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ANNEX NO. 1 TO GRAND JOINT EXERCISE NO. 4
to be held in Hawaii, 1932.
(Joint Board No. 350 (Serial No. 491))

SUPPLEMENTARY INSTRUCTIONS

The Supplementary Instructions contained herein are published for the information and guidance of Commanders and Umpires participating in Grand Joint Exercise No. 4.

To enable general, or only special distribution of the contents of these instructions, depending upon the subject matter, this Annex is divided into two parts as follows:

- Part I. A. Maneuver Rules, General.
- B. Maneuver Rules, Air.

Part II. Questions and Answers on Interpretative Decisions.

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Part I. A. Maneuver Rules, General.

1. Landings, actual.

The landing of forces will follow actual conditions as closely as possible, with particular stress as to the time consumed and the capacity of beaches where landings are made. Where constructive troops are a part of the landing force, the time of leading troops from transports, and the time required for all subsequent stages of the operation will be actually consumed just as would be the case if the total troops were actually landed.

2. Landings, constructive forces, designation of.

a. The following rules as to the landing of constructive forces are quoted from paragraph 10 of the Joint Board Directive:

"(2) Each boat carrying constructive forces ashore will carry a large signal flag in the bow to represent type of units represented in the tow. Signal flags representing type of units to be as follows:

<u>Flag</u>	<u>Unit</u>
I	Infantry Battalion
A	Artillery Battalion (75 mm)
V	Signal Company of Battalion
C	Engineer Battalion
L	Special troops
Q	Train
S	Service Battalion
Red Cross	Medical Regiment
O	Ordnance Company
H	Regiment Artillery (AA)
F	Hqrs. A.E.F.
D	Division Headquarters
B	Brigade Headquarters

"(3) The movements and position of constructive units after landing in accordance with the Army plan will be indicated by flag bearers carrying above flags.

c. The boats of each transport will be considered capable of carrying on one trip constructive troops as follows:

Infantry - one battalion fully equipped; or
Field Artillery - one battery, 75 mm, with animals
or tractors and equipment; or
Pioneers(Engineers) - 1 battalion, with material.
Other troops - at the discretion of the umpires."

b. The signal flags in question are the prescribed flags of the International Code, distinctive in color and design. Signal flags, size No. 4, are 4.35 feet square, and no signal flags of lesser dimensions will be used.

c. Tests made at Quantico under favorable weather and beach conditions, indicate the troop and equipment capacities of the various types of ships' boats and special landing craft that will be in actual use, exclusive of boat crews, as follows:

50-foot Motor Launch

Troops, fully equipped, 140, or
Animals, 7, in flying stalls, or
One (1) 75 mm. gun, or
Four (4) 75 mm. pack howitzers, and personnel.

40-foot Motor Launch

Troops, fully equipped, 63, or
One (1) 75 mm. gun, or
Two (2) 75 mm. pack howitzers, and personnel.

24-foot Motor Launch

Troops, fully equipped, one (1) squad.

26-foot whaleboat

Troops, fully equipped, one (1) squad.

Life Boat, commercial type, pulling

Troops, fully equipped, 40.

Marine Corps 50-foot Troop Barge

Troops, fully equipped, 125

Marine Corps 45-foot Artillery Barge

One (1) 75 mm. gun, caisson and tractor, or
Two (2) 75 mm. guns and caissons, or
Two (2) tractors.

3. Landings, time factors involved.

It is essential to an orderly disembarkation and landing that certain factors be observed and, with them as a basis, each unit in landing must follow a predetermined schedule covering all its movements

between ship and shore. This schedule should be furnished to the umpires prior to the landing, and cover the following factors:

a. Distance of transport area from the shore in relation to its safety from long range fire, and the time of arrival of troops on the beach.

b. Distance of rendezvous line from the ship, and from the beach.

c. Time of loading boats from the ship, shoving off from gangways, and make up into tows.

d. Time of arrival at the rendezvous line.

e. Time required for organization and orientation at the rendezvous line.

f. Time of landing on beach.

g. Time for disembarkation at beach.

h. Time boats are off beach and headed for sea.

i. Time of return of launches or empty tows to the rendezvous line, or to the transport area.

j. Time assigned to successive waves in similar procedure.

Certain assumptions, based on tests held under favorable weather and beach conditions, with fairly trained personnel, affecting the above time factors, are:

a. Troops loaded into motor launches in ten (10) minutes.

b. Troops loaded into life boats in five (5) minutes.

c. Troops unloaded at beach from motor launches in five (5) minutes.

d. Troops unloaded at beach from life boats in two (2) minutes

e. Tow can be made up at sea in ten (10) minutes.

f. Tow can be made up off beach in twenty (20) minutes.

g. Approximate time for organization and orientation at rendezvous line twenty (20) minutes.

h. Average speed of motor launches, single, loaded, is seven (7) knots.

i. Average speed of tows (one motor launch and five life boats), loaded, is six (6) knots.

4. Gun and torpedo Fire, Simulation of.

a. General. Paragraph 20, Regulations for Joint Army and Navy Exercises, provides that the fire of all ships and of heavy artillery armament of the land defenses shall be simulated during daylight by turning a searchlight on the target or targets, if visible, during such times as the target is being fired on; and that care must be taken that searchlights are not thus used when the force in question is unable to deliver an effective fire against the target so indicated.

b. Naval. Paragraph 4, Instructions and Safety Precautions, Tactical Exercises, United States Fleet, prescribes in part the following rules on this subject:

"4. Simulating Gun Fire and Torpedo Fire.

