navigation.

Coast and Geodetic Survey and Lake Survey charts, so far as they exist, are to serve as the basis and guide in placing and keeping in

their places all authorized floating aids or aids of a temporary character, and copies of these charts are to be furnished to the inspector, showing the positions of all aids including private aids, or prominent landmarks which actually exist but are not shown on the charts, so that the proper corrections may be made when new editions of the charts are issued.

Special care must be exercised by commanding officers of tenders in determining the proper positions for light vessels, buoys, and stakes. In the absence of specific orders from the inspector, all floating aids found missing or out of position should be replaced and promptly reported. Every effort must be made to replace these aids as near the old positions as possible, using the available landmarks, the lead, and the charts. The usefulness of an aid to navigation depends mainly upon the certainty of finding it in the place designated by the last notice to mariners, so long as the channel or obstruction it was placed to mark has not since materially changed in direction or character. Whenever a buoy is placed the depth of water must be determined by the lead, and the sounding obtained reduced to the plane of reference of the charts, for tide or other correction.

A rough running survey shall be made and plotted of navigable waters of which there is not available a large-scale detailed chart. The positions of the aids shall be indicated thereon and from it shall be made a list of the aids in the order of passing.

290. Testing gas tanks.—The greatest care must be taken in testing connections and joints of gas tanks in buoys and beacons, and this work must be done by a competent officer or employee. Masters of tenders shall note on the "Report of work done on gas buoys and beacons" the name of the officer who performed this duty.

291. No change shall be made in the established position, number, marking, color, or other characteristic of any aid to navigation, without authority from the Commissioner.

292. Publications corrected to date.—The latest editions of charts, light and buoy lists, and other nautical publications covering the district must be used and at all times corrected to date. Notice to Mariners must be examined and charts corrected therefrom.

293. Reports.—The following-named reports shall be made for tenders:

Daily—

Report of master of tender (Form 54).

Monthly—

Officers' report of tender or light vessel (Form 44).

Report of lost, unserviceable, or recovered buoys, lanterns, appendages, etc. (Form 62e).

Statement of mess account (Form 72).

Pay roll.

Annual—

Requisition for supplies (Form 37).

Property return and inventory (Forms 53a, 53b, 53c).

When necessary—

Reporting accidents to the vessel or to the crew (special letter).

Reporting missing aids, or of aids not functioning properly (special letter).

Reporting the shipping or the discharging of men (Form 42).

Reporting urgent repairs required (special letter).

Reporting unusual observations or occurrences (special letter).

Requisitions for supplies (Form 95 may be used).

Certificate of lost property (Form 28).

Transfer of vessel (Forms 53a, 53b, 53c).

In submitting reports, the instructions on the blank forms should be carefully observed.

PART VII.

ENGINEERING INSTRUCTIONS FOR LIGHTHOUSE VESSELS.

294. The chief engineer shall be in charge and responsible for the good working, the efficiency, and the cleanliness of the engineering department, which shall include the propelling engines, boilers, pumps, hoists, all auxiliary machinery and every mechanical apparatus installed on board the vessel and required for the good performance of its duties as a lighthouse tender or light vessel as may be the case.

In entering upon his duties, he shall make a thorough examination and inspection of all parts of the propelling engines, the line shafting and bearings, all auxiliary and deck machinery, and, as stated above, also check and certify the inventory for all engineers' stores and spare parts, noting their condition on the list.

Should defects or deficiencies be discovered during this inspection, it is his duty to make at once a detailed written report of all facts, addressed to the inspector, but forwarded through and indorsed by the master of the vessel.

The chief engineer is also responsible for the good condition, the scaling and painting of the inner hull and its structural parts inclosed between the engine and boiler-room bulkheads, the shaft alleys, coal bunkers, storerooms and workshops, together with those compartments, double bottoms, and bilges which are accessible through the engineer compartments. This includes the cleanliness of the bilges, the good condition and working of all sea valves, the draining system with all strainers, pipe connections, sluice valves, etc.

The engineer's log book must be kept up to date and every item correctly entered. The daily coal consumption, also the amount of coal on hand in the bunkers, shall be reported daily to the master of the vessel.

The weekly and monthly reports, the inventories of the engineer's stores at hand, the requisitions for supplies, applications of leave of absence, etc., shall be made out on their proper forms and submitted through the commanding officer to the inspector.

