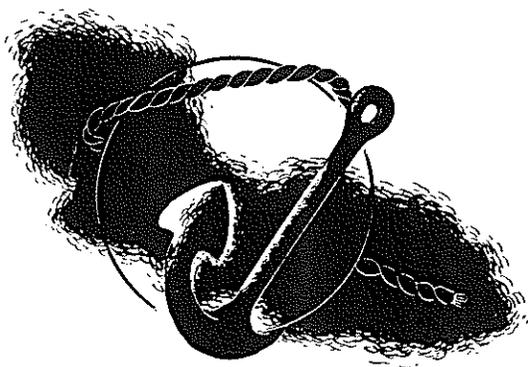


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Food and Ration Problems of the Department of the Navy *

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The second in a series of three articles in which feeding problems and specific food requirements of the various Departments of the National Military Establishment are discussed. A subsequent article will deal with the feeding problems of the Air Force.

All establishments and facilities of the Department of the Navy have but two broad purposes - to maintain the United States fleet, and to sustain its operations. The facilities and installations necessary to the accomplishment of these primary objectives can be grouped into four general types of Naval commands:

1. Shore-based installations within the continental limits of the United States.
2. Shore-based installations beyond the seas.
3. Units of the Fleet.
4. The air arm of the United States Fleet.

The subsistence problems of the Department of the Navy will be considered according to the requirements of each of these groups.

Shore-based Installations Within the Continental Limits

Shore-based installations in the United States are largely concerned with planning,

training, and supply activities. Because of the permanent nature of these installations, it is generally possible for the Department of the Navy to operate large messes, usually cafeteria style, in essentially the same manner that any large corporation would operate a cafeteria for the purpose of feeding its employees on the job. No great difficulty is encountered in procurement or supply of fresh foods. Equipment is installed and utilized with no urgent requirement for conservation of space as, for example, in a submarine.

Some special problems, however, do exist in feeding in such installations and will require research prior to their solution. Some of these problems relate to the actual feeding of personnel assigned to shore-based installations. Others arise from the part these installations play in supplying the fleet and shore-based commands beyond the seas.

Provision loading lists. To supply the fleet in modern warfare it is necessary to devise practical methods for effecting the most rapid transfer of needed quantities of subsistence. Provision loading lists must be correlated with facilities aboard ship. The problem is somewhat complicated by the fact that the study must be applied to more than 75 various types of ships in service, and each type presents a separate problem requiring a separate solution. It will be necessary to determine the kinds and sizes of containers and quantities of foods which can go into the unit loads for each type of ship.

Standard storage plan for subsistence items. The development of a standard Navy storage plan that can be adapted to all Navy subsistence supplies in the many different types of existing warehouses and storage areas is necessary in order to conserve space and labor, and thereby effect economies in time and money. The problem of standardization involves the loading, stacking, and palletizing of supplies, and the system eventually developed must satisfy the requirements of accountability, availability, and accessibility. Inventory control, stock control, and packaging functions must be given due consideration, and a universal locator or control system must be developed. The development of such a storage plan will permit maximum use of existing storage space and will improve inventory control and handling efficiency. Furthermore, it will eliminate the necessity for indoctrinating transferred personnel to the various "John Doe" systems which now exist. Such a storage plan, according to the objectives of the project, would outline storage methods to be used in large supply centers, depots, small supply departments, advanced bases, etc.

Cubage, weights, and stability. Accurate data concerning the weight, space, and stability factors of food in storage are required in planning the provision loading lists for ships. Adequate accurate data are not available concerning the dimensions of containers in which the various food commodities are packed, and thus it is not possible to determine what quantities of foods can be loaded into the space provided for storage both ashore and afloat.

Stability of subsistence commodities is another factor requiring thorough study. The effect of climatic conditions and storage temperatures on the stability of each individual product must be determined with respect to nutritional content and palatability. When storage conditions affect palatability and nutritional values adversely, new food products or processing methods must be developed which will better withstand such conditions.

Data for all foods should be reviewed, but the following are suggested for early study: cake flour, high ratio shortening, apple pie nuggets, lemon juice powder, prepared bread mix, soya flour, dehydrated onions, rock fish, prepared soup ingredients, and cake mixes.

Determination of food equivalents. Under the Navy Ration Law, it is required that definite portions of certain foods be served to each man, regardless of the form in which it is procured, prepared, or served. In order to comply with the terms of the law it is necessary to know what quantity of dehydrated apples (to select an example at random) is equivalent nutritionally to a given quantity of fresh apples, or fresh frozen apples, or dried apples or canned apples. Accurate data as to equivalents among fresh, canned, frozen,

dried, and dehydrated foods are not available for many food items. Without these data the quantity of a particular food which is served to the individual may not be nutritionally equal to the same food served him the previous day in a different form. A study is therefore required to determine what quantities of foods in different forms are nutritionally equivalent and to determine the correct portions of the various foods which are to be served to each man. The study will require comparisons of nutritional values of fresh, frozen, dehydrated, dried and canned foods and the compilation of data on actual rates of food consumption by Naval personnel. Accurate information from such a study would serve as the basis on which to requisition food; it would facilitate the preparation of provision loading lists for various types of ships and would be the basis for necessary recommendations for changes in the Navy Ration Law.