(a) Gun Fire.

(1) Ships of all types will simulate gun fire of all calibers, both by day and by night, by keeping a searchlight trained steadily on the bearing of the target. In addition, turrets will fire one-pounder blanks and other guns 30-caliber blanks.

(2) This rule applies to both aircraft and ship targets.

(3) One searchlight will be used for each caliber firing, unless the fire of a caliber is divided in which case one searchlight will be used for each target engaged by that caliber.

(4) When searchlights are used at night safety of ships shall be the primary consideration. The utmost care shall be taken to keep searchlight beams clear of ships' bridges. When indicating gun fire at night by the use of a searchlight the beam must be elevated so as to pass well above the target, unless it is possible to illuminate the after portion of the target, and only the after portion, which is permitted.

(5) It will be noted that there is no distinction in night gun fire between the indication for searchlight illumination, star shell illumination, and no illumination. A steady display of the searchlight is used in each case.

(b) Torpedo Fire in Daylight.

(1) Surface vessels will simulate torpedo fire in daylight by flashing a searchlight at the target, using a number of 6-second flashes with 3-second intervals.

(2) Submarines (on the surface or submerged) will simulate torpedo fire in daylight by firing a smoke grenade from the submerged gun, using any color except red.

(3) Torpedo planes will simulate torpedo fire by the leading plane of each unit making a puff of smoke.

(c) Torpedo Fire at Night.

(1) Surface ships will indicate torpedo fire during darkness by firing a white Very star.

(2) Submarines will indicate torpedo fire at night by firing a light grenade from the submerged gun (any color except red)."

c. Land. In addition to the use of searchlights to indicate the fire of harbor defense artillery as provided in subparagraph a, above, all artillery, - harbor defense, field and anti-aircraft - will indicate their fire by firing blanks, either actual caliber or subcaliber, when such are available. It is probable that in many cases searchlights will not be available for use with minor calibers.

5. Vessels adjudged Sunk or Totally Disabled.

The following instructions with regard to vessels adjudged sunk or totally disabled during the Exercise, as contained in paragraph 11 of the Joint Board Directive, will govern all concerned:

"a. No vessel will be adjudged sunk or totally disabled except by the Chief Umpires or Senior Umpire - Blue.

b. In the event of any vessel being adjudged sunk or totally disabled such vessel shall proceed to rendezvous to be designated by the Commander-in-Chief, Battle Force, for Blue vessels, and by the Commandant, 14th Naval District, for Black vessels. The Chief Umpires, Senior Umpires Blue and Black, and their principal assistants, shall be informed previous to the commencement of the Exercises, as to the location of these rendezvous.

c. Vessels adjudged sunk or totally disabled shall during daylight hoist the S (sail) flag at the fore truck and wear it while proceeding to the rendezvous. At night such a vessel shall carry all usual lights."

6. Sub-Surface Defenses.

a. Sub-surface defenses, other than constructive, will not be authorized. Where such constructive defenses enter into the defense plan they must be shown on maps or charts accompanying Plans to be submitted in accordance with paragraph 15, Joint Board Directive.

b. These defenses must be in accordance with the actual material on hand, and will be considered by umpires in the assessment of losses and delays that such defenses would impose on a landing force.

7. Passage and Landing of Units, Actual or Represented.

a. Paragraph 10 of the Joint Board Directive, relative to Transports and Landing, prescribes in part as follows:

(1) "Transports carrying Blue land forces will be represented by vessels of the Blue Train.

(2) The landing of troops from Blue transports will be represented by the actual passage of the boats from the ships to the beach, and the landing of units, actual or represented."

b. The Blue umpire on each transport that is to land units, actual or represented, will be furnished by the appropriate troop commander with a copy of the Embarkation or Landing Plan covering the actual passage of the boats from the ship to the beach and any successive movements. The motor launches from other vessels of the fleet assigned for the purpose of the landing will be distributed proportionately among the transports engaged in the landing of units, actual or represented.

8. Raids for Purposes of Demolition, Espionage, etc.

The landing of small raiding parties from naval vessels for the demolition or capture of defense installations or for espionage purposes is forbidden. It is obviously impracticable during peace time for a defending force to exercise the necessary restraint over the actions of civilians by closing contiguous waters to small boats as would be done in war, or to control parties of officers and enlisted men ashore in the United States uniform, and hence the operations herein prohibited would be, if allowed, too artificial to be of any value. This is not intended to prohibit operations for the seizure of a land base from which to operate naval aviation or other operations of a similar nature.

(B?)
Part I. A. Maneuver Rules, Air.

9. Control of Air Units, Fleet Air Base, Pearl Harbor.

a. The basic Joint Board Directive (J.B. No. 350, Serial No. 491) Section III, paragraphs 6 and 7, provides that the Air Units, Fleet Air Base, Pearl Harbor, will be moved to a secret point designated by Commander-in-Chief, U. S. Fleet, prior to the Exercise and will be held immobile thereat until released for operations by the Chief Umpires.

b. Further consideration of this question has led to the conclusion that the point referred to in above instructions cannot be kept secret. Therefore, Hilo, Hawaii, is announced as the rendezvous of this force.

c. Until the Naval Aviation Units at Hilo are released by the Chief Umpires, these forces will furnish no enemy information to the Blue Commander, nor will they be attacked or interfered with by Black Forces.

d. It will be assumed that these forces were transported on BLUE ships to the advanced base and that an adequate amount of ammunition has been landed or is carried in the tenders to carry out the missions assigned. Further than this, there will be no constructive features in connection with this base.

e. The use of constructive aircraft is not permitted to either BLUE or BLACK.