The chief engineer, after conferring with the master of the vessel, shall select suitable men for the positions of oilers, first and second class firemen, etc., as the authorized complement of the vessel requires.

The chief engineer shall personally operate or supervise the operation of the machinery at all times when unusual care is required to be given to the working of the engines.

He shall make frequent visits to the engine and boiler rooms during the day, and at night when the vessel is underway or at its station, to assure himself that the officers and men on watch are performing their respective duties and that the performance of the machinery and boilers is satisfactory.

He shall, in the disposition and stowage of stores and in the use of lights, take every possible precaution against fire.

He shall see that the apparatus in his charge for extinguishing fire is always kept ready for use.

He shall frequently examine the coal bunkers, with the view of ascertaining the quantity of coal actually on hand, as compared with the amount called for by the coal account. Should he discover any material excess or deficiency, he shall report it at once to the master of the vessel.

Before coaling he shall ascertain the condition of the bunkers and of all water-tight openings, and shall satisfy himself that no unauthorized materials are stowed in the bunkers.

He shall require, with the approval of the commanding officer, a proper watch and division of work of officers and crew assigned to duty in the engineer's department of the vessel.

He shall be responsible at all times, whether underway or at anchor, for the good order and cleanliness of the engineer department.

He shall report to the commanding officer whenever a boiler is injured, any accident or derangement to the propelling engines or auxiliary machinery, and record the cause and full details in the steam log.

Should he consider it necessary at any time to reduce the load on the boiler safety valves, he shall so report to the commanding officer. Any change in the load shall be recorded in the steam log.

Whenever he deems it necessary, it shall be his duty to make written suggestions or reports, through the commanding officer, to the inspector concerning the machinery and its dependencies, or other fittings of the ship for which he is responsible.

Should he receive an order the execution of which would, in his opinion, injure the machinery or boilers, or tend to extravagance in the consumption of fuel, he shall report his opinion to the commanding officer and suggest a remedy.

He shall not at any time, for the purpose of repairs, delay the movement of the vessel even temporarily, except by permission of the commanding officer.

He shall not permit fires to be lighted or hauled, except in cases of emergency, without orders from the commanding officer.

He shall, whenever the vessel arrives in port after a cruise or season's work, report to the inspector, through the commanding officer, in writing, all work needed for the proper care and preservation of the machinery and boilers, stating separately the work that can be postponed, if necessary, and that which can not, without injury, be delayed. He shall note opposite each item whether the work can or can not be done by the force on board, together with an estimate of the time and expense required.

He shall keep the steam log in accordance with the instructions and directions as printed therein.

He shall record, in a blank book kept for that purpose, the location of all spare parts of machinery; a complete statement of everything that transpires in his department; the most efficient rates of expansion in the different cylinders for various speeds, noting the page or pages of the steam log from which the data were obtained. This record shall be turned over to his successor.

He shall enter in the steam log a record of all injuries to any of the engineer force while within the engineer department.

He shall forward all official reports, communications, and returns, through the commanding officer, to the inspector.

During the temporary absence or disability of the chief engineer the engineer next in rank remaining on board shall perform the duties of the chief in addition to his own.

295. **Duties of the engineer officer of the watch.**—The engineer officer about to take charge of the watch duty shall not relieve his predecessor until he has satisfied himself that the condition of the machinery is as reported when turned over to him.

The engineer officer of the watch shall use every effort to maintain machinery in an efficient condition, and to prevent any accident or injury to the same.

He shall cause to be faithfully executed and observed all instructions and directions received from the chief engineer in reference to the use, care, and preservation of the machinery, and in other professional duties with which the chief engineer is charged by these regulations.

He shall report at once to the officer in charge of the vessel any derangement or probable derangement of the machinery which may affect the maneuvering powers of the ship, or any part of the machinery operating the characteristic display of a light vessel.

He shall not permit the speed of the engines to be altered without orders from the officer in charge, except through necessity.

He shall notify the chief engineer as soon as he discovers anything wrong with the machinery or boilers.

He shall execute promptly any order received from the deck by signal or otherwise.

He shall at all times carry out any instructions he may receive from proper authority.

He shall preserve order among his subordinates in the engine and fire rooms.