Baking facilities. In order to insure an adequate supply of baked goods a survey should be made of the baking facilities available at continental bases. Such a survey should take into consideration the quantity of items presently being baked; the amount that can be baked using currently available facilities; and the amount, capacity, and condition of the present bakery equipment. Plans must then be developed and facilities provided for the most efficient bakery services.

Baking techniques. To insure the efficiency of bakery operations and the quality of baked products, a study should be made of the many factors involved in baking techniques and materials. For example, it is necessary to determine whether or not certain of the pan glaze materials can be used to eliminate sticking of bread and rolls to the bake pans.

Nutrition and sanitation of galley operations. For the best possible feeding of personnel at shore-based installations a study is required which should include all nutritional and sanitary aspects of galley operation such as main serving line operation (the order of foods on the serving line), proper temperatures of foods in steam tables, design of galley equipment, development of preference ratings for various food dishes, elimination of insects and rodents, and consideration of new types of mess equipment such as a tray which will provide for a beverage holder and soup tureen.

Frozen foods. Present methods of transporting, storing, and distributing frozen foods have resulted in food losses which can be largely attributed to inadequate refrigeration and handling facilities. It is necessary to devise improved methods which may be used in the loading and unloading of frozen foods at temperatures at which deterioration of these foods will not take place. Studies are also required to determine what equipment is necessary for the transportation of frozen foods from ship to shore. Another phase of the problem which demands attention is the determination of changes required in shipboard refrigeration facilities.

The Navy Cook Book. A study is required in which various formulas and recipes are tested both for nutritional value and acceptability. The study would include the determination of actual food consumption in order that the correct quantities of food could be issued and prepared for each 100 men. The results of this work would then be utilized to revise the Navy cook book.

Shore-based Installations Beyond the Seas

Overseas shore-based installations are established for and exist only as operational and support bases for the fleet. The special feeding problems of such bases which are obviously common to both the United States Marine Corps and the Army Field Forces have been discussed in "Army Field Forces Feeding Problems", Activities Report, Oct., 1948, and need not be discussed here. Furthermore, a number of the problems which have been enumerated as affecting shore-based installations within the continental limits of the United States are recognized in shore-based installations beyond the seas; however, additional problems relate principally and particularly to the latter, and it is these which are dealt with here.

Marine Corps Arctic Ration. No ration is currently available for consumption without heat by Field Force personnel under extreme cold conditions. Therefore, there must be developed an Arctic ration for use principally by troops of the United States Marine Corps stationed in cold weather areas. It is anticipated that operational plans may require that men be subsisted in cold regions for unlimited periods. The ration that is called for under these conditions is one with the following general characteristics:

- a. High caloric value
- b. Palatable when eaten hot or cold
- c. Light in weight
- d. Small in bulk
- e. Easily carried by individuals
- f. Easily prepared for consumption
- g. Able to withstand repeated radical changes in temperature without damage

Packaging and packing of subsistence cargos. Subsistence items must be adequately packed and packaged to insure that the product will be acceptable and nutritious at the time of consumption. Frequent handlings, by loading and unloading personnel, transportation by rail, ship, and motor vehicles over rough or muddy terrains make it mandatory that subsistence products for use in shore-based installations beyond the seas be given special protection.

To reduce manhandling of supplies new and improved equipment is currently being devised. This equipment includes sling bars, mobile truck cranes, and fork trucks of crawler-type and pneumatic-tired construction. Studies must be made on the proper packing, packaging, crating, and palletizing of subsistence supplies for handling with the proposed new equipment.

Stability. The keeping qualities of foods to be used in shore-based installations beyond the seas must be constantly improved. It is considered that standard food items used by the Department of the Navy should be of such stability that they will be palatable after exposure to temperature conditions up to 100° F. with relative humidity up to 90 percent for extended periods.

Units of the Fleet

Many of the problems discussed in the preceding paragraphs are also applicable to the use and handling of subsistence aboard ship. Yet the very nature of Naval craft requires strict conservation of galley, storage, and dining space. Crews may be confined to the small area of a destroyer for relatively long periods during which time they must be provided foods which are nutritious and acceptable and which can be prepared with the galley equipment on hand. Naval feeding has advanced with seven league strides since the days when scurvy was an ordinary occupational hazard, but additional strides remain to be taken. The specialized problems with which the Department of the Navy is currently concerned are as follows:

Abandon Ship Ration. When ships are abandoned during emergencies at sea no time is available to the crew for collecting food and drink for the crucial period prior to rescue. Even if time were available, however, it is more than likely that foods would be gathered under such confused conditions that they would undoubtedly be unacceptable or non-utilizable under survival conditions.

