

● PSF: Subject File: Aviation

Report of Board To Investi-
gate Need for Add'l. Bases
1938

AMERICAN EMBASSY,
LONDON.
NAVAL ATTACHE.

From: R.E.I.

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1/1/54

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Admiral W. D. Leahy U.S.N.
Chief of Naval Operations

Personal

Navy Dept., Washington, D.C.



THE WHITE HOUSE
WASHINGTON

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file
RF*

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December 6, 1938

Memorandum For The President.

At the suggestion of Admiral Leahy there is transmitted herewith for your information a copy of the report of the Board headed by Admiral Hepburn which has just completed a study concerning the establishment of additional submarine, destroyer, mine and Naval air bases.

Respectfully,

D. J. Callaghan
D. J. Callaghan.

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Aviation

Navy Department,
Washington, D. C.
Dec 1 - 1938

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Signature- *JRD*
From: Statutory Board on Submarine, Destroyer,
Mine and Naval Air Bases, 1938.
To: The Secretary of the Navy.
Subject: Report of the Board to Investigate and Report
upon the Need, for Purposes of National Defense,
for the Establishment of Additional Submarine,
Destroyer, Mine, and Naval Air Bases on the
Coasts of the United States, its Territories
and Possessions.
References: (a) Secretary of the Navy letter QB(119)/P16-3
(380520)G dated June 7, 1938.
(b) Act of May 17, 1938 (Public-No. 528 -
75th Congress).
Enclosures: (A) Copies of references (a) and (b).

Part I - GENERAL AND EXPLANATORY COMMENTS

1. The Board appointed by the Secretary's letter of June 7, 1938, reference (a), in accordance with the Act of Congress approved May 17, 1938, reference (b), has made a careful study of all matters covered by the precept.

2. A study of this nature must take into consideration the naval policy of the United States as regards both the material composition of our naval forces and the plans for their operation in time of peace or war.

3. As a statement of national policy governing the material composition of our naval forces the Board considers

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the Act of May 17, 1938, reference (b), and the previous acts referred to therein, as complete and explicit and all-sufficient for the purposes of this report. Taking that act as the approved measure of preparedness in ships and aircraft, the Board has limited its specific recommendations to those features of the shore establishment covered by the precept which are immediate or clearly imminent necessities in connection with the present authorized armaments. Even with such a definite foundation upon which to base its recommendations, the material aspect of the problem is extensive and complex. It would becloud the immediate issues to take equal cognizance of possible changes in policy respecting the permanent peace time establishment which are at this time unpredictable. Nevertheless the Board has not been unmindful of the possibility of such changes, which may involve either expansion or retrenchment. The latter presents no problem. In the case of expansion the Board has indicated by comment and suggestion in appropriate places the possibilities of meeting such new necessities by administrative action on the basis of this report and without need for an entirely new exploration of the subject.

4. With respect to operating requirements of the Fleet, both in peace and in war, the Board has freely con-

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sulted with all authoritative sources of advice or information, both in the Department and in the Fleet. It has studied the reports of former Boards and other pertinent matter in the files of the Department. Operating requirements flow from two equally important considerations, viz: first, strategic requirements with respect to location and, second, physical conditions favorable to operation in any given locality. When new locations, as distinct from expansion of existing establishments, have been found advisable, the Board has visited all localities as to which complete physical data were not already at hand, and the Board's recommendations in such cases are founded upon both the strategic necessities, and the assurance of favorable physical operating conditions; and, so far as it is possible to forecast future conditions governing costs, upon availability of sites within permissible limits of expenditure.

5. The precept limits the Board's consideration to certain special types of shore establishments, designated as "bases", for aircraft, destroyers, submarines, and mines. The need for such bases arises from the fact that the types of craft in question are constantly dependent for operation, either in peace or in war, upon certain outside services of a special nature. In larger ships most of the corresponding facilities required for routine opera-

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tion are self-contained. These special operating resources which must be immediately available are quite separate and distinct from those afforded by navy yards. Destroyers and submarines share with all other types of vessels the necessity for periodical drydocking, extensive overhaul, and recourse to supply bases. It is the function of navy yards and supply bases to furnish these facilities. They are not considered as coming within the scope of this report.

6. The question of the adequacy of the naval establishment to be maintained in time of peace inevitably involves some consideration of its adequacy to meet a condition of emergency. Mobilization entails a tremendous expansion in personnel, in ships and planes in active commission, and in the shore facilities necessary to their support. For the most part, this increase must perforce be accomplished by the immediate utilization of private and commercial resources of all kinds, by working the permanent establishment at its highest overload capacity, by temporary and hasty construction for which plans are made in advance, and by improvised arrangements. Mobilization plans are drawn accordingly. Nevertheless the permanent establishment, especially as regards shore based activities, must be so designed, with respect to strategic location and physical adaptability to rapid expansion, that adequate mobilization plans are prac-

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ticable. The Board's study and recommendations take cognizance of that necessity.

7. It is emphasized throughout this report that the specific recommendations submitted are limited to the necessities of the present authorized combatant strength of the navy in peace time operation. This does not mean that the over-all capacity of the shore establishment can be cut to a neat fit with the over-all requirements of the Fleet merely from a maintenance point of view. Operating requirements must also be considered. The necessity for adequate training facilities in time of peace is not second in importance to that of physical maintenance. This refers not to primary training in special schools devoted to that purpose, but to fleet training as a whole in its tactical and strategical aspects--the paramount activity of the Fleet in time of peace. A few of the Board's recommendations for additional facilities have this requirement primarily in mind, although in each case they are equally important from strategic considerations. Instances of this sort are Wake Island and Johnston Island. The total of such additional facilities recommended forms only a small fraction of the total recommendations.

8. The Board considers that the problem of meeting emergency needs for primary training in such specialized lines as aircraft and submarine operation is one that can

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not be satisfactorily solved by the mobilization methods mentioned in paragraph 6 above. The influx of untrained personnel and the need for operation of all reserve material are simultaneous with mobilization, and the permanent peace time establishment for this primary training should be in excess of normal requirements. The Board's recommendations on this feature form the only real exception to its policy of limiting its recommendations to the actual needs of the present authorized establishment.

9. The peculiar geographic conditions confronting the United States are responsible for certain needs in the shore establishment which would not otherwise exist. The normal distribution of our naval forces in time of peace is a matter of great political and strategic importance. Apart from the obvious demands of war, or the possible division of the Fleet into separate Atlantic and Pacific forces, an adequate defense plan requires that the shore establishment be capable of supporting the whole Fleet in either the Atlantic or the Pacific. This inevitably involves some duplication of facilities. Those indispensable needs in the matter of drydocking and the industrial resources of navy yards and of supply bases, which are common to all types of vessels, are, as previously stated, beyond the scope of this report. Destroyers, submarines, and aircraft, in addition to such basic facilities for maintenance peri-

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odically available over long periods, require also certain shore-based or tender-based services immediately available at all times to insure normal active operation. With adequate tender support and the moderate additional shore-based facilities hereafter recommended for destroyers and submarines, the Board believes that the requirements of these two types for operating in total strength in either ocean are reasonably well provided for. The necessities of aircraft in this connection and the practicabilities of the matter are separately discussed in paragraph 13.

10. Summarizing briefly the general situation as it appears to the Board, it may be said that the need for additional shore-based facilities for aircraft far overshadows that for destroyers, submarines, or mines. This need does not arise solely by reason of the large increase of strength authorized by the Act of May 17, 1938. Existing shore establishments have failed to keep pace with the requirements of the number of planes authorized by the Act of 1936. The program of procurement for the additional planes authorized by the Act of 1938 has not yet been definitely worked out, but, even at the slowest rate of progress, it is reasonable to expect, it is apparent that a comprehensive and extensive building development of shore facilities should be undertaken immediately for the maintenance and operation of planes actually in hand at any given time dur-

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ing the period of increase. It is not too much to say that if all the planes now authorized were in hand by the time action can be taken on this report, they could be operated at only a fraction of their potential value, and would suffer a large measure of deterioration or obsolescence before adequate shore facilities could be provided.

11. With respect to the increase of approximately one thousand planes under the latest authorization, a program has been prepared whereby this increase is to be accomplished at the rate of about two hundred planes a year for five years. The specific number and types of planes for the first two years of the program have been tentatively fixed. In view of the present rapid technical development in aircraft, any program of this sort must necessarily be tentative in character until completion of the project is in sight. So far as shore facilities are concerned, the only point of present importance in this connection is the approximate numbers of various types of planes for which base facilities must be provided. As between the broad division of types, the requirements for operation and maintenance, and the corresponding requirements in the characteristics of bases, differ in several respects. The number of carrier type planes required can be fairly accurately estimated from the number of carriers projected and Marine Corps requirements. A late study by the General Board

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of patrol planes needed, based entirely upon operating requirements, gives the best present estimate of the number of that type to be included in the present total authorized number. The number of ship-based planes required for ships other than carriers, the number required for utility purposes, for training and spares can be estimated with reasonable accuracy. These various estimates from different points of view are sufficiently in accord to permit a reasonably accurate estimate by the Board of the total capacity of shore facilities to be supplied and the characteristics thereof.

12. Similarly, with respect to the normal distribution of patrol planes to regional areas in time of peace, no exact allocation is possible. It is an administrative matter, and changes may be expected to occur from time to time as practical considerations and changes in fleet employment may dictate. Viewed in its broadest aspect, however, the basic requirements of strategy, training, and maintenance are so clear as to present no difficulty in determining the desirable location and capacity of the separate shore establishments to be provided. Among all authoritative sources having cognizance of fleet operations, both in the Navy Department and in the Fleet, the Board has found a gratifying unanimity of opinion on this important phase of the subject.

13. An analysis of the Board's specific recommenda-

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tions for additional air bases might be taken as indicating inadequate provision for operating at total air strength in either ocean. Such apparent deficiencies in base accommodations as will exist after completion of the expansion of these facilities recommended by this report are not of serious proportions for peace time operations. In time of war this deficiency would, of course, immediately be multiplied many fold. The Board has limited its recommendations to what it considers the indispensable necessities of peace time operation because of the following considerations:

(a) In time of emergency it is always possible to operate permanently established facilities under overload conditions.

(b) In time of emergency commercial facilities and improvised arrangements, which can quickly be made available, afford considerable resources.

(c) The mobility of planes makes it possible to utilize storage and overhaul facilities on both coasts even in time of war.

(d) The peace time overhead charges of an establishment exceeding that herein recommended would verge upon the inordinate, not so much in the matter of monetary cost, but rather with respect to the number of personnel required for maintenance purposes in proportion to present total authorized naval strength in personnel.

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(e) At some of the existing stations, and at several of the most important new locations recommended, the natural conditions are favorable to rapid expansion of capacity in time of emergency.