10. Safety Precautions for Aircraft.

a. General. The following safety precautions with respect to aircraft are placed in effect for the Grand Joint Army and Navy Exercise No. 4. Nothing in these rules will be construed to mitigate the restrictions imposed upon aircraft by existing rules of the Army Air Corps, the Navy Bureau of Aeronautics, or the Commanding Officers of the forces involved. A copy of these rules will be furnished every pilot taking part in this exercise.

b. Air Combat. Opposing aircraft shall not approach each other closer than 500 feet. A combat between opposing formations will be indicated to the umpires by one dive by the formation at the greater altitude upon the formation at the lesser altitude. If, when contact is made, the Commanding Officer deems it to be advisable) a single plane or tactical unit of three planes will be detached from the formation to make the combat signal

described above. It is the specific intent of this rule to prevent dog fights and involved aerial melees while still indicating to the umpires that combat is intended. The combat signal will not be made during any night operations.

c. Aircraft Out of Action. Aircraft declared out of action by the umpires in any engagement will continue with their respective units until the next landing at the base.

d. Dive Bombing and Strafing Attacks. Aircraft making dive bombing attacks upon surface vessels or ground targets shall not go below an altitude of 500 feet above the target. Aircraft making strafing attacks on surface vessels will not approach that vessel closer than 500 feet.

e. Smoke Screens. Except in emergency, aircraft will not fly through smoke screens or curtains.

f. Crash Signal to Surface Vessel. The signal to a surface vessel that an aircraft has crashed in the water will be as follows: The aircraft making the signal will zoom the bridge of the surface vessel from approximately such a direction that upon pulling out from the zoom he may continue in straight horizontal flight for at least 1000 yards in the direction of the crash. Only one aircraft of a unit (preferably the flight leader) shall make this signal. The signal should be repeated until the vessel alters her course in the proper direction. A red Very Star may be fired to call attention to the signal. Particular attention of all pilots is called to the fact that the maneuvers made after all pull outs from bombing and machine gun attacks on surface vessels must be made so as to preclude any possibility of mistaking these attacks for the crash signal. In these maneuvers avoid especially a straight-away flight of 1000 yards, after completing the attack.

Surface vessels placed out of action will fly the alphabet flag "S" at the highest point of the foremast. This flag is a square white flag with a square blue center. An attack on a vessel carrying this signal should not be prosecuted for fear of confusing the attack with a crash signal.

g. Crash Signal to Seaplane. The signal to summon aid from a seaplane to a crash in the water is as follows: the landplane will fly alongside the seaplane and make several short zooms. This will mean "Follow me to the scene of a crash in the water."

11. Simulation of War Conditions.

Some of the restrictions imposed in these rules are intended to curb the tendency to enhance the value of aircraft at the expense of practical limitations whose effects are not felt in the conduct of the problem.

This refers particularly to such items as the allowance of insufficient time for reloading bombs, guns, etc., and to the practice of continuing to indicate attacks on ground targets when previous attacks in the same flight would have normally expended the ammunition allowance. It is the duty of all officers acting as umpires to endeavor to make this exercise as valuable as possible by requiring the utmost in the simulation of actual wartime conditions.

12. Nomenclature for Aircraft Types.

In all instances where the designation of types of aircraft is required, the following nomenclature will be employed:

BLACK AIRCRAFT	BLUE AIRCRAFT
Pursuit	Fighter
Bombardment	Heavy Bomber
Attack
Observation	Observation
.....	Scout
.....	Patrol

13. Limitation of Scope of Aircraft Attacks.

a. Before the take-off of any aircraft unit the pilots and the umpires concerned will be specifically informed as to the theoretical armament and bomb load of the planes. Such aircraft units will refrain from making any attack which is not compatible with the theoretical armament or bomb load of the unit.

b. When planes are assumed to carry bombs, torpedoes, or guns, the amount of fuel they are assumed to carry shall be correspondingly reduced if this is required by the type plane concerned. Such planes will return to the carriers or their bases before this assumed amount of fuel is exhausted. If they do not, they will be considered out of action. For reasons of safety, planes may carry, however, the maximum load of fuel.

14. Time Allowance for Rearming.

A minimum time allowance of 30 minutes for rearming will be imposed on all aircraft. Umpires will impose an additional time penalty where it is evident that the conditions indicate that 30 minutes would not be sufficient. The time shall be taken from the moment of landing of the first unit at the base, and, in general, no plane shall take off until after the expiration of the full time penalty imposed. The time penalty will run concurrently with the time which may be required actually for refueling, or respotting, etc.

15. Bombing and Strafing, Simulation of.

a. Bombing.

(1) Aircraft of the Bombardment, Patrol, and Heavy bomber type, will simulate release of bombs by the loading plane of each unit making a puff of smoke.

(2) Dive bombers and planes making strafing attacks will simulate release of bombs and firing of machine guns by diving at the target.

16. Reports of Air Operations.

a. The results of attack of aviation against surface vessels and ground objectives will be determined in the office of the Chief Umpires, based upon reports of the umpires observing the action, as follows:

(1) Report by air umpire with attacking formation to be transmitted to Chief Umpire immediately by most rapid communication (need not be encoded if actually telephoned on land wire).