He shall keep the steam log and make such entries as are required by the instructions contained therein.

He shall not absent himself from the place of his duties unless regularly relieved.

296. The engineer officer having the day's duty shall be responsible for all work being done in the engineer department and all engineering work being done by the engineer force. In the morning he shall see that the morning orders are properly executed. In the evening before retiring he shall inspect the department and satisfy himself that all cocks and valves are closed or otherwise as ordered; that all unnecessary lights are out; that all precautions have been taken to guard against fire, leakage, or other accident; and he shall report the condition of the department to the chief engineer.

297. All orders regarding the management of the machinery or the men belonging to the engineer force shall, except in an emergency, be given through the engineer officer on duty.

298. Absence of engineer officers.—Engineer officers shall, before applying for leave to be absent from the ship, obtain permission from the chief engineer. Should the chief engineer refuse such permission, he shall report his reasons to the commanding officer.

299. General care and management of engines, boilers, machinery, etc.—Under no circumstances are engines and boilers to be endangered by carrying too heavy a pressure of steam. They are to be run with the greatest possible care, and with the closest attention given to safety valves, water and steam gauges, and other attachments.

The boilers of all lighthouse vessels shall be cleaned at least once in three months, or as often as conditions will permit, the time at which each boiler is cleaned shall be entered in the log book. If through unforeseen emergencies or from accident it is necessary to allow steam to go off a boiler before the regular cleaning period, then the boiler shall be cleaned at that time, but a full explanation of the reasons for so doing shall be noted in the log book.

Special mention shall be made in the monthly reports of the condition of the boilers and the means which have been employed for their preservation.

The cylinders, receivers, and steam jackets must be gradually and thoroughly heated and drained before steam of full pressure is admitted to them.

The greatest care must be exercised that "water rams" are guarded against by carefully draining all pipes while raising steam.

The rate of expansion in each cylinder for the different powers shall be ascertained. The powers developed in each cylinder shall be nearly equal at the various cut-offs, and the horsehead arms on the reverse shaft, the links, or the cut-off gear, as may be the case, shall be marked accordingly.

The indicators shall be attached to the cylinders only for immediate use; and they shall be dried, cleaned, and lightly lubricated with cylinder oil before being put away.

Tallow or oil of vegetable or animal origin shall *not* be used for the lubrication of cylinders and valves, but mineral oil only shall be employed, using the minimum amount consistent with safety.

300. Examination and care of parts.—The crank pins, crosshead pins, main bearings, eccentrics, etc., shall be examined twice a year, and a record of their adjustments entered in the log book. Connecting rods shall be swung at this time.

The thrust bearings and the tunnel shaft bearings shall be examined at frequent intervals and their condition entered in the log.

The steam and water cylinders and the steam and water valves of all auxiliaries shall be opened and examined at least once in six months, and a note of the condition of the various parts entered in the log. Each valve shall be carefully examined and kept faced to a good seat.

Cylinders and valve chests of the engines shall be opened every three months, and at that time the leads of the valves and the clearances of the pistons shall be accurately determined. A careful examination shall be made of all parts and a full statement of their condition and the amount of loss of clearance, etc., shall be entered in the log book.

As little oil as possible shall be used for interior lubrication. This prohibition is intended to apply to every steam cylinder in the ship, for whatever purpose intended.

All cocks and valves throughout the engineer department are to be moved at least once each week.

When not under steam, the engines and main valves are to be moved every day, when possible, and all steam machinery jacked at frequent intervals, the fact being noted in the steam log.

Zinc plates shall be suspended in the hot wells and condensers to prevent corrosive action. The condition of the zinc and of the interior surfaces shall be frequently examined and noted in the steam log.

All holding-down bolts shall be examined at least once in three months, and care taken that the nuts of pillow block bolts do not become set fast.

The gratings over the engine-room hatches are not to be taken off, except in cases of necessity, and shall be replaced as soon as possible.

The engine-room gongs and bells and the instruments fitted on board for telegraphing signals to and from the engineer department shall be carefully examined, oiled, and tried before getting under way.

Mineral oil causes rubber valves to swell and overlap each other. All such valves must be examined periodically, turned and trimmed to their original size, if necessary. Their condition as well as that of the condensers, at each examination, shall be noted in the steam log, with all further information that may be considered necessary. Rubber valves will be washed in a solution of soda or potash.