(f) Even with the restrictions the Board has imposed upon itself to limit its recommendations to immediate and clearly imminent necessities, the project as a whole is one of very considerable magnitude. Practical possibilities of the moment having to do with normal budgetary considerations, facilities for the technical work of detailed investigation and planning, and for the actual construction work involved make the development as herein outlined a formidable project for completion within the time the situation demands. Conditions may change to require either retrenchment or expansion. In the case of necessary expansion it is to be presumed that the cost involved would become of secondary consideration; the planning work for the present project should in large measure cover that required for the expanded project, and the single governing factor would rest in the physical possibility of performing the needed construction work within the time required.

14. It is impracticable in a study of this nature to give any trustworthy approximation of the costs involved in the Board's recommendations. The costs of building,

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dredging, and filling vary greatly in different localities. These costs can only be accurately estimated by the technical Bureaus after detailed examination of the various sites. The cost of land also varies greatly and the changes that may occur before action can be taken on this report are not predictable. Where pertinent information of a general nature respecting costs was obtainable, the Board has considered it in connection with its recommendations as to specific sites, and has included it in the supporting data supplied to the Department in connection with this report.

In this connection it is pertinent to note that our experience up to this time indicates that the cost of shore establishments for the adequate maintenance and operations of aircraft is in excess of the cost of planes themselves.

15. The precept directs that the report of the Board shall be accompanied by a complete statement of the considerations governing its conclusions. The most important considerations are matters of a specific technical nature applying to the operations of special types of ships and aircraft, and of broad general principle as regards naval operations as a whole. A modern fleet is a highly intricate organization. The capabilities of the various types are widely diverse, as are their requirements for maintenance and efficient operation. The Board has had occasion to note widespread lack of understanding about many of these matters which are almost

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axiomatic to the naval profession, and it appears advisable to the Board that in a report of this nature its exposition of these governing considerations should, even at the risk of over-simplification, be not only complete but elementary. Part II of the report is devoted to a discussion of matters of that nature, applicable to all types of naval craft but principally aircraft. Succeeding parts III, IV, V, and VI contain the Board's specific recommendations as regard aircraft, submarines, destroyers, and mines in that order, with comment of a more particular nature applying to the specific type or to the localities under consideration. Part VII is a priority list.

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Part II - BASIC CONSIDERATIONS

16. Every naval ship or aircraft, of whatever type, is dependent upon shore-based facilities for its maintenance. Roughly, in proportion to size, a ship may be regarded as self-sustaining for longer or shorter periods of time. The capital ship, with its living accommodations for a large crew, its considerable resources in the line of machine shops and other repair equipment, and its storage space for repair materials, may be said to be self-sustaining as regards mechanical maintenance, except dry-docking, for about eighteen months. At the end of that period the accumulation of repair or alteration work which is beyond the capacity of the ship's force or the resources of the fleet repair ships requires recourse to the facilities of a navy yard for general overhaul.

17. Large cruisers have practically the same qualities of self-maintenance as capital ships, although between periods of general overhaul at a navy yard they generally require comparatively more assistance from the repair ships of the fleet.

18. A destroyer is, ton for ton, the highest powered and most heavily armed type of ship that exists. It has habitable accommodations for its crew but only for a crew

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of the size needed for the actual operation, under war time conditions, of its intricate and powerful armament. Machine shop and other repair equipment, as well as storage space for spare parts and other consumable supplies is severely limited. For much of the constant routine work of mechanical adjustment and minor repair of delicate machinery, arising from ordinary wear and tear, the destroyer requires the services of a tender with its specially trained crew of artificers, its extensive machine shop equipment, and its considerable storage resources for special materials and spare parts. Given the support of a tender, a destroyer may be considered as self-supporting to about the same extent as a cruiser. Periodically, however, a general overhaul at a navy yard is necessary.

19. A submarine may be likened to a destroyer in the intricacy of its mechanism, but because of even more severe limitations of space it is not possible to provide a submarine with repair equipment--or with the personnel required to make use of it--comparable to even those reduced facilities installed on destroyers. A submarine in active operations may be said to be self-sustaining only during the periods when it is at sea. For the ordinary work of mechanical upkeep it is dependent either upon the resources of its tender or some shore establishment. Periodically the

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submarine, in common with other types, requires major overhaul at a navy yard. In this type of ship we find an additional limitation upon self-maintenance in the matter of habitability. In our newer and larger submarines it is possible, in a temperate climate, to berth and mess the crew on board for protracted periods without intolerable demands upon their physical stamina, provided that they have access to a food and water supply, either from a tender or shore establishment, which the submarine is not fitted to carry in sufficient quantity. In the smaller types, however, and in any type when stationed permanently in the tropics or in very cold climates it is necessary to provide living and recreational accommodations for the crew when not actually at sea, either upon a tender or on shore.

20. As regards the problem of self-maintenance, as aircraft of any type may be regarded as an exaggerated case of the submarine. It is self-sustaining only during the time it is in flight. Routine inspection and minor repair work for correction of wear and tear is of the most exacting nature and must be performed by specially trained mechanics under the supervision of personnel responsible for the plane in flight. Engines are completely disassembled and overhauled after specific hours of flying

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time. Periodically, at intervals differing for the different types of planes, a major overhaul corresponding to the navy yard overhaul of a surface ship is necessary. The actual crew of the ship can assist in this work only in minor degree; most of it must be performed by ground crews or tender crews.

21. It is obvious that this upkeep work must be carried out at a place from which planes can operate, at which they may arrive and from which they may depart under their own power, whether of the land plane or the sea-plane type. Such an establishment may be termed either a Fleet Air Base or a Naval Air Station. Except for the matter of military command, the necessary functions and characteristics are identical. Since no naval plane contains living accommodations beyond the bare necessities during flight, every such base or station, in addition to its mechanical equipment, needs to be provided with living quarters for both the flying crews and the ground crews of the planes it is required to support.

22. A distinction must be observed between the routine maintenance work on planes and work of a more extensive nature, such as engine overhaul and periodical general overhaul of the plane as a whole. The Board has adopted the term Major Air Base for an establishment having complete facilities for operation, storage and supply,

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engine overhaul, and periodical general overhaul of all types of planes. The term Secondary Air Base is used to designate a station having facilities primarily for the operation and routine upkeep and emergency repair work of planes, but lacking in some respects the full facilities of a Major Base. As a matter of economy, Major Bases should be equipped to carry out major repair and overhaul work for a considerably greater number of planes than those which may regularly base thereon, and should be only sufficient in number to absorb the total volume of such work arising from all sources, having regard to geographical and normal operating considerations. As in the case of destroyers and submarines, the functions of a Secondary Base can be performed for a limited time by seaplane tenders and airplane carriers.

23. The foregoing relates to the functions of bases only as concerns the mechanical upkeep of ships and planes and the maintenance of personnel attached to them. An equally important set of considerations arises in connection with methods and conditions of operation.

24. The need for landing fields at naval air bases is primarily caused by requirements of maintenance and training of carrier planes, i.e., planes of the land type. The carrier is a floating aerodrome of limited capacity,

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upon which planes must take off and land singly. It has facilities for routine maintenance and living accommodations for personnel attached to the planes which it carries. Its function is to transport planes to the sea areas of active fleet operations and there operate them in accordance with the definite plan of fleet action in effect at the moment. The types of operation which may be required, as well as the types of planes employed, are many, and the exercises designed for training in these various kinds of operation are accordingly numerous and varied. It would be possible to accomplish only a small part of the necessary training required if carrier planes were restricted to the use of the carrier itself as an aerodrome. Carrier planes are, therefore, for a large part of the time in a shore-based status, and a landing field and other shore facilities are necessary. Periodically, at the time of fleet tactical exercises, they are embarked upon the carriers for exercise with the Fleet at sea. Similar considerations govern in the case of small types of seaplanes carried by battleships and cruisers. The training exercises and other employment of these surface ships are often of such a nature that useful training of their planes cannot be carried on in connection therewith. At such times the planes are based on shore.

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25. The large seaplanes of the patrol plane type are, as a rule, never hoisted on board ship. For upkeep and preservation purposes they must be hauled out on shore on specially constructed ramps. With the support of adequate tenders they may be operated for considerable periods in any sheltered harbor that offers anchorage space and sufficient room for take-off. The tender supplies adequate routine upkeep and living accommodations. Submarine tenders perform the same functions for submarines. Both submarines and planes, on account of their limited qualities of self-maintenance, must operate in time of war from a base, located as near as may be to the area of hostile operations. That base may be either a tender or a shore base. In many cases it can only be a tender. In any case the protection of the base is a function of the fleet as a whole rather than of the submarines or planes operating from it.

26. The location and number of Major and Secondary Air Bases are determined by three principal considerations, viz:

1st - The total number of planes to be maintained. Apart from any question of a two-ocean Navy, it is apparent that the shore maintenance facilities should be capable of supporting the whole fleet in

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either the Pacific or the Atlantic.

2nd - Requirements of training. Training being the paramount duty of the Navy in time of peace, air bases should be sufficient in number and so located as to best support the operations of the Fleet as a whole in its strategical exercises.

3rd - Strategical considerations. As regards the continental limits of the United States, this involves no great problem. The requirements of strategy are those applying to the Fleet as a whole. The discussions and recommendations of the Rodman Board in this connection are still sound as applied to present day conditions. If those recommendations and the preceding two considerations are fulfilled, the strategical demands will be met as regards the continental limits of the United States. In outlying possessions the strategical factor is something to be separately considered in connection with each specific location.

27. The operation of a large number of planes from any air station involves the important problem of congestion in the air. The activities of numerous detachments constantly engaged in such practices as machine gunning, bombing, and night and day tactical flying of various sorts cannot safely be carried out in the near vicinity

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of a single landing field or seaplane take-off area. It is necessary to utilize other fields or take-off areas in the more remote vicinity. Up to the present time the use of such fields has been acquired as necessary either by lease or without cost. They are not bases, but appurtenances of the main stations, and are generally referred to as "outlying fields". The necessity of these "outlying fields" is so vital, however, that their use should not be contingent upon the insecure basis of a lease or permit. Such fields as are necessary for purposes of operation at any Naval Air Base should be acquired outright.

28. There is no important military reason to embody both carrier plane facilities and patrol plane facilities within the limits of a single base. On the score of congestion it would be preferable not to do so. For other reasons, however, having to do with reduction of overhead and maintenance charges as regards material and personnel and the simplification of administrative procedure, the consolidation of these activities offers manifest advantages. Where local conditions are not favorable to the establishment of full facilities of both kinds within a single reservation, a satisfactory solution may be found in the use of supplemental operating areas, modestly equipped in comparison to the main base, at a considerable saving in initial cost as compared to fully

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equipped separate bases of each sort.