(a) Number and types of planes taking off from base and number and size of bombs carried.

(b) Number and types of enemy planes engaged while enroute to objective; time of engagement; losses assessed.

(c) Anti-aircraft fire encountered and losses assessed.

(d) Number and types of planes actually attacking; time of attack; objective attacked; altitude of planes; number and types of bombs released; and number of hits adjudged.

(2) Report by Umpire on Surface Vessel or at ground objective (in code, if by radio) giving:

(a) Number and types of planes making attack and time of attack.

(b) Anti-aircraft fire delivered, rate of fire and number of guns bearing.

(c) Loss assessed planes by anti-aircraft fire prior to release of bombs.

(d) If a ship is the objective of the attack, position, course, speed and movement of vessel.

(e) Altitude of attacking planes.

(f) Number of hits adjudged and damage assessed.

(3) Report by air umpire accompanying defense aviation in immediate vicinity of the objective will be made to the umpire at the objective of the attack and will show:

(a) Number and types of enemy planes engaged.

(b) Time of engagement.

(c) Losses assessed to both BLUE and BLACK aviation.

b. The results of air combats will be determined by the air umpires involved, and will be included in the reports given to the Chief Umpires as specified in sub-paragraph a. of paragraph 16.

(1) The difference in characteristics of various types of aircraft introduces complexities into the formulation of rules for adjudging the results of air combat which prevents the employment of a simple method of assessing losses unless certain artificialities are accepted. Therefore, in the formulae which follow, and which are suggested to umpires for use in assessing losses quickly, all types of planes will be considered to possess equal offensive and defensive air combat powers, except that BLUE heavy bombers and patrol planes and BLACK bombardment and attack planes will equal two of any other type.

(2) When a force of A planes engages B planes, the

$$\text{Losses of A} = \frac{B^2}{A^2 + B^2} xA$$

$$\text{Losses of B} = \frac{A^2}{A^2 + B^2} xB$$

The bombardment, heavy bombers, attack and patrol planes of A and B first having been reduced to the equivalent of other types which may be engaged.

(3) When more than one type of plane takes part in an encounter, the losses will be distributed in proportion to the number of each type which are present.

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Part II. Questions and Answers on Interpretative Decisions.

1. a. It is impracticable to assign arbitrary rules as to losses, and other details, in the conduct of Grand Joint Exercise No. 4. Discussions of certain main questions are herein presented, so that umpires may have the decisions of the War and Navy Departments on these questions, and thus be assisted in arriving at required decisions. In order to strip the Exercise as much as possible of artificialities, only the arms, armament, landing craft, and other facilities that will be in actual use are to receive consideration in the making of assumptions and decisions.

b. Questions raised by the Commanding General, Hawaiian Department (Commander BLACK Forces), have been decided as indicated below.

(1) Question: If submarines are known to be included among the elements defending Oahu, what effect will they have in causing transports, airplane carriers and any other major ships to keep well away from Oahu until the submarines are neutralized; and about how far away would the surface ships consider it necessary to stay?

Decision: Neutralization of submarine action in an area is most difficult, and never sure of accomplishment. Movements of the BLUE Fleet will be screened by destroyers, and certain losses, possibly due to BLACK's submarine operations, must be accepted. The BLACK Commander must therefore accept the fact that BLUE operations would be made with this acceptance of losses, and that BLUE's movements will not be appreciably delayed by the presence of enemy submarines. The BLUE Commander will make such use of his destroyers as is possible in order to minimize BLACK's submarine action. The menace of the BLACK submarines would not materially affect the time factor in the BLUE advance on Oahu. It is to be assumed that BLACK submarines would not expose themselves to losses unless there was a favorable opportunity of penetration of the BLUE destroyer screen to drive home an attack on capital ships and transports within the screen.

The BLUE Commander must make his decision regarding his approach to Oahu based on the mission to be accomplished, and the presence or absence of enemy submarines would have little effect on such decision itself, but rather on the method of accomplishing the mission.

In the advance to the landing submarine action would be countered by active operation of the screening destroyers, which would make submarine action difficult.

In considering what effect BLACK's submarines might have on the operations of BLUE carriers, or other major ships, the question enters as to the future contemplated operations of the BLUE Fleet. It must be assumed, for the purposes of the problem, that the operation against Oahu is of vital importance to BLUE, and that BLUE must accept certain pos-

sible losses necessary to its capture, without regard to future operations. It is likely that BLUE will project air operations from a considerable distance at sea, and will not keep his carriers in sight contact of the transports advancing to the landing. These air operations could be projected from 75 to 100 miles at sea, and still act as a satisfactory transport screen.

The use of major ships in close support for the transports is a decision that must rest with the BLUE Commander. The absence of capital ships in the BLACK forces would make close support by the capital ships and large cruisers of BLUE valuable only from the standpoint of gunfire against the contemplated landing points and terrain in rear thereof.

The above considerations constitute a sufficient answer as to what effect the menace of BLACK submarines would have on keeping the BLUE carriers and other major ships at a distance from Oahu.

(2) Question: Assuming that the hostile fleet commander does regard submarines as a real menace, how long should it take a fleet such as BLUE to neutralize the submarines sufficiently to warrant bringing the transports, airplane carriers, battleships and cruisers close in to Oahu? If the fleet commander has no good reason to think the submarines have been neutralized, what action should he take?

Decision: These points are covered in the decision on Question No. 1.