Water shall only be used where necessary on the bearings.

When water has been used, the bearing shall be examined at the earliest opportunity.

The tubes of surface condensers must be examined at least once in six months and kept clean. If not examined, the reasons for the omissions are to be stated in the quarterly report. If any considerable amount of steaming has been done, the condensers must be examined before the expiration of the time mentioned.

If at any time the condenser tubes are found to be leaking, steps will be taken, as soon as practicable, to prevent the passage of circulating water from the condensers to the hot-well and feed-pump suction.

Valves of sounding pipes to double bottoms must be kept closed when not in use. The height of water in the bilges shall be measured and the water pumped overboard each watch and all bilge strainers cleaned.

Independent circulating and air pumps will be started at least 15 minutes before attempting to move the engines, or to warm the cylinders by means of the pass-over valves.

When filters or grease extractors are fitted, they must be in continuous use except when under repairs or being cleaned.

The valves of air and circulating pumps shall be examined frequently.

The interiors of evaporators shall be frequently examined and the tubes or coils cleaned and scaled when necessary.

When evaporator tubes or coils are made of iron or steel, zinc plates shall be fitted for protectors, as in boilers.

When the evaporator is not in use, the shell and coils shall be drained.

301. Special care of boilers.—Rolled zinc slabs shall be suspended in such parts of the boilers as may be directed. The chief engineer on each inspection of the boilers shall examine these zincs and note their condition in the log. Special care must be taken to insure perfect metallic contact between the zincs and the stays or plates of the

boilers to which they are attached, the surfaces in contact being filed bright. These zincs shall be renewed as soon as their exposed surfaces are reduced by oxidation to about half their original thickness. Zincs that have become bent, cracked, or distorted, should be removed at once.

It has been found by experience that the number of rolled-zinc slabs (12 by 6 inches by 1 inch) required for the thorough preservation of boilers is about one for every 100 square feet of heating surface. This proportion is, however, merely intended as a guide and not to interfere with any alteration of position or number which may appear desirable or necessary for the arrest of oxidation.

No tallow or oil of vegetable or animal origin shall be allowed to enter the boilers. This prohibition applies to all boilers in use aboard ship of whatever type or service.

The dry pipes and drains of the steam drums are to be examined frequently to ascertain if the holes in them are clear.

Boilers that are not in use shall be kept, if possible, full of fresh water made slightly alkaline, and failing this, full of salt water made slightly alkaline.

When water is used from a boiler, the water line must not be maintained at a level among the tubes.

The boilers, when empty, shall be kept dry by such means as are at the disposal of the officer in charge. The water bottoms and lower part of the fronts are to be kept free from scale and rust and contact with ashes, and well painted.

When boilers are empty, the furnaces shall not be primed.

The main and auxiliary stop valves, safety, check, and blow valves, and any other valve or cock by which steam or hot water could enter the boilers in which men are at work, shall be shut and secured so that they can not accidentally open or be opened.

The engineer officer having the day's duty will see that these precautions are carried out before he allows any men to enter the boilers.

The safety valves shall be partially lifted by the hand gear at least once each week when not under steam, to insure their good working order.

The boilers shall always be filled with fresh water when possible. When filled from overboard, the necessity for doing so from shallow water or using impure water of any kind should, as far as possible, be avoided.

The water will be retained in the boilers without change as long as possible, even when the fires are not lighted. The boiler will be drained only when necessary for examination, cleaning, or repairs, and the water changed only when dirty or acid, or when the boiler is to be used for distilling without the aid of an evaporator.

The boilers shall not be used for trimming ship nor for water tanks for any purpose except for a reserve of fresh water.

Salt water shall never be introduced into the boilers except for the purpose of washing out the interiors or to make up a deficiency of feed when steaming, when the supply of fresh water is not sufficient. When the interior of a boiler has been washed out with salt water, it shall be filled with fresh water immediately thereafter, or if fresh water is unobtainable, with salt water.

The exteriors are to be kept as dry as possible and nothing wet or combustible is to be stored over or around them.

The bilges in the firerooms are to be kept dry and well painted.