29. The location of a base of any sort in any specific port or harbor within continental limits, with a view only to the local defense of such a locality, is not in accord with sound naval policy as applied to the conditions confronting the United States. The development of naval operations has brought it about that our area of naval coastal defense must extend from the continental limits to a line many hundred miles to seaward, and over any direction of hostile approach. It is manifest that in the opening stages of hostilities a difference of a hundred miles or more along the coast means little in the location of an air base from the strategic point of view. If and when hostile operations proceed to closer quarters, and their objective becomes more apparent, every port or harbor physically capable of use as a base in the region menaced would be occupied by tender-based forces. To repeat, since this is a point upon which much misconception exists, the location of air bases within continental limits should be determined by the requirements of defense over broad regions rather than specific localities, and primarily with a view to the coordination of air operations with the operations of the fleet as a whole, both in peace and in war. Beyond continental limits other considerations apply. These are discussed separately where necessary in connection with specific recommendations

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for each such outlying station.

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Part III - AIR BASES

30. The following specific recommendations upon air bases are arranged in the order:

Atlantic Continental

Atlantic Outlying Possessions

Pacific Continental

Pacific Outlying Possessions

(a) Alaska Area

(b) Mid-Pacific Area

31. In view of the interest which has arisen in connection with certain localities and in order to present a more comprehensive picture, the Board has seen fit to comment upon some locations at which no extension of facilities is recommended. In the cases of existing stations not mentioned in this report, it is to be understood that they are either at present adequate or that authority, funds, and plans are in hand to make them so. In the present state of development of lighter than air craft the Board considers that existing facilities meet all requirements and consequently recommends no additional facilities for this purpose.

ATLANTIC CONTINENTAL AIR BASES

32. Owing primarily to the fact that the United

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States Fleet has been based in the Pacific during recent years, when the expansion of the air force has been most rapid, the growth of air bases, to serve the Fleet, has been almost wholly in that area. The result is that at the present time only one major air base, as defined in this report, exists on the Atlantic Coast. This base, at Hampton Roads, is entirely inadequate to serve the Fleet in its peace time operations or to take its pro rata of repair and overhaul work. In an emergency it would be disastrously insufficient. To meet normal operation, as well as war emergency, three major air bases on the Atlantic continental coast are necessary. Two of these would be components of the Fleet Bases as recommended by the Rodman Board in the New York-Narragansett Bay region and in Chesapeake Bay. The third should be located upon the southeastern coast, a region where natural features afford no suitable sites for the establishment of a complete Fleet Base.

33. Limited facilities for Naval aircraft operation exist at several locations on the Atlantic Coast of the United States. These are not, within the meaning of this report, Naval Air Bases but do support certain Naval air activities. Naval reserve aviation bases exist at Squantum, Mass., Floyd Bennett Field, N. Y., Cape May, N. J.,

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and Miami, Fla. In addition, Coast Guard air stations are situated at Salem, Mass., Floyd Bennett Field, N. Y., Cape May, N. J., Elizabeth City, N. C., Charleston, S. C., and Miami, Fla. A Marine Corps flying field exists at Parris Island, S. C. All of these stations afford valuable facilities for peace time operation, but none of them contains both the natural physical characteristics and the desired strategic location which would warrant their development into a fully equipped Major or Secondary Air Base. In an emergency they could be quickly expanded to meet war time needs. Secondary Air Bases in the sense used in this report are not necessary for the normal operation and training of the fleet on the U. S. Atlantic Coast, and none is recommended.

Northeastern Base

34. Due to the character of the terrain and the density of population in the New England-Long Island area, there are very few sites suitable for the construction of the Northeastern Naval Air Base. After careful study and visit by the Board to several possible sites, the most favorable site was found at Quonsett Point, R. I. This land is partly state owned and partly privately owned. The land adjacent to the shore line is generally privately

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owned and used for the development of a small summer colony. While the land available for this site is barely adequate in size, it is possible, with reasonable dredging and fill, to acquire sufficient terrain to build a Major Air Base. Sufficient depth of water for carrier anchorage is available at the northern end of Conanicut Island. It is practicable to dredge a channel of sufficient depth from this anchorage to Quonsett Point. Such a channel would permit carriers to berth at piers at Quonsett Point. In view of the frequent severe winter weather and the prevalence of foggy days in this locality, it is highly desirable that this be done.

35. The Board recommends that a Major Air Base be constructed at Quonsett Point, R. I., and that this base have the following general characteristics:

- (a) Facilities for two (2) carrier groups.
- (b) Facilities for two (2) patrol plane squadrons. (The initial fill and water front development should provide for expansion to four patrol plane squadrons).
- (c) Facilities for complete plane and engine overhaul.
- (d) A channel to permit carrier berthing at piers on Quonsett Point.

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Chesapeake Bay

36. The existing station at Hampton Roads is now equipped to overhaul planes and engines and to provide operating facilities for certain fleet units. As previously mentioned, it is not adequate to meet the demands of present requirements, even with the Fleet stationed in the Pacific. This area is of the highest strategic importance in war and is a vitally necessary operating area in peace time. The present station is located within the limits of the Fleet Operating Base. The lack of sufficient land area and the near presence of other major activities impose restrictions upon this station. By Act of 14 June 1934, Congress authorized the purchase of additional adjacent land for the development and expansion of naval air activities at this station. Without this additional land, which to date has not been purchased, the necessary expansion of the Hampton Roads Air Station cannot be carried out at the present site. The Board made a careful survey of this area, and finds that, with the facilities already installed, the present site is the most advantageous for expansion. Other possible sites in the Hampton Roads area exist, but their development would entail a separation of naval air activities with increased maintenance costs. The Act referred to above authorizes the purchase of land known as East Camp with such additional land adjoining as

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is necessary. The Board considers that additional land adjoining East Camp to the southeastward is necessary.

37. The Board recommends that the additional land authorized be purchased and that this station be fully developed as a Major Air Base having the following general characteristics:

- (a) Facilities for two (2) carrier groups
(planned with a view to expansion
for four (4) carrier groups).
- (b) Facilities for four (4) patrol plane
squadrons (planned with a view to
expansion for six (6) squadrons).
- (c) Facilities for two (2) utility squadrons.
- (d) Facilities for complete engine and plane
overhaul.

Southeastern Base

38. Both operating and strategic considerations point to the East Coast of Florida as the best location for the third Major Air Base. It is difficult to find a suitable location for a Major Air Base in this region which combines sufficient land area with nearby adequate depth of water for surface ships and adequate protected water area for operation of patrol planes. After exhaustive study, including tests of the area by actual operation of sea-

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planes, the Board considers that the best site as regards operating conditions, and most economical one, is to be had on the St. John's River, approximately five miles south of Jacksonville, on a site known as Camp Foster. This is on land partially government owned and partially state owned. This site does not fill, in an ideal manner, all requirements in that the present depth of water is not sufficient for the near approach of carriers or seaplane tenders. However, the carrier requirement can be met with reasonable satisfaction by berthing carriers at piers which will have to be constructed at the inner end of the entrance jetties leading to the Jacksonville channel. The dredging required for approach by seaplane tenders is moderate in amount and of comparatively inexpensive character.

39. The site at Jacksonville also falls short of the ideal in that the water area for full load patrol plane take-off is barely adequate in an east-west direction, and that approaches under conditions of very low visibility are not of the best. These shortcomings can be met and additional highly advantageous operating facilities can be obtained by the construction of an outlying operating seaplane area near Jacksonville. A suitable site for such an adjunct to the main base exists in

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the lower reaches of the Banana River near Cocoa Beach, Fla. Such an outlying operating area must be considered to be an integral part of the Jacksonville development. The costs involved for this supplementary development are moderate in amount.

40. The Board recommends the establishment of a Major Air Base at Jacksonville, on the site described above, having the following general characteristics:

- (a) Facilities for two (2) carrier groups
(planned with a view to expansion
for four (4) carrier groups).
- (b) Facilities for three (3) patrol plane
squadrons (planned with a view to
expansion to accommodate six
squadrons).
- (c) Facilities for two (2) utility squadrons.
- (d) Facilities for complete plane and engine
overhaul.
- (e) Berthing for carriers at inner end of
entrance jetty.
- (f) A channel to permit tender berthing at
piers at Camp Foster.
- (g) Development of an outlying patrol plane
operating area in the lower Banana River.

CONFIDENTIAL

Quantico, Virginia

41. There exists at Quantico, Va., a Marine Corps Flying Field which serves the needs of the Fleet Marine Force. This is an expeditionary force which in time of emergency might be called upon to occupy and operate from an isolated temporary base, where neither the facilities of a tender nor of an air station are available. Operations under these conditions make it necessary that the ground personnel be highly skilled in repair, and such overhaul work as can be carried out in the field. To accomplish this training of Marine Corps personnel this station at Quantico has overhaul shops, in which all work is done by personnel of the Marine Corps. Certain facilities are now lacking which are needed for this station to carry out its mission.

42. The Board recommends that the Marine Corps Flying Field at Quantico be equipped to serve and overhaul five Marine squadrons and one Marine utility squadron.

Gulf of Mexico

43. Naval defense of the continental coast bordering the Gulf of Mexico is primarily a matter of controlling the entrances to the Gulf, that is, the Florida Straits and Yucatan Channel. Insofar as aircraft are

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concerned in this defense, the southeastern base recommended above and the existing bases at Coco Solo, Canal Zone, and Guantanamo Bay, Cuba, are better placed to discharge their functions in this respect than any that might be located on the Gulf Coast. Should hostile operations actually penetrate into the Gulf, there are several favorable locations from which both carriers and tender-based patrol planes could operate without recourse to special shore facilities beyond those the region at present affords. If and when the recommendations of this report are put into effect, no other continental coastal region will be more secure against hostile naval attack.

Pensacola, Florida.

44. There is in the Gulf of Mexico one naval air station, at Pensacola, Fla. This station exists for, and is devoted exclusively to, the training of pilots for all types of heavier than air naval aircraft. All aviators of the Navy, including the Marine Corps, are trained at this station. It is unnecessary to emphasize its vital importance. During recent years of naval aviation expansion Pensacola has been seriously pressed to meet the demands of this training. It is now barely adequate to supply the necessary pilots for existing planes and can-

CONFIDENTIAL

not, in its present status, train sufficient pilots for the expanded program. In building up to this program it is imperative that the training of the necessary number of pilots keep pace with the procurement of the planes. It requires approximately one year to train a naval aviation pilot, and, consequently, it follows that the training of an increased number of pilots must begin immediately.

45. The Board has given careful study to this situation and has considered the alternatives of expanding Pensacola or the construction of an additional Training Station or both. The Board finds that by the acquisition of additional acreage which is available Pensacola can be expanded to provide an approximate fifty per cent increase over the number of pilots now being trained. This expansion can be more rapidly completed than could the construction of a new station. In view of the urgent nature of the training requirements, the Board recommends that Pensacola be expanded immediately to increase by fifty per cent the present output.