(3) Question: Assuming that airplane carriers do have to stay a considerable distance from Oahu until submarines, as well as opposing aircraft, have been neutralized, to what extent, during this period, can BLUE aviation reduce BLACK's ability to deal with a final assault? What will the vital damage consist in?

Decision: The assumption that BLACK submarine operations might keep the BLUE carriers beyond operating range is an untenable one, as carriers properly screened and guarded will approach within operating range. It is obvious that a BLUE force would first seize one of the outlying islands of the Hawaiian group, and establish a secure air base from which to conduct air operations directed against Oahu. Any other decision and action would introduce an element of artificiality into the Exercise.

BLUE aviation damage to BLACK, to be vital, must be such as to prevent BLACK from seriously threatening BLUE surface craft. This would comprise such logical objectives as BLACK airdromes, airfields, fire control stations, etc. The primary objective of the BLUE air force is BLACK's air force, and remains so until the latter is destroyed. BLACK's ability to deal with the final assault, i.e. - the landing, will be mainly reduced by the loss of all or the greater part of its air force. A landing projected without air superiority would be almost doomed to failure at its inception.

(4) Question: Assuming that BLUE landing parties, while still in small boats or while debarking on the beach, are brought under the close range fire of machine guns, automatics and artillery, or are subjected to gas, what percentage of losses is to be chargeable to such a landing party, and to what extent will the psychological effect of such fire or gas reduce the initiative and morale of the men of the landing party?

Decision: It is assumed that the morale, training and national characteristics of the forces involved are on a parity, and the landing force has been assured air superiority that would materially aid in a close approach and debarkation.

Landings will most probably be made under cover of darkness throughout the landing, or under partial cover, with actual debarkation on the beach in the latter case at dawn. Unusual weather conditions, such as fog or low visibility, would lend a natural screen to the operation. Smoke screens may be utilized, however, either in a landing completed in, or conducted throughout daytime, to gain the screen approximating that of darkness.

It is manifestly difficult to lay down any arbitrary scale of losses when a landing is made under the handicap of close range fire of small arms and light artillery. So many factors enter into the situation that it is preferable to have decisions made on the spot without such restrictive scales of losses. The following factors should enter into the decisions rendered:

- (a) Strength of enemy infantry on a given front.
- (b) Armament and equipment of defenders, including their proportion of machine guns and anti-boat guns.
- (c) Types of hostile artillery; prearranged concentrations or barrages, if any; proportion of artillery to the given front.
- (d) Length of time the defenders have had to organize their ground; nature and location of defensive works.
- (e) Preliminary air reconnaissance by the attacking force, with air photographs, to give the attacking force knowledge of opposition to be expected.
- (f) Depth of water off beaches and nature of terrain beyond; special consideration to the defending force's observation for its artillery fire; nature of terrain for at least 1000 yards beyond the beach line.
- (g) Relative proximity of defending force's observation posts to the beach line after debarkation of the attacking force.
- (h) What proportion of the defending force's machine guns that can be brought to bear for close range fire on the beaches.

- (i) The number of BLUE boats to a given front of beach, and the number of troops in the boats. This is of manifest importance in the determination of time required to disembark the attacking force, the length of time it is under fire, the defending fire that can be brought to bear on the beach before and after the disembarkation, and the interval of time between the lifting of covering fire from the beach and the arrival of the attacking force on the beach.
- (j) The type, speed and armament of boats. The factor of speed is important in the determination of time that boats are in hostile fire zones.
- (k) The number and type of covering ships' guns, and the amount of ammunition available for the support of the landing.
- (l) The ranges at which various types of covering ships will have to deliver their fire. This is especially important if destroyers, or special types, are able to deliver direct fire on beaches at close ranges.

The battle experience, amount of special training, and capabilities of leaders are factors that should receive special consideration in this situation. The effect of close range fire would undoubtedly have a very adverse effect on troops receiving losses while still in their boats, or in the water after disembarkation; and their state of initial morale, due to the strength or weakness of the above-cited factors, would exercise considerable influence on their resulting morale and initiative.

The degree of inurement of troops to the preceding sea travel, and the passage from ship to shore in small boats, is a factor that should receive due consideration. Lack of sea service, and the discomfort of a new environment, would obviously lessen the degree of inurement, and contribute to the loss of morale and initiative in this crucial stage of the operation.

To assess losses at this stage due consideration must be assigned to extremely variable conditions, such as darkness, daylight, screening or its absence, the character of beaches, surf and weather conditions, variable factors that make the assessment of losses a difficult task. It is believed that losses will, under general conditions, vary from 10 percent or possibly less, if landings are made under cover of darkness or effective screening, to as high or higher than 50 percent, if made with-

out such aids. Superiority in the air is fundamental in value, while the effectiveness of covering fire, speed of boats while in hostile fire zones, and the possibility of deception as to the actual point of landing are material factors that would tend to reduce losses. The chief disadvantages of a landing under cover of darkness, such as inability to keep courses on the designated beaches, collisions, deployment after landing, will vary greatly and, if present to any degree, would largely vitiate the initial advantage of cover.

The experiences of the World War revealed that combat troops of first-class fighting ability could endure losses far greater than had hitherto been accepted, and still perform their mission. The question as to what proportion of losses would entail failure in a landing operation is therefore extremely difficult to fix arbitrarily. The practical impossibility of withdrawal or retreat at the critical stage of debarkation is a factor that has little parallel in purely land warfare. Troops subjected to heavy losses while still in the boats, or in the water making for the beach, cannot withdraw. They must make the beach to seek cover and to reorganize. Withdrawal may be made later, but not in the critical stage outlined.

