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# PERIMETER DEFENSE IN JUNGLE WARFARE

Submitted by;

GEORGE T. PITTS, JR.
Lt.Col., Cav.
Advance Class #1
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The campaign against the Japanese in World War II 1941-1945 was a war of special conditions. In the initial stages of the campaign of U.S. Forces in the South-West Pacific an unusual system of warfare was introduced. A system of seizing a beach-head on which an airfield could be constructed, setting up a cordon of defense around it and then proceeding with further development if the mission or situation so required. This system or technique later became known as "island hopping". A term coined by our imaginative and descriptive journalists and quickly adopted by Sunday morning strategists and military men alike.

Within this "island hopping" system of warfare crystallized a technique of perimeter defense necessitated by three major factors: the nature of terrain in these jungle islands, the superior ability of the Japanese to infiltrate by skillful use of this terrain, and the resultant employment of small units to neutralize the Japanese efforts to take away what ever we desired to contain within our defenses. This system of perimeter defense was not only used to protect air fields, service installations, port facilities and beach heads, but was also employed by marching troops, ranging from regiment or small detachments, such as patrols and distant security outposts, down to platoon and squad size, when halting for the night or a prolonged period of time.

In the discussion of perimeter defense methods in jungle warfare, I cite two early examples from this "island hopping" type of warfare, the "Northern Solomons Campaign", and the "Bougainville Campaign", as a basis

to consider the measures taken to combat the Japanese tactics of infiltration and night attack.[1] The "Guadalcanal Campaign" (as it was popularly called) involved an initial seizure of a beach-head and establishment of a defense around an airfield (Henderson Field) and ultimate seizure of Tulagi, Florida, Gavutu and Tanambogo islands to provide an advance base for further operations against Japan. This provided a forward naval fuel and repair base, an advance air base and a major forward supply, training and staging area base for the ground forces. In comparison, the "Bougainville Campaign" was a typical perimeter defense mission to construct and protect an advanced air-base from which the Air Force could extend its ranges to reduce the Japanese potential by raiding its shipping, gain air superiority by destruction or neutralization of Japanese advance air bases, and later support the movement of ground troops in landing operations further north. Thus, we have two comparative examples of perimeter defense: Guadalcanal, with an original beach-head perimeter from which was expanded the total seizure of the island; and, Bougainville, a perimeter defense to contain and protect an advance air base for a sustained period.

The troops of the Americal Division, organized and trained in New Caledonia, received their first combat experience on Guadalcanal[2] when the

1. See inclosure #1 for sketch of Solomon Islands with approximate air distances and inclosure #2 for sketch of general location of Solomon Islands in the Pacific Ocean.

2. See inclosure #3 for general sketch locations of troops on Guadalcanal 13 October - 24 November 1942. After Action Report - XIV Corps (Guadalcanal) 13 Oct - 24 Nov '42.

first elements of 164th Infantry Regiment landed on 13 October 1942 to reinforce the perimeter organized around Henderson Field by the Marines[3], and were later joined by the remainder of the Americal Division and other Army troops to clear the entire island of Japanese[4]. The troops immediately found that difficulty of movement, due to restrictions of jungle terrain, caused the majority of troops to become ineffective at darkness. Night operations, except in very small numbers and with specialized personnel were eliminated. This meant that each commander had to consider his night defensive line as a perimeter about his own unit. Basically, these perimeters were organized on the principle that there was no "front" in

3. Initially a beachhead was secured and a perimeter of defense organized by 9 August 1942 by the 1st and 2nd Battalions of the 1st Marine Regiment and the 5th Marine Regiment after practically an unopposed landing on 7 August 1942. Confident of easy victory, the Japanese initially landed with about 2200 men of the 28th Regiment of the 7th Division (Known as the Ichiki Detachment) and advanced against the perimeter to recapture Henderson Field (named after a marine aviator killed in action there) and continued to pour in reinforcements. Later, Naval Intelligence Reports estimated the Japanese troops and reinforcements in the campaign to have totaled approximately 32,000. (Historical Record #2, G-2 Section, Americal Division dtd 20 May 1943) Simultaneously landings were made on Gavutu, Tulagi and Tanamboga and were met by stubborn resistance that was wiped out by 1700 on 10 August 1942. From "Report on Guadalcanal Campaign" - Fort Riley Ka.