46. In its consideration of additional bases to care for current aircraft expansion, the Board has restricted itself to that expansion actually provided for in the Act which constituted the Board. In the matter of training aviators, however, the Board feels compelled to go beyond the actual present requirements for normal operations

CONFIDENTIAL

and to consider the facilities which must be available immediately on the outbreak of war.

47. With the above recommended increase of facilities at Pensacola, that station will be able, by working to maximum capacity at all times, to meet the requirements of training pilots for the plane program as provided for by the Naval Expansion Act of 1938. With this expansion, however, Pensacola will have reached the limit of possible expansion. Because of air congestion, no further training facilities at Pensacola should be attempted. The Board feels that a lack of training facilities to meet an emergency constitutes a grave situation. In time of war many additional training centers would have to be provided, but considerable time would elapse before these could be ready even to begin organized training. The Board considers it a necessity that there be in existence before the outbreak of war a second air station for training which can immediately function to take the initial load of war time training expansion.

48. As a location for an additional air station for training, the Board has considered all possible sites on the continental seaboard. A station similar to Pensacola requires a large area of air, both over land and water, which is relatively free from other aviation activities. This precludes locating such a training

CONFIDENTIAL

station at or near existing air stations. From the point of view of weather (number of days per year on which student flying is practicable), the Board considers that the Gulf of Mexico area offers the greatest advantage. Further, an additional training station in this area facilitates the coordination of training with that carried on at Pensacola, and is most conveniently situated with respect to the necessities of the fleet on both coasts. Of possible sites inspected Corpus Christi Bay, Texas, affords the most suitable terrain, both land and water, for the establishment of a Naval Air Station for training.

49. The Board specifically recommends, first, the construction of additional facilities at Pensacola, to increase by fifty per cent the capacity for training at this station. This work is of vital importance and should be started immediately. Second, that an additional air station for training, comparable to Pensacola, be constructed on Corpus Christi Bay.

ATLANTIC OUTLYING POSSESSIONS

50. Naval air bases in the Caribbean are an obvious necessity to the United States, from the strategic point of view, in time of war. Of scarcely less importance

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are the facilities they may afford for strategic disposition of forces in time of peace, for training, and for easing to some extent the problems of maintenance. Within United States possessions there are only three locations, in the Caribbean, in which the natural physical conditions lend themselves to the establishment of naval air bases of any kind, viz., at the naval reservation at Guantanamo Bay, Cuba, at the port of San Juan, Puerto Rico, and in the Virgin Islands. Fortunately, these locations are strategically as well placed for the defense of the continental coast and the Panama Canal as could be chosen, considering the dearth of United States possessions in this area.

Guantanamo Bay, Cuba

51. Guantanamo Bay is a fleet operating area and is used to capacity for fleet anchorages and moorings whenever the Fleet is present in this area. Under these conditions the operation of seaplanes in Guantanamo Bay is difficult and at night dangerous. In addition, the topography and the character of the shore line limit possible sites. There is under construction on the naval reservation a landing field, suitable for small planes, and patrol plane facilities to accommodate one squadron. There is also available a second suitable site for a land-

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ing field on Leeward Point. Guantanamo Bay will serve, within its limits, as a valuable intermediate station between the Panama Canal and stations to the east; and between the United States South Atlantic coast and stations to the east. It will also serve as an operating area for patrol planes whenever surface vessels of the fleet are not present in great numbers.

52. The Board recommends that the development projects be carried to completion in such manner as to have the following general characteristics:

- (a) Facilities for one (1) carrier group.
- (b) Facilities for one (1) patrol plane squadron.

Puerto Rico

53. In its study of the Caribbean the Board found only one site capable of being made into an air base suitable for the normal operations of patrol planes. This site is at Isla Grande, in the harbor of San Juan, Puerto Rico. The major shortcoming is that the wide harbor mouth permits the entrance of ocean swell into the area needed for patrol plane take-off which would frequently make operations dangerous. This can be readily corrected by the construction of a breakwater. In addition to its suitability for patrol planes, the site offers suitable area

CONFIDENTIAL

for the construction of a landing field and facilities for the training of one or more carrier groups. A base for patrol planes situated this far eastward in the Caribbean will be of major strategic importance. The Board understands that negotiations are in progress to have this site transferred by the Insular Government to the jurisdiction of the Navy.

54. The Board recommends that Isla Grandc be developed as a Secondary Air Base having the following general characteristics:

- (a) Facilities for one (1) carrier group
(planned with a view to expansion
for two (2) carrier groups).
- (b) Facilities for two (2) patrol plane
squadrons (original plans for this
station must provide for immediate
emergency expansion for at least
four (4) patrol plane squadrons).
- (c) Facilities for complete engine overhaul.
- (d) Construction of breakwater at harbor entrance.
- (e) Berthing at pier for one carrier.

Virgin Islands (St. Thomas)

55. At St. Thomas there now is an outlying base for

CONFIDENTIAL

one Fleet Marine unit (less than a squadron). Investigation shows that the land area available is capable of very little further expansion. In addition, the water operating areas in the vicinity of this base are subject to continuous ocean swells of greater or less degree, which makes patrol plane operation difficult and at times impossible. This forces the opinion that St. Thomas is not a suitable site for the establishment of a permanent base for patrol planes. This area, however, offers sheltered anchorage and would be utilized extensively in time of emergency by tender-based planes. Limited facilities for patrol planes, such as ramps and parking apron, can be provided at relatively small cost.

56. The Board recommends that the present development be expanded to have the following general characteristics:

- (a) Facilities for one Marine squadron
(18 planes) on a permanent basis.
- (b) The shore front developed by the building of ramps and parking apron to serve one patrol plane squadron in a tender-based status.

Coco Solo (Canal Zone)

57. A Major Naval Air Base exists at Coco Solo, designed to serve primarily patrol plane squadrons per-

CONFIDENTIAL

manently stationed there. These squadrons are an integral part of the Fleet, and have as their main mission operations with the Fleet in the defense of the Canal. In time of war the number of planes assigned may have to be greatly increased. The importance of this base cannot be over-estimated.

58. Due to the recent increase in number and size of patrol planes, the area at present occupied by the Fleet Air Base, Coco Solo, is barely adequate to meet present needs and does not permit of great expansion. Approved plans contemplate the expansion of seaplane facilities in the area now occupied by the adjacent Submarine Base. With the addition of this area, and the utilization of available water front, this station can be made to serve seven (?) patrol plane squadrons, with overload capacity to accommodate up to ten (10) squadrons. The present site is considered to be the most advantageous that could be found in the Canal Zone and, consequently, maximum expansion on this site is advocated rather than construction of an additional base in other locality.

59. The greatest single deficiency which exists in the present base is the lack of sheltered water for full load take-off in the water area immediately adjacent to the base. There is a wide gap of open water between the eastern breakwater and Margarita Point. Due to this gap

CONFIDENTIAL

and heavy northeast trade winds, ocean swells enter Manzanillo Bay and frequently make patrol plane operations dangerous. Approved plans call for a breakwater to be built to close this gap which will make the water operating area smooth and of sufficient size. The construction of this breakwater is necessary and urgent.

60. In addition, Coco Solo lacks many facilities to enable it to properly fulfill its mission. Outstanding are the lack of sufficient hangars, ramps, and parking aprons and the very great inadequacy of housing facilities.

61. The Board recommends: that the Margarita breakwater be constructed at the earliest practicable date; that the Fleet Air Base, Coco Solo, be fully equipped to have the following general characteristics:

- (a) Facilities for seven (7) patrol plane squadrons.
- (b) Facilities for complete plane and engine overhaul.

PACIFIC CONTINENTAL BASES

62. With the completion of the Alameda Air Station, now building, there will be three Major Air Bases on the Pacific Coast of the United States, namely, San Diego, Alameda, and Seattle (Sand Point). Certain further devel-

CONFIDENTIAL

opment beyond that now in progress will be necessary to make these stations in all respects sufficient to fulfill their mission. When this work has been done, these three major bases, together with the auxiliary stations now existing or in process of construction, will be adequate to meet the normal operation needs of the Fleet in the Pacific continental area.

63. However, as regards the overhaul of planes, an economical policy of utilizing all overhaul facilities to capacity requires that the total overhaul work load be divided among all major stations. This means that planes are at the present time flown from the Pacific Coast to Norfolk, in numbers proportionate to Norfolk's facilities for overhaul. The total overhaul facilities of all existing stations are not now sufficient to meet the needs of present aircraft strength. Consequently, in considering increased overhaul facilities required for the expanded aircraft program, the Board has placed the additional overhaul facilities required in the Atlantic Coast stations which have been recommended above. The adequacy for overhaul purposes of the existing stations on the Pacific Coast is dependent upon the completion of the recommended stations on the Atlantic Coast.

64. With the problem of overhaul provided for as above, the Board considers that the stations now established on the

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Pacific Coast are sufficient in number. The Board recommends that all necessary additional buildings and facilities be provided to equip these existing stations so that they will be in all respects ready to carry out their mission.

San Diego, California

65. San Diego is at present the best equipped of all Major Air Bases but nevertheless falls short in many essentials to enable it to properly serve the Fleet. It is situated in the main fleet training area in the Pacific and, consequently, overload demands on San Diego are greater than at other stations. Work is now in progress to convert ex-Army war time buildings for use by carrier squadrons. These buildings will shortly require replacement by permanent structures. In addition, San Diego is greatly deficient in seaplane hangars.

66. The Board recommends that San Diego be developed to have the following general characteristics:

- (a) Facilities for four (4) carrier groups.
- (b) Facilities for one (1) Fleet Marine Force Group (5-18 plane squadrons and one (1) utility squadron).

CONFIDENTIAL

- (c) Facilities for five (5) patrol plane squadrons.
- (d) Facilities for two (2) utility squadrons.
- (e) Facilities for complete plane and engine overhaul.

Alameda, California

67. Alameda is now under construction, and the plans for this station appear adequate. The Congressional limitation was reduced from the amount originally authorized. This reduction is acting to curtail seriously the facilities which were contemplated under the original plans. Further funds will be needed to properly equip this station.

68. The Board recommends that Alameda be developed to have the following general characteristics:

- (a) Facilities for two (2) carrier groups
(planned with a view to expansion
for four (4) carrier groups).
- (b) Facilities for five (5) patrol plane squadrons.
- (c) Facilities for two (2) utility squadrons.
- (d) Facilities for complete plane and engine overhaul.

CONFIDENTIAL

Seattle (Sand Point), Washington

69. This station is now in progress of expansion. After the completion of work under way, many items will remain to be done to make this a Major Air Base. Seattle, in addition to its own load, will have a large supply burden in connection with Alaskan squadrons which may be established.