It is believed that the umpires can function best if not restricted to prearranged figures of losses.

(5) Question: Assuming that battleships, cruisers and destroyers are able to get in close to the beach, how much can their gun-fire assist in the case of a combat between a landing party and a well-placed and well-handled defending force?

Decision: The fire of battleships, cruisers, destroyers and special types will not be very effective, even under the most favorable conditions, against a well-placed and well-handled force on shore. Naval gunfire is not at present suitable for such employment because of its limitations in trajectory, fragmentation, etc., when used against shore defensive installations and troops. It will be comparatively ineffective against such appropriate targets as personnel, machine guns, batteries, communication centers, etc. The question of ammunition supply is a serious handicap to such fire. Except for such direct hits as may be made, this covering fire would be of assistance to the landing force mainly in raising its morale while under hostile fire, and in its limited neutralization of that fire.

Covering fire schedules should be communicated in advance to the appropriate umpires. They should comprise the fire supporting the attack of a landing force, on defensive installations during the approach, debarkation and subsequent advance.

As this fire is delivered, and action by the defense required, the defending force should, wherever conditions make it practicable, make known its decisions to the appropriate umpires as to the time of open-

ing fire, the rate of fire, the target or targets, amount of front covered by the fire, type of shells used, and the duration of fire. If prearranged defensive fires are to be employed against the approaching boats, or to be laid on the beaches, this data should be communicated in advance.

Consideration should be given by the umpires to the possibility that such factors as fog, improperly located observation posts, or their temporary neutralization, will alter the character of defensive fire. In such cases the defending batteries must then depend on prearranged defensive fires, and take the chances of boats passing through such fire. The battery commanders will probably lack information in such cases as to speeding up the rate of fire as boats approach the barrage zones or concentration areas, and might then be limited to the normal sustained rate of fire for the particular type of gun employed. For the same reason they may not be able to step down the fire to follow the advance of the assaulting waves, and thus cause them to pass through successive barrages.

(6) Question: The duration of BLACK's occupation of Oahu would have a direct bearing on the condition of his defenses when the problem opens on February 6th. Oahu is a fortress which can and would be materially strengthened, progressively, under military direction in time of war. It is recommended that a definite date, say October 1st, 1931, be set as that on which BLACK captured Oahu. It is also recommended that, as implied in the last sentence of the note to paragraph 5 a of the directive, BLACK's operations be assumed to have given him possession of the entire Hawaiian Group, not solely the Island of Oahu as is implied in paragraph 3 b of the directive.

Decision: Reference to the assumption recommended that BLACK's operations have given him possession of the Hawaiian Group, the same is approved to the extent that BLACK's control in the archipelago is such as to permit full freedom of operation of the actual garrison of the Hawaiian Department, or of any civilian agencies with which you have an understanding for cooperative action in time of war.

As to your recommendation that October 1, 1931, be recognized as the date of BLACK's capture of Oahu, the same is approved. However, due to the probable tasks which confronted the BLACK in establishing civil control in Oahu and extending control to the other islands; the limited forces at his disposal and the improbability of appreciating the necessity for increasing the defenses of Oahu prior to the development of BLUE threat, January 1, 1932, is considered a more logical date for starting work on strengthening the defenses.

(7) Question: As implied in paragraph 7 b(1) and (3) of the directive, it is recommended that the following assumption be authorized: All BLUE fortifications, military equipment and arms (including war

reserves) and military and civil communication systems which actually exist in this Department on February 6th, 1932, are assumed to be at the disposal of BLACK.

Decision: Recommendation approved.

(8) Question: The question of the attitude of the civil population towards the military forces here in time of war is a very complex one. The various nationalities, particularly Orange, would have a considerable, though somewhat indeterminate, bearing on the problem. Our present estimates and plans in this regard are of course drawn from the standpoint of our being BLUE. Under the conditions of the Joint Exercise, we being a BLACK force in occupation, it is recommended that the entire question presented by the mixed population be disregarded, and that we be authorized to assume that we have full and unhampered military control of the civil population of the Islands and their resources.

Decision: Recommendation approved.

(9) Question: One of the purposes of the problem being to determine the adequacy of our land defenses to repel an overseas attack (Paragraph 2 of the directive), the question of personnel to man our defenses arises. Paragraph 7 of the directive gives us the Regular Army Garrison of Oahu, the National Guard of Hawaii and the Reserves. Our organized reserves are all officers. But if the purpose is to test the defensive strength of Oahu, several months after the outbreak of war, it is believed that this can be attained only if a reasonable assumption be made as to military personnel which would be obtainable locally after D day. More than 9,000 men volunteered or were drafted in the Territory in 1917 for a war on the other side of the world. If we were BLUE we could largely augment our strength in the first few months of a Pacific war. If we were an ORANGE force in occupation for the same period, we could do even better. In order that the problem may approximate actual conditions, it is recommended that we be allowed an assumed increase in military personnel, from local resources, sufficient to bring all existing Regular and National Guard units to war strength. It should be noted that the tactical experience to be gained by all unit commanders will be of greater advantage to them if this assumption is made.

Decision: It was considered advisable to base this exercise upon the actual peace garrison of the Hawaiian Department in order to avoid unnecessary artificiality and complications involved in the use of constructive forces.