4. Sequence of arrival of Army Combat Troops on Guadalcanal 13 October 1942 - 9 January 1943. From Graphic Scenario of Operational Phases on Guadalcanal - XIV Corps (G-2) - AG Combat Records Washington,D.C.

Americal Division
164th Infantry (-) 13 October 1942
182nd Infantry (-3d Bn) - 12 November 1942
3d Bn. 182nd Infantry - 8 December 1942
132d Infantry - 8 December 1942

25th Division
27th Infantry - 4 January 1943
35th Infantry - 17 December 1942
161st Infantry - 30 December 1942

147 Infantry Regiment (-)
2d Bn - 8 February 1943
3d Bn - 29 November 1942

jungle warfare and that contact must always be considered imminent. Thus, units down to platoon size would organize much on the principle of the old Roman phalanx with all around defense and each subordinate unit within close mutual supporting distance of each other to prevent infiltration and avoid surprise. Because of the terrain and the type of warfare in which the ground had to be physically occupied or secured by means of observed fire, a commander was often forced to employ more of his command than that considered tactically sound by academic principles of defense. More often than not the bulk of a command was committed to the line of defense with small reserve, if any.

The troops learned quickly that strict fire discipline was paramount in a successful defense under these conditions. This was accomplished by establishing a system where by the men on the MLR were the only personnel allowed to fire and then only when they definitely had a target to shoot at. At first much ammunition was expended and many casualties resulted from uncontrolled and premature firing. This "trigger happy" attitude only disclosed positions, caused confusion and loss of control. Especially was this true when the machine guns and automatic weapons opened fire too soon. The Japanese put these automatic weapons out of action as early as possible by locating their position, infiltrating around them and pinching them off. In one night the Japs succeeded in putting most of the machine guns in one battalion sector out of action just because of premature, uncontrolled, unplanned and excessive firing and failure of

our troops to move to alternate positions at night[5]. As a result of these early experiences, measures for controlling fire discipline were established and the locations of machine guns and automatic weapons were concealed until a real attack was launched. Upon contact with the Japanese, grenades, rifles and mortars were used initially until it could be determined where the attack was coming from and whether it was actually an attack or a ruse.

Machine guns and all automatic weapons were emplaced on the MLR and sited for all around fire. In some cases, depending on concealment and cover available, domination of the position, location of the Jap and time, as many as three alternate positions were selected for automatic weapons in order to keep their location concealed. It was especially important to move into an alternate position after last light as the Japs regularly attack at night any automatic weapon position that had been located during daylight. These automatic weapons were sited with final protective fires almost perpendicular to the direction of expected attack, as usually the fields of fire to the front were very limited and this was the only way to get effective interlocking bands of fire. In this connection, it was found that, in heavy kunai grass, the penetration of several weapons were approximately as follows: Cal 30 MG - 30 yards; Cal 50 MG - 50 yards; and

5. Ltr Hq AGF Army War College Wash.D.C. 8 Dec 1944 - Subj. "Defense of a Beachhead" 319.1/6 (PTO) (R) GNGBI

37 MM Gun, using canister, - 40 yards.[6] Generally, machine guns and automatic rifles were placed low to cover most likely avenues of approach, but at times automatic rifles and even in some cases the light machine guns were placed in trees to obtain better fields of fire and observation, although these positions were easily disclosed to the Japanese upon firing. Later in the Bougainville Campaign and in other operations in the Philippines the 37th Division used the M-16 AAA mount and the 90 MM AAA guns on the line for the primary mission of direct observed fire against attacks.[7] These weapons proved invaluable in repelling the Japanese attacks against the perimeter in the 37th Division Sector on Bougainville. Every effort was made to place all available automatic weapons in the line to repel the Japanese mass attacks, known as the "Banzai Charge".