70. The Board recommends that Seattle be developed to have the following general characteristics:

- (a) Facilities for one (1) carrier group.
- (b) Facilities for three (3) patrol plane squadrons (planned with a view to expansion for six (6) squadrons).
- (c) Facilities for complete plane and engine overhaul.
- (d) Additional service for Alaskan squadrons.

71. In addition to the three Major Air Bases, there are in existence or building on the Pacific Coast two auxiliary stations. These stations, at the Fleet Air Base, San Pedro, and on San Clemente Island, are recent developments being carried out with emergency construction and relief funds to meet training needs of the Fleet.

CONFIDENTIAL

Astoria, Oregon

72. In view of recent discussions in the Congress respecting the establishment of permanent naval shore-based facilities near the mouth of the Columbia River and the widely expressed concern of the communities in that region with respect to their local defense, the Board made a careful personal inspection of the area and has given special consideration to the requirements and possibilities of the matter.

73. The Navy now owns a reservation at Tongue Point, near Astoria. It is undeveloped except for wharfage facilities intended for a few submarines and other small vessels. The natural terrain is suitable for only a very limited building development in the matter of barracks, shops, or storage facilities. To adapt it to the requirements of a permanent operating base for land or seaplanes or surface or submarine craft would involve very substantial costs.

74. The Board agrees with the following comment of the Rodman Board in reference to this locality:

"While the mouth of the Columbia is illy adapted as an operating base for destroyers or submarines, yet in time of war it may be necessary for strategic reasons to use it for a mobile force of these vessels, and it is therefore recommended that

CONFIDENTIAL

the improvements undertaken at the submarine and destroyer base, Astoria, Oregon, be confined to providing harbor facilities only for such a force."

75. As regards air operation, especially by seaplanes, the area is not unsuitable. With the support of tenders and such existing resources in the matter of fuel and provisions from commercial sources as are now available, a large force of seaplanes could be quickly established here upon threat of emergency and maintained for an indefinite period. This fact taken in connection with the proximity of the Major Air Base under construction at Sand Point, Washington, and the municipal or commercial air facilities in the vicinity, supplies all reasonable demand for shore-based naval air facilities in this immediate area, whether for local defense or in support of general naval operations.

76. Coos Bay, Oregon, in this vicinity was also inspected. This bay does not afford satisfactory water operating area for modern patrol planes which would warrant the establishment of permanent operating facilities. Permanent facilities are not needed either from a strategic or maintenance point of view.

Fleet Air Base, San Pedro, California

77. This air base has been built within the past two

CONFIDENTIAL

years to afford shore facilities for the planes of the battleships and cruisers which are based in the San Pedro area and to relieve the congestion which developed at San Diego. With the completion of the present project this base will be well equipped to serve its purpose and will meet the needs of the Fleet in this area. However, the present construction is only temporary in view of the fact that the land is not Federal property. Steps should be taken to acquire this land for the Federal Government.

San Clemente Island

78. The construction of a landing field with attendant services for one carrier group is now in progress and should be completed shortly. This station is intended to increase the operating space for carrier planes in the San Diego area, which is the normal peace time training area of the fleet aircraft when the Fleet is in the Pacific. The San Clemente Station, when completed, will be well adapted to serve its purpose.

79. With these two stations in operation, which are in reality adjuncts to the training facilities of the Fleet in the San Pedro-San Diego area, the Board finds no necessity for additional secondary air stations on the Pacific Coast.

CONFIDENTIAL

PACIFIC OUTLYING TERRITORIES AND POSSESSIONS.
Alaskan Area

80. Naval air bases in the Alaskan area will be essential in time of war. Such bases are necessary links in the patrol of the eastern Pacific and for the defense of Alaska and the Pacific Northwest. Alaskan air bases must be designed primarily to serve patrol planes. The dependability and radius of action of patrol planes of recent type have greatly enhanced the value which Alaskan bases would have in their service to the Fleet. From a strategic point of view, the area of greatest importance is in the Aleutian chain of islands. In addition to the question of strategic value, however, there is a controlling feature of the Alaskan situation which governs the effectiveness of air operations and which determines the choice of location and characteristics of Naval Air Bases in this region. This controlling feature is weather. The weather conditions of Alaska are so changeable and so severe that the most careful consideration must be given to operating conditions, living conditions, and maintenance problems. Consequently, in spite of their favorable strategic location, the Board does not favor the Aleutian Islands as a site for the main Alaskan base. Considering all of the above conditions, a location at Kodiak offers greater advantage for maintenance and operation.

CONFIDENTIAL

81. Because of the peculiar climatic conditions and the rugged nature of the terrain, our forces must be specially trained in this region in order to retain full effectiveness. In recent years there have been many surveys of possible air base sites and much reconnaissance work by the Fleet in its operations. The nature of the terrain and the lack of sufficiently sheltered take-off areas greatly limit the number of favorable sites. After careful study of all possibilities, the Board has selected Sitka, Kodiak, and Unalaska as offering the most favorable natural sites for naval air bases.

Sitka, Alaska

82. A small base now exists at Sitka where half-squadrons of patrol planes (6 planes) have been operating in rotation for periods of from three to six months. The present station has utilized the existing buildings of an old naval fuel depot on Japonski Island. All facilities now available, both for housing and operations, are meager and makeshift. The location of Sitka is not sufficiently far to the westward to permit it to serve as a main Alaskan station, from the strategic point of view. However, Sitka is necessary as an intermediate station between Seattle and stations farther westward. The extremely severe weather in this entire area makes it imperative that such an intermediate

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station be available and, in addition, requires that facilities at Sitka be sufficient to accommodate a heavy overload for considerable periods of time. With no housing to draw on in the town of Sitka itself, this means that the air station at Sitka must have housing and also mooring and beaching facilities in excess of its normal needs.

83. The Board recommends that Sitka be developed as a Secondary Air Base to have the following general characteristics:

- (a) Facilities for one (1) patrol plane squadron.
- (b) Facilities for housing and beaching in excess of normal needs to accommodate occasional heavy overload.

Kodiak

84. Surveys have shown that the best site for a naval air base in the entire Alaskan area is at Women's Bay, Kodiak Island, and that a base at that location can be developed at reasonable cost. An area for this purpose has been transferred to the Navy by Executive Order, but, in order that the best site in Women's Bay may be available, it will be necessary to acquire further areas to the southward and westward of the present reservation. Because of the distance from the nearest United States continental air

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station, at least one naval air base in the Alaskan area must have some features of a major air station. In other words, the primary base in Alaska must have adequate storage and supply facilities and, to a limited extent, overhaul facilities to maintain and serve other Alaskan bases. Complete overhaul of planes is not a necessity, but engine overhaul and plane repair facilities are necessary. In addition, it is highly desirable to have an adjacent landing field for carrier planes.

85. The Board recommends that Kodiak be developed as a Secondary Air Base equipped to have the following general characteristics:

- (a) Facilities for three (3) patrol plane squadrons.
- (b) Facilities for engine overhaul and limited plane repair.
- (c) A landing field to be developed.
- (d) Facilities for storage and supply sufficient to serve as a main base for other Alaskan bases.

Unalaska

86. Purely strategic considerations would indicate a location to the westward of Unalaska as being the most

~~CONFIDENTIAL~~

desirable. Unalaska is, however, the westernmost point at which a base could be maintained in time of peace without inordinate maintenance charges as regards both funds and the necessary permanent personnel for custody and operation. The most favorable natural conditions for an air base in the Aleutians appear to be at Chernofski Bay on Unalaska Island, although surveys of the entire region are not yet complete. Unalaska Harbor, including Dutch Harbor, is moreover the only practical location in the Aleutians to serve as a base for the operations of surface craft and submarines without extensive development. The Navy maintains a well equipped radio station here and a small fuel storage plant. The coast Guard has a small establishment, and there are some commercial facilities, all of which could be utilized to advantage in time of emergency.

87. The prevalence of bad weather at Unalaska makes operating conditions there even more severe than at other Alaskan stations. The Board has given consideration to the possibility of patrol plane operation from this area in a tender-based status without additional shore facilities. This possibility has been rejected as its success is too problematical to meet the demands which would inevitably arise at the outbreak of war in the Pacific.

~~CONFIDENTIAL~~

Shore facilities for the maintenance, repair, and servicing of planes would be a necessity. Such facilities cannot be rapidly improvised at Unalaska, due to its isolation and distance from U. S. continental bases. Facilities to be immediately available at the outbreak of war must be constructed in time of peace. The many difficulties of maintaining a large permanent establishment at Unalaska are recognized, but nevertheless the Board considers that permanent facilities, at least to the minimum indicated below, are a necessity. In locating this base, consideration should be given to the equally important requirements for submarines in this area.

88. The Board recommends that a Secondary Air Base be constructed at such site on Unalaska Island as surveys show to be most favorable and that this base have the following general characteristics:

- (a) Facilities for one (1) patrol plane squadron.

MID-PACIFIC AREA

89. The importance of a secure defense of the Hawaiian Islands need not be emphasized in this report. Measures already taken with respect to the defense of this

CONFIDENTIAL

area by both land and naval forces sufficiently attest the recognition by all branches of the Government of the issues involved.

90. So long as the United States retains command of the sea between Hawaii and the mainland, the Island of Oahu may be considered practically impregnable against hostile occupation. It is only, however, as a secure base for naval operations that the Islands possess a great strategic value either in the defense of the mainland or defense of possessions to the westward. In this defense the functions of naval aircraft have in recent years rapidly developed into outstanding importance in fleet operations.

91. The advent of the large, long range, seaworthy patrol plane has greatly extended the area of plane operation. The Fleet with its aircraft, both ship-based and land or tender-based patrol planes, can patrol the entire area of the Pacific east of the 180th meridian, between the Aleutian Islands and a line well south of Hawaii. The need for accomplishing this has added greatly to the number and capacity of air bases required in this area. In time of emergency it will be necessary to throw into this theater of operations large numbers of planes in excess of

~~CONFIDENTIAL~~

normal complement. The radius of action of patrol planes makes this a comparatively simple matter if facilities are in existence to receive and maintain the planes. Such bases must be established in peace time, because their maximum value will be realized immediately upon the outbreak and during the earliest stages of war. Apart from the problem of maintenance of planes in this area there are some locations of high strategic value that should be fitted for occupation by tender-based detachments. In these latter only very moderate development in the line of permanent shore facilities is required.

92. There is but one site in the Hawaiian Islands that possesses the requisite natural features for a Major Naval Air Base, namely, Ford Island, within the limits of the Pearl Harbor Naval Reservation. This site, even if it were now available in its entirety, would be inadequate for the safe and efficient operation of the number of planes necessary for this area. In time of war the operating deficiencies would limit intolerably the scope of naval operations. There are, however, two other locations in the Islands suitable for development as auxiliary bases, which, in conjunction with the full facilities of Ford Island, offer a reasonably adequate solution of the problem. These are at Kaneohe Bay, Island of Oahu, and Midway Island.