Sudden changes of temperature in the boilers are to be avoided; and when circumstances will permit, at least six hours should be occupied in raising steam from cold water, in other than water-tube boilers.

Connection doors must not be used to check the draft and fires.

The uptakes shall be kept free from dirt and well painted.

Fires shall not be hauled after discontinuing steaming, except in case of emergency, but shall be allowed to burn down and die out in the furnaces, with the dampers, furnaces, and ash pits closed. The boilers shall be blown down at the lowest pressure practicable, or, if necessary to empty them, the water shall be pumped out.

Coil, pipe, or water-tube boilers shall never be used as tanks or reservoirs for any purpose whatever.

When in cases of emergency it is necessary to increase the speed of the vessel, it shall be done by increasing the steam in the boilers from the working to maximum pressure under natural draft.

The blowers may be run at any time at moderate speed for purposes of ventilation or to assist the draft, but the air pressure must not exceed one-half inch of water.

The temperature of the feed water should be from 190° to 240° F., and in general where no special heaters are fitted shall be as high as is consistent with the maintenance of a fair vacuum.

The air space between the uptake and casings of the boilers shall be examined frequently and any accumulation of soot or coal dust prevented.

When it is necessary to keep ashes in the firerooms temporarily, they must not be stowed against any part of the boilers or bulkheads; boards or heavy canvas must be used to protect the metal surfaces.

Coal must not be stowed in the firerooms in such quantities as to cover up the handles or wheels of valves or to get into the bilges, thus choking up suction and strainers and endangering the safety of the ship.

In order to determine the condition of the water in the boilers using fresh water only as regards its acidity, neutrality, or alkalinity the water in each boiler will be tested with both kinds of litmus at least once per day when they are under steam and once per week when the fires are not lighted.

If the water in the boilers, on applying litmus paper, be in an acid condition, a small quantity of soda will be put into the condensers or hot wells, from which it will be pumped into the boilers with the feed water. Only the smallest quantity of soda possible to accomplish the purpose intended shall be used.

Boilers using salt water only or as additional feed supply must be fitted with salinometer pots, one for each boiler, properly connected to the boiler about halfway between the bottom and the low-water line in the boiler.

When steaming and using salt feed only the saturation in each boiler must be taken once every hour; when using salt feed supplementary, every four hours, or as the chief engineer may direct, to suit the conditions on board the vessel. If density of the boiler water shown on the hydrometer should be or exceed two thirty-seconds, the boiler should be blown through the bottom blow. In no case should the water in the boiler be blown out below the first try cock on the water column.

The surface blow should be used once during the watch to skim off the impurities and grease accumulating on the surface of the water.

Heavy banked fires should never be kept except in cases of emergency, but when so banked ash-pan doors shall not be put in place.

The boilers of all vessels in commission shall be tested by water pressure at such times as the chief engineer may deem necessary or advisable, and at least once each year by the United States local inspectors of steamboats.

The hydrostatic pressure applied to boilers shall not exceed the designed working pressure plus 50 per cent of same.

During the application of hydrostatic pressure the boilers will be carefully examined and proper gauges used to detect any change in the form of any of their parts.

In applying water pressure care must be taken that there is no leak past the main or auxiliary stop valves.

Should a drill test be made and reveal unusual thinness of any plates, the water pressure will be carefully applied, in order that injury may not be caused by overpressure.

The following particulars of the results of boiler tests will be entered in the steam log: The greatest pressure applied; the load per square inch on safety valves previous to the test and when boilers were first used; the date of last repair; the effect of the test on the

plates and stays of furnaces, combustion chambers, and shell, and on the tube sheets, and such additional information as necessary to make a complete report on the condition of the boilers.

The boilers shall be thoroughly examined at regular intervals of about three months. A detailed report of the condition of each boiler, fusible plug, connection, etc., at each of these examinations shall be entered in the steam log.

When during the periodical examinations of boilers the engineer in charge has reason to believe that any part or parts of the boiler are unduly worn or corroded, he will cause these parts to be tested by drilling, the holes to be not over one-half inch in diameter. The thickness of the plates originally and when drill-tested, the probable cause of corrosion or wear, and all other details of the test will be entered in the steam log and reported to the inspector.