In relation to control and communications, the doctrine of not moving after dark obviously eliminated the practicability of commanders checking outposts, sentries and general alertness of their command by personnal inspection. This placed a great responsibility upon each individual member of a unit for rigorously carrying out what ever task assigned him in the system of this defense. Commanders took every precaution of developing their defense so that their men were always in contact with one

6. See extract Tng. Memo #9 Hq 41st Inf Div.

7. Related by Major Roderick MacEachen - Formerly of Rcn Troop of 37th Inf. Div.

another and if possible organized their defense so that approximately 2/3's of the command could rest during the night. In organizing their defensive perimeters on Guadalcanal, the 164th Infantry Regiment of the Americal Division used three-man fox holes, with about ten yards between holes. This kept the men in easy contact with each other and produced a team capable of operating alone for short periods. In this connection, troops new to jungle combat performed better if kept together during their initial phase of combat. The ominous, murky appearance of the jungle, the strange noises of jungle life, the feeling of solitary isolation, and expectant silence, in addition to the usual combat jitters, caused a psychological strain on the individual that made him nervous, panicy and "trigger happy". Of course, the longer troops were in combat the greater the number of variations in individual fox holes. Some units preferred to have their men so arranged that three or four-man teams were dug in sufficiently close together so that they could reach over and touch the man next to them and thus alternately stand watch, usually by sitting up. The teams would string wire between their positions and signal back and forth by tugs on the wire at each change of guard or alert. This was especially popular when small detachments or patrols were operating alone. Another system used by small detachments was to construct three to six slit trenches which radiated from each other like the spokes of a wheel. So constructed, the members of the patrol or detachment could lie prone with their feet towards the center and heads outward providing all around security and close communication by touch contact. After placing the men

in close proximity to each other and providing them a means of communication, the success of the system depended entirely upon each individual. In spite of good intentions on the part of the men, fatigue caused many individuals to fall asleep on post. Many of the men found this could be avoided if they propped up their rifle, or a helmet in the case of machine gunners, in such a manner that it fell on the owner should he relax and go to sleep[8]. This dependablilty on the individual of course comes only with thorough training, superior discipline of troops and experience in combat.

Because of the impractibility and tactical unsoundness of maintaining continuous line defense of units alerted 100%, security of the perimeter defense consisted of a warning system composed of various devices, from a simple arrangement of a hand grenade strung between two trees to an elaborate system of wire entanglements, illumination devices, infra-red scopes, personnel mines, trip wires and various alarm devices. After their initial experiences in jungle combat, and under tutelage of the Marines, who had also learned by experience, Army troops ceased to use outposts, listening posts, and cossack posts in front of the defensive line after the hours of darkness, since isolated groups were usually cut-off and annihilated at night and provided no advance warning that could not have been detected at the MLR organized with an adequate warning system. In place of an outpost system, a system of booby traps and other warning

8. Told by Major Willard O. Foster - Former Ass't G-3 Americal Division on Guadalcanal.

devices was organized to cover all possible means of approach to the position. Usually a platoon would string a few hand grenades and stake out a few thermite grenades to illuminate critical areas when the Jap or suspected Jap approached. The larger the unit and the longer the time of defense the more elaborate become this warning system. Wire, barrels of fuel oil, or other illumination munitions to be ignited on alert, use of artificial moon-light, mine fields, and prepared charges were added to warning systems as time permitted. These type warning systems were almost invariably dependable, if mechancially correct, and saved man power, gave the individuals of the command concerned a feeling of security in that they could not be surprised even behind enemy lines, and avoided unnecessary disclosure of positions by promiscious firing and movement caused by error of human judgement and panic when confused by darkness, noises of jungle life and Japanese ruses[9].

Marching units when making halt for the night found that sufficient time prior to last light had to be allowed to organize an area for a secure defense. These preparatory items were: reconnaissance of bivouac area and assignment of sectors for all around defense: movement of troops into assigned sectors; clearing of limited fields of fire for automatic weapons; preparation of hasty all around defense; and preparation and consumption of a meal. In order to efficiently utilize personnel during this

9. In effort to draw fire the Japanese would send small detachments out to simulate firing of weapons by use of fire crackers, beat on messkits, make noises by beating bambo sticks together, yell insults to the defending troops and even fire weapons and expose themselves. See Int Memo "Methods and Ruses in Borneo" Hq 38th Inf - 20 Nov '44.