~~CONFIDENTIAL~~

Pearl Harbor (Ford Island)

93. Pearl Harbor is our main and only fleet base in the mid-Pacific area. Its separation from the mainland and the consequent time and ship tonnage necessary to obtain materials make it mandatory that Pearl Harbor be ready in all respects to serve the Fleet at the outbreak of war. It is manifest that deficiencies which exist when an emergency arises cannot be remedied in time to be of any service in the early stages of any war in the Pacific.

94. A Major Naval Air Base exists on Ford Island in Pearl Harbor. This base represents a gradual growth under conditions of restricted terrain and meager appropriations. It is inadequate in its present condition to carry out its mission. A large part of the present lack of proper facilities may be attributed, directly to the recent expansion of patrol planes, which has far exceeded the rate of increase in other types of planes. The fact is that the air base on Ford Island has not now the facilities necessary to serve the Fleet in time of emergency even to the extent of operating at full efficiency the peace time complement of planes now assigned to it. There are two main reasons for this condition, namely, the lack of sufficient land area on Ford Island for the building of necessary shore facilities and the lack of sufficient un-

CONFIDENTIAL

obstructed water area in Pearl Harbor to permit efficient operation.

95. As regards the land area available on Ford Island, this island is now shared with the Army, and naval occupation is restricted to a narrow strip of shore on the south and east sides. The President, by Executive Order dated October 25, 1935, placed Ford Island in its entirety under the jurisdiction of the Navy. The Army was required to evacuate as soon as facilities at other location could be provided. Under this proviso Congress authorized, and the Army commenced building, an air base at Hickam Field. More than three years have elapsed, and this new Army base is not ready. From the best information which the Board could secure, it appears that three more years must elapse before this station, under its present construction program, can be completed. Urgent naval development and expansion on Ford Island cannot be begun until complete evacuation by the Army has been accomplished. Partial evacuation by certain Army units will not meet the situation since it is these army buildings which will be the last to be evacuated, namely, the Air Corps Depot buildings which are in the area of most urgent naval expansion for seaplane ramps and hangars. It is urgent that the work on Hickam Field be expedited and early Army evacuation of Ford Island be secured.

96. The available water operating area in Pearl Harbor

CONFIDENTIAL

is very restricted. Whenever there is heavy traffic of ships and small boats this water area becomes so congested that patrol plane operation is difficult and at night extremely hazardous. These conditions at Pearl Harbor make it necessary that an additional nearby water operating area be made immediately available. Such an area can be provided at Kaneohe Bay, on the east coast of Oahu, which has land communication with Pearl Harbor.

97. In addition to the deficiencies of the Fleet Air Base, Pearl Harbor, discussed above, there are lacking many facilities for maintenance and operation which must be supplied. Outstanding are the lack of ramps, parking apron, and hangars, adequate overhaul facilities, storage facilities, ready bomb supply, and plane fuel storage placed underground, secure from attack and sabotage. Much of this development cannot be undertaken until Army evacuation is complete, but such expansion as can be accomplished on the present site is urgent.

98. The Board recommends that the Fleet Air base, Pearl Harbor, be developed as a Major Air Base, to have the following general characteristics:

- (a) Facilities for two (2) carrier groups.
- (b) Facilities for ten (10) patrol plane squadrons.

CONFIDENTIAL

- (c) Facilities for complete plane and engine overhaul.

Kaneohe Bay (Oahu)

99. Kaneohe Bay, situated on the east coast of Oahu, is admirably suited for patrol plane operation. The water area, while restricted, is sufficient for full load take-off. Outlying reefs afford protection so that the waters of the Bay are not affected by ocean swells. The entire area of the Bay is fouled by coral heads, and these will have to be removed before plane or ship operation is possible. The removal of the coral heads and the dredging of a channel into the Bay are practicable and can be done at reasonable cost.

100. The development of Kaneohe is visualized as an adjunct to the station at Pearl Harbor. Under conditions of normal operation in peace time, squadrons would utilize Kaneohe Bay for training purposes for short periods of time. In war time, however, it is considered that the congestion in Pearl Harbor would necessitate using Kaneohe Bay as the main operating area. As a war readiness measure, Kaneohe Bay must be equipped with facilities to service operating planes and to house personnel. Services would require ramps and aprons, fuel supply, bomb storage, and a

CONFIDENTIAL

pier for small craft. The Board does not contemplate the construction of an additional air station, but all facilities, including housing and messing accommodations, necessary for squadrons to operate in rotation for comparatively short periods of time without recourse to Pearl Harbor should be supplied. A suitable site for these shore facilities exists on Makapu Peninsula.

101. The Board recommends:

- (a) That Kaneohe Bay be cleared for patrol plane operation;
- (b) That a channel be dredged to permit the entrance of large tenders; and
- (c) That shore facilities adequate to permit five (5) patrol plane squadrons to operate be provided.

Midway Island

* 102. From a strategic point of view, an air base at Midway Island is second in importance only to Pearl Harbor. The main island is now in regular use as one of the stops on the Pan American Airways route to the Orient. It is also the site of a cable station of the Pacific Commercial Cable Company. The dredging of a channel into the lagoon and construction of a breakwater are now in progress. The Board is of the opinion that the scope of the present pro-

CONFIDENTIAL

ject and, in particular, the depth and width of the channel, is not adequate. The channel into Midway should be sufficient to accommodate a large tender or tanker. Development work should be continued to a point where this base can fully maintain two patrol plane squadrons. Shops will not be necessary except for minor repair and overhaul work. Of major importance is an adequate storage supply of plane fuel.

103. The Board recommends that Midway be developed as a Secondary Naval Air Base, having the following general characteristics:

- (a) Facilities for two (2) patrol plane squadrons permanently based.
- (b) A pier, channel, and turning basin of sufficient depth of water to accommodate a large tender or tanker.

Wake Island

104. From a strategic point of view, Wake Island is next in importance to Midway in the mid-Pacific area. It is also a station on the Pan American airways route to the Orient. Wake is adapted to development similar to that proposed for Midway. A channel into the lagoon and a turn-

CONFIDENTIAL

ing basin sufficient for a large tender or tanker should be constructed. After this is completed, Wake would be admirably suited to the operation of tender-based patrol planes. There is a distinct possibility, however, that in time of emergency a tender might not be able to arrive at Wake in sufficient time or, once there, might have to evacuate. The immediate continuous operation of patrol planes from Wake would be vital at the outbreak of war in the Pacific. It is considered necessary that Wake have an adequate supply of plane fuel and sufficient shore facilities to maintain planes and their crews.

105. The Board recommends that Wake be developed in a manner similar to that recommended for Midway and to have the following general characteristics:

- (a) Facilities for one (1) patrol plane squadron.
- (b) A pier, channel, and turning basin of sufficient depth of water to accommodate a large tender or tanker.

106. In addition to Midway and Wake, other United States islands in the Pacific are of strategic value to serve as patrol plane bases in support of fleet operations and the defense of Hawaii. These are Johnston Island, Palmyra Island, Canton Island, and Rose Island.

CONFIDENTIAL

107. It is not considered necessary that these islands have permanent shore facilities. It is necessary that each be developed to permit tender-based patrol plane operations. This will require the dredging of a channel to afford entry of small tenders into the lagoon and clearing of coral heads within the lagoon at each of these islands to give a sufficient area for full load take-off. Facilities for hauling out a plane, such as a single ramp, would be highly advantageous. Work to this extent can be done at reasonable cost.

108. It is known that such development on Johnston, Palmyra, and Canton is practicable. No survey of Rose Island lagoon exists, and this will have to be made to determine the practicability of operations from Rose Island. Rose Island is of importance because the harbor at Pago Pago, Samoa, is not of sufficient size to permit patrol plane operations, and no other harbor exists in Samoa proper. The Board recommends the development of these islands as discussed above and considers the order of importance to be Johnston Island, Palmyra Island, Canton Island, and Rose Island.

Philippine Islands

109. The defence of the Philippines involves matters of national policy which take precedence over the

~~CONFIDENTIAL~~

military problem involved. The military problem itself is one whose solution requires measures beyond any that could be recommended by this Board within the limits of its precept.

110. Pending settlement of those questions of broad political and military significance which must be considered in connection with Philippine independence, the Board recommends maintenance of existing facilities only.

111. Within this Board's purview in connection with the defense of Guam lie certain possibilities which greatly simplify the military problem of the defense of the Philippines.

Guam

112. Guam is at present practically defenseless against determined attack by any first class power based in the western Pacific. With adequate air and submarine protection securely based on Guam, the Island could be made secure against anything short of a major effort on the part of any probable enemy, an effort that is to say on the same order of magnitude that would be required to establish a footing in the Philippines.. Supported by a garrison of only moderate strength in comparison to

~~CONFIDENTIAL~~

the important military issues involved, with appropriate anti-aircraft and coast defense equipment, it seems that such a defense force should be able to hold out to the limit of time that its supplies lasted, a period long enough in ordinary probability for adequate support to arrive. The salient military features of the situation above envisaged are as follows:

(a) The island is well adapted to the maintenance of an air force equal or superior to any similar hostile force that could be assembled within a radius of 1200 miles.

(b) Its natural facilities for development of a submarine base are excellent,

(c) Even without command of the sea extending westward of Midway, the air and submarine strength of the island could be reinforced.

(d) The island could only be reduced or occupied by an enemy through landing operations supported by naval surface operations on a large scale. Hostile air attack alone could produce no decisive effect, and against defenses of the character mentioned would be likely to incur heavy and unrequited losses,

(e) So long as Guam existed as a strong air and submarine base hostile operations against the Philippines

~~CONFIDENTIAL~~

would be a precarious undertaking. To an even greater extent Guam would greatly impede, if not actually deny, extensive hostile naval operations to the southward, thus greatly simplifying our naval problem should the fleet ever be called upon for operations in the Far East.

113. The foregoing considerations are of sufficient weight to warrant the recommendation that Guam should be developed as a major air and submarine base, with a garrison sufficient in strength to make its reduction or occupation a major effort on the part of any probable enemy. There are, however, other considerations and possibilities of a far greater significance which it is pertinent to take account of in this connection. Although these considerations may be regarded as beyond the precept of this Board they are of such far-reaching importance that the Board feels impelled to include them in its report.

114. Guam is adapted naturally to development as a Major Advanced Fleet Base. Detailed studies to this end have been made in the past, and plans adequate to the situation are in hand. Technical development in aircraft and submarines during recent years have greatly increased the possibilities of such a base.

115. On December 18, 1919, the Joint Army and Navy Board recommended that "Guam be fortified and garrisoned

CONFIDENTIAL

adequate to its defense against any force that could be brought against it," and that a first class naval base be prepared in Apra Harbor. The Washington Treaty of 1922 put an end to those plans, but that treaty has now expired.