The present abandon ship ration is not deemed adequate to meet future operational requirements. Before a significantly improved ration can be devised, a careful determination must be made of the nutritional requirements for emergency existence, and this information then used as a basis for the development of an abandon ship ration. Since the ration is intended

for life boat, life net, and life raft feeding under emergency conditions, its container must be one which will not rust or leak. Further, it is necessary that the container in which the ration is packed be capable of floating.

Submarine feeding. Conservation of space, so important in all types of naval craft, is an even greater necessity aboard submarines. Few craft of any kind are designed with such limitations with respect to space for the placement of equipment, armament, and general living accommodations. The radius of operations of this type of boat is largely determined by the quantity of food which may be stored aboard. Of great importance, too, is the morale factor among the men who are confined to the extremely limited areas available with little to relieve the monotony of their duties. Close confinement may also affect the health of the crew. Providing submarine crews with highly acceptable foods is an effective means of maintaining morale; providing them with highly nutritious foods is an important means of maintaining health. Submarine feeding, therefore, is a special problem which must be solved with particular attention to conditions peculiar to sub-surface craft.

Galley equipment for use aboard ship. Improvements in food preparation, food service, and mess hall operation aboard ship are greatly to be desired. The rearrangement of galley equipment may facilitate galley operations, and feeding lines may be rerouted to improve feeding conditions. Such equipment as pressure cookers, new types of coffee urns, and dishwashing devices should be studied in order to determine their usefulness aboard ship.

Preliminary preparation of foods. Much time could be saved and galley personnel freed for other duties by eliminating, insofar as possible, many of the steps required in the preparation of foods. Foods which are particularly adaptable for the saving of man hours are boneless beef, cut-up chicken, prefabricated lamb, pork, and veal. Prefabrication has proved a great space and time-saving expedient in military feeding in the past, but further refinements will undoubtedly effect even greater savings.

Storage conditions of subsistence aboard ship. Studies are required to devise improved conditions for the storage of subsistence items aboard Naval vessels of all types. Specifically, the problem requires study with respect to improving refrigeration facilities to permit the use of frozen foods. Structural changes may be necessary in the construction of ships to accommodate refrigeration equipment. Much work has been accomplished in the way of preliminary studies, and recommendations have been forwarded to the Bureau of Ships.

The Air Arm of the United States Fleet

The Navy's air arm exists for one purpose only - to implement the overall operations of the fleet striking force. Two basic feeding problems are under current consideration for the Navy's operations - in-flight feeding, and emergency feeding.

As for in-flight feeding in Naval aircraft, the problem is limited to patrol flights and attack bombing. Actual in-flight feeding is, however, only one of the problems of the Naval air arm. Consideration must be given also to "pre-flight" and "post-flight" feeding. When aircraft are in flight during a normal meal hour, it is desirable to feed the personnel aboard. It is necessary that personnel who are about to participate in such flights be provided proper non-flatulent foods. Highly acceptable foods must be provided personnel participating in this type of flight after their return to base.

The second major problem with which the Naval air arm is concerned is the necessity for an adequate emergency flight ration to be consumed when air-craft are forced to make emergency landings at sea or in locales remote from sources of subsistence supply. The

present life raft tablet ration issued to Naval aviation personnel for emergency use is not considered adequate for sustaining life for an extended period in either arctic or sub-arctic ocean areas. There is a particular need for a ration which will provide for the caloric and psychological requirements of Naval personnel who have made an emergency landing in cold weather areas. This ration may be required where the temperature falls as low as -60° F., and it must be taken into consideration that the survivors might of necessity be forced to walk out from the scene of the forced landing to a point of rescue along the sea coast.

It is fully realized by the Department of the Navy that the problems enumerated here are only a few of those which will undoubtedly face the Bureau of Supplies and Accounts in its endeavor to maintain Navy subsistence at the highest possible level in order that the basic policy of the United States Navy may be carried to a successful conclusion. That policy is to "Maintain the Navy as a thoroughly integrated entity in sufficient strength on the sea and in the air to uphold, in conjunction with our other Armed Forces, our national policies and interests, to support our commerce and our international obligations, and to guard the United States including its overseas possessions and dependencies."

The distance the Navy can travel is directly influenced by the quantity and quality of the subsistence which it can make available to its shipboard personnel. Therefore, if the old maxim "an Army travels on its stomach" is true, it is equally true of a Navy.