organization, one third prepared their food while another third prepared positions and the remaining third was on security. Thus the perimeter defense was organized rotating details within squads as tasks were completed. It was found that a battalion required approximately three hours to make these arrangements. Accordingly the halt for the night would have to come at about three hours before last light. During the night one third of the command remained awake, requiring the platoon leaders, sergeants and platoon guides to be awake and alert for about four hours, each in turn. Each squad rotated its own members on a one third alert basis. It took approximately one hour of daylight to move a unit of battalion size in the morning with a total allowance of approximately two hours from time of alert to time of movement. However, more time was required if precautions to eradicate evidences of the units use of the bivouac area were necessary.[10]

In an analysis of these initial experiences in organization of perimeter defenses the principles were simple: prepare your positions with all around defense out of observation of the enemy by use of a screening force or smoke or natural concealment and cover; prepare alternate key positions in order that positions occupied in daylight differ from those occupied at night; at night dig in and stay in your holes except for

10. See Marine Corps Gazette, July 1944 - "Jungle Combat" and Observer's Report - G-3 Tng Sec Gen Hq SW Pacific Area - 1st Marine Division - Guadalcanal - 7 Aug--1Dec '42. Sect 5 par W USA.226 (09a-23) The Armored School Ft Knox Ky.

designated strong points on the MLR, where only these personnel are allowed movement without direction from the commander concerned; maintain strict fire discipline; patrol aggressively, and move putposts and ambushes well forward during daylight hours and withdraw outposts at night; provide a warning system in front of the perimeter; employ a simple but complete communication system; and, if possible, have fire support perpendicular to the direction of movement or attack.

On Bougainville the defense was for a long sustained period and the establishment of the perimeter was elaborate and defenses organized for almost vertual permanent occuppancy. This operation required only maintenance of a perimeter and no complete annihilation of the Japanese troops was necessary, as their isolation alone made them ineffective strategic troops. The perimeter was organized with two divisions (37th and Americal Divisions) dividing the perimeter into two sectors under the command of XIV Corps[11], with supporting Corps Artillery, AAA, and service troops. All three regiments of both Divisions were employed in the defense line with the 754th Tank Battalion as a mobile counter-attacking force under Corps control.

In general, the regiments each had about a 4000 yard frontage. In the 182d Infantry Regiment (Americal Division) the battalions were employed with two battalions on the line, each with three companies in the line. The reserve battalion was held out for counter-attack to restore a

11. See inclosure #4 for sketch of general organization of the perimeter defense on Bougainville.

penetration or occupy the strong regimental reserve line, as conditions demanded. The battalions in the line also had the machine gun platoons and anti-tank platoons of the battalion actually in the line, together with an additional antitank platoon from the antitank company in order to provide emplacements sufficiently close to-gether and with sufficient fire-power to prevent infiltration at night. In addition, two automatic rifles per squad were used and additional machine guns were issued so that each front line battalion had forty-two (42) of them on the line. This was generally the organization of positions within regiments in the remainder of the perimeter.[12]

There were few support positions since the conventional number of these would have thinned out the front line of the perimeter. Great reliability was placed on the direct support light artillery (one battalion per regiment), the general support artillery and the support of the regimental heavy weapons. The artillery was held under central control.

Three conditions of readiness were maintained, depending on tactical situation and probability of attack. These were:

Condition 1 - Everyone awake and at battle stations.

Condition 2 - 50% of the front line alert and corresponding readiness in rear elements.

Condition 3 - 1/3 of front line personnel at battle stations and corresponding readiness in rear.

Condition 3 was normally maintained at night. During critical times

12. As reported by Col William D Long - Former CO of 182d Inf Regt - Americal Division. Also see After Action Report - XIV Corps (Bougainville) 7 Jan - 30 June 44, 8-18 March 1944 - AG Combat Records - Wash D C and Report of 37th Div (Bougainville) USA 507 (09al) The Armored School, Ft Knox Ky

Condition 1 was in effect for 2 hours at dusk and 2 hours in the morning (including dawn period) or whenever an attack was imminent.