116. The establishment of a fully equipped fleet base at Guam, capable of maintaining at least the major part of the fleet in all types, would in itself practically assure the impregnability of the island. This by virtue of two facts, viz., the natural adaptability of the island to defense by inferior force, and, second, the availability of a fleet base at this point would practically assure, if not unquestioned command of the sea between the island and Hawaii, at least the possibility of maintaining our communications over this area upon no less than equal terms with any force that might attack them.

117. An important though not governing consideration is the obvious fact that a fleet base in Guam would provide for the security of our Asiatic Fleet in time of sudden emergency, and for the maintenance of its peace time mission with no great loss in efficiency or convenience as compared to the present situation.

118. Confining itself to the purely military aspect of this question, the Board is of the opinion, in which it believes itself supported by the most authoritative

~~CONFIDENTIAL~~

sources that have given study to the matter, that a strong advanced Fleet Base at Guam, developed to the practical limits which the natural resources invite, would assure

1st - Practical immunity of the Philippines against hostile attack in force.

2nd - The most favorable conditions that could be brought about for the prosecution of naval operations in the western Pacific, arising from whatever necessity. It would reduce to its simplest possible terms the defense of Hawaii and the continental coast of the United States.

3rd - The ability of the fleet to operate with greater freedom in meeting emergency conditions that might arise in the Atlantic.

PART IV - SUBMARINE BASES

119. It has been pointed out that submarines, because of their limited powers of self-maintenance, are dependent upon outside resources for routine upkeep when not actually at sea in active operations. These resources, consisting of sheltered and protected anchorage, living accommodations, mechanical repair equipment, and supply facilities for food, fuel, and equipment, form a submarine base, whether embodied in a mobile tender or in a permanent shore establishment. For the purposes of this report the term "submarine base"

~~CONFIDENTIAL~~

is applied only to a permanent shore establishment.

120. As previously mentioned, the strategic location of a permanent base of any sort within continental limits is determined more by the requirements of protecting the continental coast as a whole than by the necessity of local protection to any particular limited area, and in outlying territories and possessions other considerations apply. All such outlying bases are in themselves dependent upon continental sources of supply, which requires naval command of the seas over the intervening waters. Apart from the strategic value of such bases in contributing to continental defense, the secure defense of the outlying possession itself may be of vital national importance as, for example, in the cases of the Hawaiian Islands and the Canal Zone. In view of the uncertainties with respect to future hostilities and the great distance over which fleet operations may be required in order to afford the necessary timely support of these outlying possessions, it is necessary that the local defense, both naval and military, be of a permanent character, and of sufficient strength reasonably to assure effective defense until fleet support can arrive. It is in these localities that advanced fleet bases are required, of which submarine and air bases are important and necessary component parts.

~~CONFIDENTIAL~~

121. With respect to outlying possessions of another character which are of no great intrinsic economic importance in themselves, but of great strategic value by reason of their location and natural adaptability to base purposes, a sound defense plan demands not only their active employment as bases by our own forces in time of emergency but, equally important, denial of such use to an enemy. Provided such a base is located within a relatively short distance of some strong point of support as compared to its distance from enemy territory, submarines and aircraft provide a ready and fairly adequate answer to the double problem involved. By reason of their high offensive power combined with their peculiar resources for self-protection, either of these types acting alone, and preeminently both types acting in cooperation, can be employed in such locations to the full limit of their designed functions. Tender support, rather than permanent shore facilities in operating areas of this kind, is preferable from several points of view, but in some cases, because the continuous presence of a tender cannot be assured, some items of a permanent installation are necessary to supplement tender resources. These are mainly in connection with fuel supply. In some cases channel and harbor improvements are necessary to accommodate the tender itself.

CONFIDENTIAL

122. As a sound policy, the foregoing considerations all point to the use of tenders as the primary support of submarines in all areas in which the tender can be afforded reasonable protection, and limiting fully equipped submarine bases to those localities in which submarines will be required to operate continuously either in peace or war.

123. The following specific recommendations with respect to submarine bases are made:

Atlantic Continental

New London, Conn.

124. This base is the only training station for all submarine personnel, and is especially equipped for this purpose. Facilities which will be available upon completion of approved projects will be adequate, except that river channel should be widened to accommodate, as necessary, the larger submarines. This station also is a component part of the New York-Narragansett Main Fleet Base and should at all times be readily available to fulfill its mission as such.

Hampton Roads, Va. (Chesapeake Bay)

125. At this Main Fleet Operating Base there is an area which was partially developed as a permanent submarine

~~CONFIDENTIAL~~

base, consisting of a sheltered basin with small piers suitable for submarines, and a few small shops. Following the development of the present policy of basing submarines upon tenders to the greatest practicable extent and the transfer of the main fleet to the Pacific area, this base has been in an inoperative status. At any time of concentration of the Fleet in the Atlantic, whether in peace or in War, this Main Fleet Base, the only one fairly well developed as such on the Atlantic, would have to operate under severe overload conditions. Because of the strong currents and fresh winds prevalent in Hampton Roads, anchorage conditions are as a rule unfavorable for submarines even if berthed alongside a tender, and the anchorage area needed for them cannot well be spared in view of the necessities of surface ships. These limited submarine facilities as planned are still necessary to augment tender resources for the increased authorization program, and they should be restored to usefulness as originally designed.

Key West, Fla.

126. This naval station is completely closed. It contains special submarine facilities which would be important in time of national emergency, and for that reason should be retained, although not required at present in

CONFIDENTIAL

active status.

Atlantic Outlying Possessions

St. Thomas, Virgin Islands

127. A small submarine base was formerly established here, but it long since has been abandoned as such and at present would require complete rehabilitation for any purpose. However, it lends itself to rapid rebuilding and expansion in time of national emergency, and is located in an important strategic position. Therefore, all present naval holdings should be retained.

Puerto Rico

128. This location is important strategically for submarine operations in the Caribbean. The facilities required at San Juan beyond those which can readily be supplied by tenders are primarily berthing space and fuel storage. In view of the limited anchorage area available at San Juan, wharfage space should be provided for submarines. The Board previously in this report has recommended the establishment of an air base at San Juan. Necessary wharfage for submarines can be readily provided at the air base without interference with air activities.

129. The Board recommends that submarine berthing be provided at Isla Grande and that an adequate supply of fuel be established.

CONFIDENTIAL

Canal Zone

130. An active submarine base, adequately equipped except for housing facilities, now exists at Coco Solo on the Atlantic side of the Panama Canal. There is no base of any sort on the Pacific side to facilitate submarine training and operations in that area. The Board considers an operating base in the Pacific should be available. Such a base is needed not only for submarines under current operating conditions, but also for destroyers and small craft in time of emergency.

131. The Board recommends that a submarine operating base be established at the Pacific entrance to the Panama Canal which will provide berthing at piers for submarines and living accommodations ashore, but not equipped with shops and maintenance facilities duplicating those existing at Coco Solo.

Pacific Continental

132. No submarine operating base exists on the Pacific Coast. Submarines operating in these waters are tender-based. At Mare Island Navy Yard, a part of the Yard has been set aside as a Submarine Repair Base, for Navy Yard overhaul work. This is considered adequate.

133. In the building of "Treasure Island" for the

CONFIDENTIAL

San Francisco World's Fair 1939, a basin was formed adjacent to and mostly a part of the Navy Reservation at Yerba Buena Island, which would serve submarines well in operations from San Francisco Bay. In view of the strong currents and severe weather conditions frequently prevailing, a sheltered water area for submarines and other small craft is necessary. This basin affords the only satisfactory site within the Bay, and steps should be taken to acquire title to the whole of this basin as soon as it has finished its purposes in connection with the World's Fair.

134. The Board considers that no further submarine bases need be established, but the present Navy holdings on Yerba Buena Island should be retained.

Pacific Outlying Territories and Possessions

135. The necessity for permanent works to supplement tender facilities for submarine operations in outlying stations is much less than that required for air operations and can be most conveniently provided in connection with the development of the air bases already recommended.

Alaskan Area

Kodiak

136. In connection with the development of the air

CONFIDENTIAL

station recommended at Kodiak, provision should be made for the accommodation of one division of submarines, operating without tender.

Unalaska.

137. Unalaska is the most important location in the Alaskan area as a base for submarine operations. Because of its vital importance in time of war, submarines should be capable of extended operations from this base, with or without tender support. The requisites are ample fuel for both submarines and tenders, and adequate housing for submarine personnel. The Board recommends that, in the Unalaska area, a base capable of supporting one submarine division be constructed.

Mid-Pacific Area

Pearl Harbor, Hawaiian Islands

138. A well equipped submarine base already is in operation which, with normal development as needs arise, will meet all requirements.

Midway Island

139. Midway, as an operating base for both air and submarines, is not second in importance to any other location recommended, from a strategic point of view. In con-

CONFIDENTIAL

nection with the development of the air station recommended at Midway, provisions should be made for the accommodations of two divisions of submarines operating without tender.

Wake Island

140. In connection with the development of the air station recommended at Wake Island, provisions should be made for the accommodation of one division of submarines operating without tender.

~~CONFIDENTIAL~~

Part V - DESTROYERS

141. The functions of destroyer bases under present day conditions are limited to the preservation of decommissioned destroyers and their rapid recommissioning in time of emergency. A large number of over-age destroyers left over from the World War are still serviceable, and although obsolescent in type they would prove a valuable addition to fleet strength in time of war. The task of protecting these vessels against deterioration through corrosion, of keeping their multitudinous items of equipment segregated and ready for immediate installation, and the incorporation of such improvements in design as their age and potential usefulness warrant, is one of considerable magnitude. This work has been divided between the Navy Yard, Philadelphia, and the Destroyer Base at San Diego. The latter is the only station specifically designated as a Destroyer Base. Its establishment was made necessary by the lack of suitable berthing accommodation for the large number of inactive units involved at any naval station other than Philadelphia which possessed the requisite industrial facilities to perform the work. Owing to the lack of tenders this station in the past has been called

~~CONFIDENTIAL~~

upon for much routine upkeep work in connection with the active destroyers, but with the gradual improvement in the tender situation its activities have been more and more restricted to its original purpose. Because of the seriously inadequate drydocking facilities on the Pacific Coast for all types of vessel, the small marine railway and the floating drydock at San Diego are worked to the limit of capacity not only for active and reserve destroyers but for submarines and every other type of small craft which they are able to handle. Additional drydock facilities are needed.