(10) Question: Paragraph 8, Regulations for Joint Army and Navy Exercises, states: "Constructive armament and means will not be used, except that field works, shelter, obstacles, and other structures that could not be built except at considerable expense and labor may be used constructively, but must in every case be outlined clearly and indicated

by markers or other contrivances, and material therefor must be actually available." Our defense plans for Oahu include organized lines of defense, to be completed in from 14 to 60 days, for which both material and labor is locally available. Under the conditions of the problem it is certain that BLACK would have constructed such works, even if he had not found them partially completed when he captured the Island. It is therefore recommended that we be authorized to assume such organization of the ground, including the mining or gassing of airdromes on outlying islands and such work on the water areas as the netting or obstructing of the Pearl and Honolulu Harbor channels, as the duration of our occupation and the material and labor locally available would permit us to accomplish. It is proposed that we keep a work diary, beginning with the date of our occupation of the Islands and based on actual labor and materials available, by means of which we may arrive at a graphic representation on maps of the organization of the ground which would exist on February 6th, and that these maps be furnished to the Chief Umpire, BLACK.

Decision: Paragraph 8, "Regulations for Joint Army and Navy Exercises" will govern in this regard. January 1, 1932, as indicated in paragraph 1 a of this indorsement is the earliest date authorized for the assumed initiation of work on these defenses.

The constructive mining and gassing of airdromes on outlying islands is not authorized.

The constructive laying of nets and mine fields, to the extent of material on hand is authorized.

All constructive works authorized above to be shown on maps and charts accompanying Plans to be submitted in accordance with paragraph 15, Joint Board Directive.

(11) Question: Although we are allowed the Hawaii National Guard under paragraph 7 b (2) of the directive, it will be impractical, for reasons which have been explained to the War Department in our radio No. 6885 of June 4th, to obtain the participation of more than the regimental and battalion commanders, with their staffs and communication details. Even this skeletonized participation of the National Guard is now up for decision of the War Department. It is recommended that the constructive use of the entire National Guard be authorized in the Joint Exercise, since it forms a component part of the forces comprised in our defense plans.

Decision: The approval of this recommendation requires a modification of the restriction contained in paragraph 9 of The Joint Board Directive, reference to employment of constructive BLACK forces.

However, due to conditions which will prevent the calling out of the National Guard, other than regimental and battalion headquarters personnel; for this exercise, the assumption is authorized that when such unit headquarters personnel is present, the unit is present at its authorized maintenance strength.

(12) Question: The note to paragraph 5 a of the directive states that no BLACK forces will be more than 400 miles from Pearl Harbor when the problem begins. Under this, we will be able to have O.P's and to base observation planes on all the main Islands of the Hawaiian Group, including Hawaii. But the note to paragraph 7 c of the directive states that "Air Units, Fleet Air Base, Pearl Harbor, will be moved before the Exercise begins to a secret point designated by the Commander-in-Chief, U. S. Fleet, and will be held immobile at said point until released by the Chief Umpire for operation with the BLUE forces." It is evident that the secret point above referred to will be on, or in the sheltered waters of, one of the Islands within the 400 mile limit of our operations and observation. It is realized that this is an artificial condition which cannot be avoided. But, in order that we may not be placed under the disadvantage of having this BLUE air force begin operations from a point which it should not have reached unobserved or unopposed by us, it is recommended that this force be required to join the BLUE Fleet before it is considered to be BLUE or, if this is impractical, that we be given such warning of its penetration of our observation screen and of its subsequent movements as we might be expected to have received if it came from the BLUE Fleet under actual conditions.

Decision: Your views contained in this paragraph will be brought to the attention of the Chief Umpires and you may be assured that special effort will be taken to control the movement of this aviation in such a way as to work no disadvantage to BLACK.

(13) Question: What safety rules will be prescribed for aerial combat? It is recommended that hostile air forces be forbidden to approach and dive at each other and that air umpires make decisions, based on numbers and relative positions of opposing groups, as to the local control of the air and the losses suffered. If any factors other than numbers and relative positions are to be considered by air umpires in deciding aerial combats, we should be informed beforehand as to what these factors will be.

Decision: These points are covered in Part I, Manuever Rules.

(14) Question: Will the BLUE air forces be allowed any constructive operations, such as I understand was permitted in the 1925 Joint Exercise when it was assumed that a land base had been seized on Molokai? It is recommended that this be not allowed.

Decision: BLUE will not be allowed to have constructive air forces in this exercise. (See paragraph 9 a, Joint Board Directive). Constructive operations by BLUE aviation will not be authorized.

(15) Question: Chemical Warfare would be a very important factor in the defense of Oahu. The use of gas, particularly toxic, would increase the effectiveness of our defensive forces very materially by making it impracticable for the attacking forces to land at certain points or cross certain areas during the period of persistence of the gas. The question therefore arises as to chemical warfare in the Joint Exercise. May we actually use smoke and tear gas? Will we be given credit for simulating the projection of other chemicals under conditions analogous to those which would govern our credit for simulated artillery or infantry fire? In other words, if we can show that our dispositions are such as would enable us to use chemical weapons, materiel and personnel both being available, will we be given credit for their simulated use? It is recommended that these questions be answered in the affirmative.

Decision: Simulated use of toxic gases, or the actual use of tear gas will not be authorized. Smoke may be used but will be limited to such measures as will not endanger life, such as laying smoke on reefs which will constitute hazards to the navigation of launches engaged in landing troops.