The front line was well dug in with both protective and tactical wire, with specially cleared fields of fire, coordinated fire plans, and an elaborate communications system (preferably wire)[13]. Emplacements were organized close to-gether because of the difficulty, not of covering intervals with fire, but of knowing when to fire, - particularly against night infiltration. These emplacements were constructed to accomodate two or three men and their positions selected to cover not only the assigned sector of fire but also permit fire to the flanks and rear. Most emplacements had, on one or both sides, a bay from which grenades could be thrown. Fire slits were provided on at least three sides with slits conforming to slope of ground and sand bags were provided for blocking slits. For communications between emplacements telephone was used when available and for emplacements in close proximity to each other, artillery shell cardboard containers were laid end to end between the two emplacements and buried, thus providing a speaking tube between the two groups. In other cases, merely a strand of wire was strung between positions and signals exchanged by use of a prearranged system of tugs on the wire. Radio was generally a secondary means of communication due to

13. For additional information see "Preparation of Defensive Positions" - Tng Memo. Hq 38th Inf.; "Notes on Defense" - Int Memo #4 - Hq 38th Inf and Report of 37th Div (Bougainville) Part D USA 507 (09-91) The Armored School Ft Knox Ky.

difficulty of maintenance and ineffecient operation in the jungle. With these combinations of communication the perimeter was tied in laterally and from front to rear providing a simple but multiply communications system. As the positions were developed, lateral and front to rear communication trenches were constructed and bunkers with living quarters in rear of the emplacements were added. It was found necessary to have covered communication trenches as the Japanese would use open trenches to their own advantage in attacks. Chicken wire screen was nailed over slits and provided for entrances to ward off grenades. Great care was taken to utilize the natural jungle cover to conceal the entire line. Thus, each position could be stubbornly held by use of fire-power, bayonet and grenades, should the Jap succeed in closing in on a position. At one instance where the Japs succeeded in over-running an emplacement, an adjacent pill-box, alerted by the crew in this emplacement, annihilated them by firing on the emplacement from its flank port. These pill boxes and emplacements were numbered and charts distributed to each, showing location and distribution of emplacements in the sector concerned. These were used in conjunction with planned night fires wherein the fires were limited by sector. In the 37th Division sector it was calculated that 50% of Japanese killed in the Coi Creek area were killed at night by use of planned fires.[14]

Fields of fire were cut 50-75 yards in width to 10-15 yards beyond the tactical wire, which was in view of the defensive line, in order that men on

14. Also see 37th Div Report - Bougainville Compaign - Part D USA 507 (09-al) TAS 14 Jul '44 - The Armored School Fort Knox Ky.

the line could see or hear Jap cutting parties. Within this cleared belt extending beyond the protective wire all vegetation was cut that obstructed the sight of the defenders. Logs, debris, trees and other vegetation removed was hauled off to fill depressions. Some brush and tree branches were left forward of the tactical and protective wire to make noiseless travel over this ground difficult. The second belt, extending from the defensive diggings to the protective wire, and of grenade range width, was carefully cut by selective cutting, by removing foliage only where necessary for the defending firer to see. Clearing of fields of fire requires planning and careful instruction of clearing personnel. Particular care must be taken lest they expose the defender as well as the attacker by too much clearing on the defensive position where natural vegetation should be retained as camoflage. The fields of fire should serve the following purposes: expose attacker to view; conceal defender; permit defender to grenade attacker when he is delayed at obstacles; retain vegetation on the defensive position to make it difficult for the attacker's grenades to reach the defender; and make silent crossing of the fire lanes difficult. Behind the MLR only undergrowth and low vines were cut to facilitate movement but retain concealment of the natural vegetation.

Tactical wire, it was found, should be laid out to give flanking fire diagonally across the defensive front with the forward ends of wire bands in the open so that enemy wire cutters may be seen and eliminated. Protective wire should be just beyond the effective grenade range of the defender's emplacements in order to catch the advancing attacker at the wire obstacle

with the best night weapon, - the hand grenade. Ample use of "tangle-foot" wire loosely coiled inside the wire bands of both the protective and tactical wire further hindered the attackers movement and gave away his presence and position when endeavoring to breach or cross it.[15]

In addition to warning of the Japanese approach to the perimeter by wire, sentries and listening posts, sound and light devices were used to further secure the system of defense, especially during hours of darkness, rainstorms and conditions when poor visibility existed because of fog and haze. Sound devices consisted of any arrangement that would attract attention of sentries. A popular improvisation was to hang on the protective wire an empty tin can, with a hole punched in the bottom to drain water, containing several small pebbles. Simpler still, was two rifle clips wired to-gether and looped over a strand of wire so that the pieces of metal hung to-gether and tingled when disturbed. These improvisations were not too satisfactory when wind blew as they would tinkle with each gust of wind. Nor were such devices loud enough to be heard during a rain storm, fire fight or mortar fire. Therefore, the warning system was further supplemented by use of hand grenades or charges of TNT arranged on a trip wire system to detonate when disturbed by movement around or through the tactical or protective