142. The conception of a destroyer base as an operating necessity for active destroyers derives from a period when this type of vessel had even more limited powers of self-maintenance than at present and before the full development of the tender plan of operation. With the support of adequate tenders, as previously mentioned, modern destroyers have the same mobility and almost the same powers of self-maintenance as cruisers. Any base, permanent or temporary, of suitable characteristics for the larger vessels of the Fleet is suitable for them. The tactical functions and potentialities of this type of vessel have accordingly been greatly expanded, with the result that many of the present tactical and strategical possibilities in the employment of the Fleet as a whole would

~~CONFIDENTIAL~~

be impossible without them. To limit destroyer operation to that which could be achieved only from permanent, specially designed bases, would require a prohibitive number of such shore establishments and would entail a severe decrease in general fleet efficiency.

143. It is possible that the extra load thrown upon the Philadelphia Navy Yard by increased building activity and increased maintenance work resulting from the current expansion program may make it impracticable to continue the work of caring for decommissioned destroyers at that yard, and invite assignment of that work to another yard. A decision upon that question involves matters beyond the Board's precept. Therefore, in the absence of any necessity to curtail the facilities which are now being rendered by the Philadelphia Yard in connection with decommissioned destroyers on the Atlantic Coast, the Board recommends against the establishment of additional destroyer bases. However, the Board recommends that facilities should be readily available at these two bases, one at San Diego on the Pacific seaboard, and one on the Atlantic seaboard (now at Philadelphia), to meet the necessities of placing the decommissioned destroyers into active service without calling unduly upon active destroyer and tender personnel and facilities. At San Diego Base, in particular, such

~~CONFIDENTIAL~~

necessary facilities should be provided, in view of the absence of any navy yard or shipyard facilities in that area, and further because of the very probable overload otherwise on the two West Coast Navy Yards.

~~CONFIDENTIAL~~

Part VI - MINE BASES

144. The term "mines" should not be interpreted in its literal sense. Depth charges, torpedo warheads, and aerial bombs are simply adaptations of mines to particular uses. In time of peace it is necessary to maintain enough of these weapons to meet immediate requirements on the outbreak of war and to have facilities available for preparation of a continual supply thereafter.

145. Within continental limits, the location of a mine base or depot is immaterial as long as safety requirements are met and shipping facilities are readily available. But storage magazines, and in some cases mine-loading equipment, must be an integral part of all important outlying naval bases if they are to be reasonably self-supporting.

146. The Navy has but two mine bases as such. One is located at Yorktown, Virginia, the other at New London, Connecticut. The base at New London, constructed to meet the World War emergency, is of limited capacity and is inactive due to the proximity of habitation and industry. Yorktown is inadequate of itself to meet the needs of the Navy, but additional mine facilities have been provided at certain ammunition depots. It is, therefore, impossible to divorce entirely mine bases from ammunition depots. The

~~CONFIDENTIAL~~

Board has, however, confined itself to matters applicable to Mine Bases and makes no recommendations regarding other activities of Ammunition Depots.

147. Provided certain deficiencies in existing establishments are corrected, the Board sees no need for any new mine bases. These deficiencies are:

Yorktown, Virginia

This base is well equipped as a mine depot except that the storage capacity is inadequate. The Board recommends:

- (a) Additional magazines as necessary to meet storage requirements.

Hawthorne, Nevada--Mare Island, California

Inadequate storage facilities, and the absence of any mine assembly plant or shipping facilities at tidewater for the output of Hawthorne are the principal deficiencies. Present plans call for the use of the Ammunition Depot at Mare Island as an assembly and shipping point, but this would violate the safety precautions laid down in House Document 199 of the 70th Congress, 1st Session, and bring about an extremely dangerous situation due to congestion of high explosives. A mine assembly plant and shipping facilities would be required immediately on outbreak of war

~~CONFIDENTIAL~~

and could not be improvised quickly. After considering various locations, the Board recommends:

- (a) Construction of a mine assembly plant on the north side, and shipping wharves on the south side, of Dike No. 12 at the southwest end of Mare Island, located to preserve the safety requirements as specified by the Congress in House Document 199.
- (b) Additional magazines at Hawthorne as necessary to meet storage requirements.

Oahu, T. H.

No adequate bomb storage now exists in Pearl Harbor to meet ready service requirements of the Fleet Air Base. In time of war this would be a serious deficiency. The Board recommends:

- (a) Aerial bomb storage and aircraft torpedo warhead storage in West Loch, Pearl Harbor, of capacity to meet the ready service requirements of the Fleet Air Base.
- (b) Additional magazines at the Naval Ammunition Depot, Lualualei, Oahu, as necessary to meet storage requirements.

~~CONFIDENTIAL~~

Part VII - PRIORITY LIST

148. The primary consideration governing the Board's estimate as to the relative priority of the various projects recommended in this report is that all these shore facilities are required in connection with the increased armament authorized by the Act of May 17, 1938, and should be in existence when the ships and aircraft authorized by that Act are completed. The recommended priority is accordingly based upon prospective dates of completion rather than dates of initiation of work.

149. With respect to the best order of undertaking the various projects recommended a number of important considerations, some of them beyond the purview of this Board, must be taken into account. Among them are:

(a) Some of the recommended developments are primarily important from strategic reasons, other from the point of view of maintenance, others from that of training, and others from a combination of these factors. It is impossible accurately to evaluate these differing considerations upon any common basis of importance. It should be noted, however, that some of the projects of outstanding strategic value are of a relatively minor nature in their physical aspects.

CONFIDENTIAL

(b) The various projects are of very differing magnitude from the point of view of the physical work involved in their planning and construction. It is natural that those requiring the longest period for construction will have a later date for completion, although not second in comparative importance.

(c) In a plan of such scope the initiation of the various items must be considered in connection with other plans of the Department. This refers not only to budgetary considerations, and resources of the various Bureaus involved in the work, but also to plans for operation of the Fleet. Until some action is taken on this report as a whole it is impossible to do this.

150. In view of the foregoing the Board has found it possible to indicate only two general categories of importance, or practicability, for early completion of the various items recommended. The items in each category are obviously of widely varying physical magnitude, but the order in which they appear has no bearing upon their relative importance. They are arranged in the order in which they appear in the body of the report.

~~CONFIDENTIAL~~

AIR BASES

Category A. (For earliest completion)

Chesapeake Bay (Hampton Roads, Va.), par. 37.
Southeastern Base (Jacksonville, Fla.), par. 40.
Pensacola, Fla., par. 49.
Puerto Rico (San Juan), par. 54.
Coco Solo, Canal Zone, par. 61.
Seattle (Sand Point), Wash., par. 70.
Sitka, Alaska, par. 83.
Kodiak, Alaska, par. 85.
Pearl Harbor (Ford Island), T. H., par. 98.
Kaneohe Bay (Oahu), T. H., par. 101.
Midway Island, par. 103.
Wake Island, par. 105.
Johnston Island, par. 108.
Palmyra Island, Par. 108.
Guam, Par. 113.

Category B. (For later completion)

Northeastern Base (Quonsett Point), R.I., par. 35.
Quantico, Va., par. 41.
Corpus Christi, Texas, par. 49.
Guantanamo Bay, Cuba, par. 52.
Virgin Islands (St. Thomas), par. 56.
San Diego, Calif., par. 66.
Alameda, Calif., par. 68.
Unalaska Island, par. 88.

CONFIDENTIAL

Canton Island, par. 108.

Rose Island, par. 108.

SUBMARINE BASES

Category A. (For earliest completion)

Guam, par. 113.

Fuerto Rico (San Juan), par. 129.

Canal Zone (Balboa), par. 131.

Unalaska Island, par. 137.

Midway Island, par. 139.

Wake Island, par. 140.

Category B. (For later completion)

New London, Conn., par. 114.

Hampton Roads, Va., par. 115.

San Francisco (Treasure Island), Calif., par. 133.

Kodiak, Alaska, par. 136.

DESTROYER BASES

Category A. (For earliest completion)

San Diego, Calif., par. 143.

Category B. (For later completion)

Philadelphia, Pa., par. 143.

MINE BASES

Category A. (For earliest completion)

Yorktown, Va., (Mine Base), par. 147.

Hawthorne, Nev. -- Mare Island, Calif., (Ammunition
Depots), par. 147.

Oahu, T. H., (Ammunition Depot), par. 147.

~~CONFIDENTIAL~~

Category B. (For later completion)

None.

151. There are certain projects, however, which the Board has no hesitation in selecting because of their immediate strategic importance as being necessary of accomplishment at the earliest practicable date and without regard to the expansion contemplated by the Act of May 17, 1938. These items are: Kaneohe Bay, Midway Island, Wake Island, Guam, Johnston Island, and Palmyra Island in the mid-Pacific area; Kodiak and Sitka in the Alaskan area; and San Juan, Puerto Rico in the Atlantic area. In addition, the immediate increase of training facilities at Pensacola, Florida, is mandatory.

A.J. Hepburn, Rear Admiral, U.S.N.
Senior Member

E.J. Marquart, Rear Admiral, U.S.N.
Member

James S. Woods, Captain, U. S. N.,
Member

Arthur L. Bristol, Jr., Captain,
U.S.N., Member

Ralph Whitman, Captain (CEC) U.S.N.
Member

William E. Hilbert, Comdr., U. S. N.
Recorder

OFFICE OF THE SECRETARY
File QB(119)/P16-3(380520)

C O P Y

DEPARTMENT OF THE NAVY
WASHINGTON, D. C.

JUN 7 - 1938

From: The Secretary of the Navy.
To: Rear Admiral Arthur J. Hepburn, U. S. Navy.
Commandant, Twelfth Naval District.

Subject: Board to investigate and report upon the need, for purposes of national defense, for the establishment of additional submarine, destroyer, mine, and naval air bases on the coasts of the United States, its territories and possessions.

1. A board consisting of yourself as senior member, and of Rear Admiral Edward J. Marquart, U.S.Navy, Captain James S. Woods, U.S.Navy, Captain Arthur L. Bristol, Jr., U.S.Navy, Captain Ralph Whitman, Civil Engineer Corps, U.S.Navy, as additional members, and of Lieutenant Commander William E. Hilbert, U.S.Navy, as recorder, is hereby ordered to convene at the Navy Department, Washington, D.C., at 10:00 o'clock a.m., on Friday, 15 July, 1938, or as soon thereafter as practicable, to investigate and report upon the need, for purposes of national defense, for the establishment of additional submarine, destroyer, mine and naval air bases on the coasts of the United States, its territories and possessions. Attention is invited to the Act of May 17, 1938 (Public - No. 528 - 75th Congress).

2. The board is authorized to adjourn from time to time and to proceed to the location of sites under consideration as may be deemed necessary.

3. The report of the board shall be accompanied by a complete statement of the considerations governing its conclusions, and shall be submitted to the Secretary of the Navy in sufficient time to be transmitted to the Speaker of the House of Representatives during the first session of the Seventy-sixth Congress.

4. The conclusions and recommendations of the board shall be considered as confidential until released by the Secretary of the Navy.

5. Necessary instructions for assistance to the board in carrying out its mission will be issued by separate correspondence.

/s/ Charles Edison.
Acting.