(16) Question: Paragraph 20 of the "Regulations for Army and Navy Exercises" provides for simulating heavy artillery fire during the day by means of searchlights. By what means will such fire be simulated at night? In this connection it should be noted that it will be difficult, and in some cases impossible, to indicate to a target by searchlight during the day that the target is under long range artillery fire. It is believed that a more practical way of handling this matter would be by radio, through the umpires.

The constructive landing of BLUE forces (paragraph 10 of the directive). We understand this paragraph to mean that all the boats of a transport must be used in one group to represent the passage of one battalion of infantry (or corresponding unit) from ship to shore, and that each of these boats will carry the prescribed flag. Confirmation of this is requested, and also information as to about how many boats such a group will contain. It is recommended that the flags be distinctive in color and at least 4 feet square.

It will be very important to the successful working of the Exercise that conditions as to landing follow as closely as possible actual conditions, particularly as to time consumed and capacity of beaches. No matter how few boats may land constructive troops, the time necessary to load from transports to boats, to ferry ashore, and to disembark should be held to that of the actual operation of the number of troops assumed to be present. It is recommended that this matter be carefully regulated.

Decision: The points raised in these paragraphs are covered in Part I, Manuever Rules.

(17) Question: The use which BLUE may make of spies and the friendly civil population is not covered in present instructions. It would seem that the Exercise will better operate to the satisfaction of all concerned if such activities are forbidden. In time of peace the Department obviously cannot take the necessary measures to control such activities. To do so would seriously interfere with civil business, and any effective restrictive measures would arouse serious civilian complaint. If such activities are allowed, unrestrained, the breaking of BLACK communications, the disclosure of BLACK positions, and the assistance from the shore to BLUE navigation would be carried out with a success not possible in war. It is recommended that all BLUE espionage and sabotage activities be forbidden.

Decision: Since BLUE has previously occupied the Hawaiian Islands it is expected that he will have rather complete information of the defensive installations. It is not believed that he will find it necessary to have recourse to espionage measures. No constructive acts of sabotage will be allowed.

(18) Question: How many men (infantry) can be landed in each wave, using the lifeboats of 14 converted merchantmen each capable of carrying 3,000 men, assuming 16 life boats to each merchantman, augmented by thirty 50-foot motor launches and fifty 40-foot motor launches from the fleet?

Decision: It is assumed that the force employed is equivalent to a Corps of two Infantry Divisions, or a total of twenty-four infantry battalions; with the infantry on eight of the fourteen transports, each carrying a regiment of three battalions; that each transport has not less than two gangways for the purpose of disembarking the troops.

It is possible, with such assumptions, to load simultaneously twenty-one battalions with equipment, shore and beach party details, echelons of higher units, medical and signal personnel, and such artillery personnel as must precede the landing of that arm in the boat transport furnished. The remaining three battalions, which might constitute a regiment in Corps Reserve, must remain on board to proceed on the second trip of the boats if this procedure is followed.

The question of the tactical formation, with its number of waves, and the composition of each wave, rests with the decision of the Corps Commander. Into this decision also enter such factors as to what boats go free, what go in tows, and the size of each tow; also the equipment to be carried and armament employed.

(19) Question: Make a time study of the time to load, make up tow, and to tow life boats to beach; time to unload at the beach and to make up tow and retow lifboats to ship for further waves. In other words, obtain from Marine Corps sources the estimated time that will elapse between Wave No. 1 and Wave No. 2 from 14 transports carrying 42,000 men, augmented by ships' boats as indicated.

Decision: Without knowledge of the tactical formation to be used, its number of waves and their composition; the front to be landed on, and the character of the beaches; the requested study is impracticable. There are certain factors, however, that apply to every estimate of time factors. Under favorable conditions of weather and beaches, fairly trained troops can be loaded into motor launches in approximately ten minutes, and into life boats in five minutes. They can be unloaded at the beach from motor launches in approximately five minutes, and from life boats in two minutes. A tow, of one motor launch and five life boats, can be made up at sea in ten minutes, and off the beach in twenty minutes.

Assume that eight ships are discharging into boats simultaneously from two gangways on each ship; that the transport area is 16,000 yards from the shore to avoid long range fire; that the rendezvous line is 5,000 yards from the shore. Under these assumptions a time study discloses that a single boat, self-propelled, with a speed of seven knots, may return on its second trip to the transport in two hours and thirty-three minutes from the time it finished unloading its initial load on the beach. A tow of one motor launch, and five life boats, with a speed of six knots, will accomplish the same task in three hours and fifty minutes. Details of certain time factors to be observed will be found in Part I, Maneuver Rules.

2. Question raised by the Commanding General, Ninth Corps Area (Commanding General, Blue Army Expeditionary Force).

Question: Reference Grand Joint Exercise to be held in Hawaii 1932, request confirmation: First. The infantry division less tank company and 155 millimeter howitzer regiment mentioned in paragraph 6 b is understood to be a war strength infantry division. Second. The only corps troops in Blue Expeditionary Force is one war strength regiment of artillery antiaircraft.

Decision: War Department does not desire to give detailed composition of forces. It is suggested that you make assumption as to composition of your forces based upon units specified, consisting of one infantry division (less tank company and 155 mm howitzer regiment), one division of Marines and such additional Army and service units in corps troops as you may consider desirable. Total forces should not exceed 40,000. Medium caliber artillery should be eliminated as impracticable of being landed on the beach.

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