15. In the attack, a Japanese method of crossing wire was to throw themselves prone on the wire and allow others to pass over them. Or, if available, their dead were piled on the wire and used as a ramp to cross wire. This was attempted in the "battle of the Teneru" on Guadalcanal. When the Japs made a landing against the perimeter in vicinity of the Ilu River which was incorrectly called the Teneru by our troops. The Teneru was the next river south. For descriptive detail see book "Guadalcanal Diary".

wire. These explosive warning devices were satisfactory under most conditions, but the location of the detonation could not always be easily located, especially while being fired on by Japanese mortars or engaged in a fire fight. To rectify this condition, the warning system was still further added to by use of illuminating devices. This illumination was used for two purposes. One, to alert the sentries and locate the disturbance, and two, to illuminate the target, if any, for definate identification and give light for firing on the target detected by the first illumination. Two types of illumination were used in combination to achieve the desired effect. The first was a short burning illuminating munition set-off by the approaching Japs. It was also wired so it could be pulled by the sentry if necessary. The second type, was a long burning illuminating munition that would burn for ten minutes or more. This secondary device was usually set off by a pull-wire laid back to the sentries and controlled by squad or platoon leaders. This system provided an initial alert with sufficient illumination to determine the target, if any, and a secondary illumination for firing on and repulsing an attack. Short burning illuminators were improvised by use of an incendiary or WP grenade secured to the ground or a tree in the field of fire, and a trip-wire set to be sprung by the Jap or a pull-wire to be released by the sentries. A simple improvisation for a long burning illuminator was to fill a No. 10 can half full of sand soaked in gasoline and attach to it a thermite grenade to be set-off by a pull-wire from the defensive position. Sometimes just a gallon can of gasoline was used, but this was hazardous and ineffective if

the gas spilled or can broke setting fire to dry vegetation or illuminating too large an area, thus disclosing and blinding the defenders. The length of time this improvised illuminator would burn was controlled by the amount of gasoline used and the area exposed to burning. Burning times could be determined by trial and error only. In the use of these illuminators particular care was taken to avoid illumination of the defenders. This was accomplished by placing the illuminators well forward and backed by a mound of dirt, a log, or a tree so that the approaching Jap would be silhouetted in the fields of fires. On installation and maintenance of these illuminating munitions care must be taken to shield them from rain to avoid ignition failures. Some units used an Air Force illuminating flare hung in a tree and tripped from the ground by a wire. This provided good illumination but was not replaceable during any one continuous action. However, this was generally true of all preset illuminators, and onee the devices had been exhausted during a continuous action the troops depended on mortar and artillery flares and AAA searchlights for further illumination.

Another type of illumination used was that of "artificial moonlight" by use of searchlights. This means of illumination was used only in case of a general attack or large raid by the Japs or when our troops were attacking. Use of this type of night lighting required close liaison and planning in order to avoid blinding the defenders, by illumination of the perimeter. The changing altitudes of the cloud layers caused difficulty in adjusting this illumination so that only the attacking Japs would be illuminated. Initially the lights would be set at the last known cloud

level and then adjusted to the proper illumination. This of course, reduced the element of surprise and gave the Jap time to take cover if the first adjustment was incorrect. This method of illumination was controlled by headquarters of battalion or higher and required dependable rapid means of communication from control headquarters to the searchlights to provide timely availability in emergency. The most satisfactory communications in this case, was wire. Usually a liaison officer was provided to arrange for and adjust illumination. In most cases this was a preplanned arrangement and could not be called for easily and with the same accurate speedy results as an artillery request. Three types of illumination were provided: direct; low clouds; and tree top. The low cloud type was best, giving an illumination of 35 x 100 feet per light on low clouds.[16] In addition to these other types of illumination, of course the illuminating flares fired by mortars and artillery were invaluable for night security of a perimeter defense. However, these were generally used only in a general attack or prior to the time the front line units were able to organize their own illuminating devices. In this connection, the 60 mm Mortar illuminating flares were excellent as they provided a 25 second 10,000 candle power illumination.[16]