Full information will be noted in the steam log of the kind, quality, steaming power, and other particulars of the coal received. The statement that the coal is bituminous or anthracite, being indefinite, will not be used except when it is impossible to obtain any further information of the coal received, in which case a special note of the fact will be entered in the steam log.

302. When using red lead at any time for painting the double bottoms or other confined spaces in the engineer department, the chief engineer officer will see that proper precautions are taken to prevent its injurious effects on the health of the men. Two days is the maximum length of time that a man should be kept at this work.

303. Cotton waste or any other materials used for wiping, and which are saturated with oil, will be destroyed immediately after using, or, if intended for starting fires, will be put in a covered iron receptacle, and the latter kept in a safe place.

304. All chocks and ties fitted to cylinders, boilers, and other parts of machinery, to prevent their shifting from the effects of collision, will be kept at all times in an efficient condition.

305. Steam launches and motor boats.—The preceding instructions for the management, care, and preservation of the machinery of the vessel will, as far as applicable, govern the management, care, and preservation of the machinery of steam launches and motor boats.

The safety valves of the boilers of steam launches will be examined whenever steam is raised after an interval of more than seven days not under steam. The condition of the safety valves, water gauges, check valves, etc., will be ascertained from time to time while the machinery is working. Great care will be taken to keep these important fittings in a thoroughly efficient condition.

Salt water will not be used in the boilers of steam launches except in cases of great emergency, and after its use the boilers will be scaled and cleaned as soon as possible.

Unless it is expected that the machinery of steam launches will be used again in a few days, the wearing surfaces of cylinders and valve chests will be cleaned and lightly coated with mineral oil, and the engines made ready for use. All drain cocks should be kept open and the engines, valves, pumps, etc., moved every day.

Strainers on sea-valve openings will be kept clear, and receiving pipes of circulating and air pumps examined and cleaned annually, or more frequently, if necessary.

The boilers of steam launches will be frequently examined, internally and externally, and hydrostatically tested in the same manner as the main boilers.

Fuel connections must be absolutely tight. Gasoline or kerosene must not be allowed to enter into the bilges of the boat. All connections must be frequently examined and be tight.

All fuel must be strained when filling the tanks.

The electric batteries must be stowed in a dry and protected place.

The dynamo for the ignition system must be kept dry and free from grease and dirt.

The exhaust pipe and muffler should be covered with nonconducting material to prevent the scorching of the surrounding woodwork.

The Rules and Regulations of the Board of Supervising Inspectors of the Steamboat-Inspection Service for the equipment of motor boats and steam launches must be adhered to.

306. When a vessel is laid up, the iron or steel bright work of the machinery, except such parts as pass through stuffing boxes, or upon sliding surfaces (as piston rods, valve stems, slide and guide faces, and journals), shall be covered with white lead and tallow.

Soft packing shall be removed from piston rods or valve stems.

All parts passing through stuffing boxes, or working upon their surfaces, such as piston rods, valve stems, guide and slide faces, clutch coupling slides, interiors of steam cylinders and valve chests, must be cleaned and covered with a coating of vaseline, the machinery being moved upon first application so as to bring all these parts upon properly covered surfaces.

All bearings must be well oiled and the oil holes plugged with waste, the engines being turned one complete revolution after oiling.

All water-containing parts of the machinery inside of outboard valves shall be thoroughly drained. Particular attention should be paid to draining of pump cylinders; condensers; feed, blow, and suction pipes; fire main, and all steam and exhaust piping where it is possible for water to gather. In draining these pipes, drain plugs to be removed or flange joints should be broken at the lowest parts of each system and wherever a pocket is formed which is not drained by a proper drainpipe. Outboard valve casings below valve seats must

be covered where possible with nonconducting material, such as sawdust or manure, temporarily boxed in.

The gauges and oil cups will be drained but not removed.

The sea valve must be closed and properly secured and precautions taken to prevent freezing.

The storerooms must be cleaned.

The smokestack and ventilators must be covered.

307. Care of the electric plant.—This apparatus must be kept clean, in perfect condition and repair; the dynamo must be protected from moisture.

Proper precautions must be taken against short circuits and the overheating of the armature and the rheostats.

Switches must be wide open or securely shut to prevent arcing; contact surfaces must be clean.

The steam turbines or engines and their lubricating systems must be frequently examined and kept in proper state of efficiency.

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