In this type of operation with a sustained defense of a perimeter, it was found that conditions peculiar to jungle warfare required a

16. Report of 37th Div (Bougainville) Part D - USA 507 (09-a1) The Armored School Fort Knox Ky.

combination of arms to provide a mobile unit for counter-attacks against penetrations of the perimeter and reduction of strong points and areas of resistance. The answer to this requirement was to organize and train Infantry-Tank-Engineer Teams[17]. Each regiment had opportunity to train their platoons and companies with tanks from the 754th Tank Battalion (light tanks, M-3) retained under control of XIV Corps. Thus, when the situation demanded, tanks were assigned to the regiments as required and the Infantry-Engineer-Tank Teams were made up from the regiment to which tanks were assigned and organized in a predesignated attack position. The basic unit comprised of one platoon of tanks, and one platoon of Infantry with Engineer specialists (demolition and mine removal specialists) attached. This team was organized into three echelons: first, an assault wave of three tanks; next, a support echelon of two tanks each followed closely by an Infantry squad with attached Engineers; and last, the platoon reserve with one reserve tank and remaining Infantry. Of course the position of the Infantry and tanks changed depending on the situation. Many times, because of restricted terrain and heavy jungle growth, only one tank with an infantry squad could operate against a given objective. However, with this basic team as a unit, suitable company and battalion formations could be built up with variations in the combination of tanks and Infantry to cope with the particular situation at hand. To control these tank-infantry teams many means of communication, immediately available to the troops in

17. "The Tank - Infantry - Engineer Team In Jungle Operations" - Tng Memo - XIV Corps - Bougainville.

this area, were tried and the one that worked best was the EE8A telephone. An EE8A telephone was strapped to the inside of the tank turret and also in the turret, at a place conspicuous to the tank commander, was strapped a regulation flashlight, the circuit of which was wired into the EE8A telephone. A twenty (20) foot length of four (4) strand electric cable was tied into the telephone and an EE8A telephone hand set was attached to the end cable. The butterfly hand switch on the hand set completed the circuit through one channel of the cable, when pressed, and caused the flashlight to attract the attention of the tank commander. With this arrangement, the squad leader had only to carry the hand set and communicate with the tank commander at will. The Infantry platoon leader communicated with his squads with the SCR 536 radio and runners, but had no satisfactory means of direct communication with his component tank platoon leader. The Infantry and Tank company commanders established communication with the SCR 510 radio with the Infantry to the SCR 508 radio in the tanks. The Engineer officer or Non-Commissioned officer was equipped with an SCR 593 radio (receiver) to keep abreast of the situation and communicated with the company command post (Infantry or Tank) by runner. As the Tanks were almost blind when buttoned-up, the designation of targets to the tank commanders by the Infantry leaders was of prime consideration in making these teams effective. Tracer fire and pointing proved entirely unsatisfactory and directions over the Tank-Infantry telephone using the clock system designation served to get the direction of target but failed to pin-point hidden and well camoflaged targets. The only entirely successful method of target

designation was by use of colored smoke grenades, with red and violet being the most easily distinguished colors. A full charge grenade produced too much smoke and obscured the target. To avoid this, half the charge was removed from the grenades by unscrewing the fuze and thus an adequate amount of smoke was produced to mark the target without obscuring it. For longer ranges, rifle projected grenades were used. With this method, best results were obtained by arming the rifle grenade before firing, - thus producing a trail of smoke to the target.

In order to permit concentration of artillery fire in the heavy jungle growth, the artillery of the division was held under central control of division with one light battalion normally in direct support of each Infantry regiment in action. Request for artillery normally was made through forward observers. In this connection, any one who had a target could call for artillery fire and make adjustment for effect, as all personnel were trained in artillery fire adjustment. Sometimes this adjustment, because of heavy jungle growth and rugged terrain, was made using smoke shell or sound sensings. Corps had one 155 Gun Battalion in general support, and all artillery was so organized that every artillery piece in the perimeter could fire a full 360 degree traverse to place concentrations anywhere outside the perimeter.

To continuously maintain security of the perimeter, security patrols were sent out daily to determine presence or activity of Japanese, take prisoners, prevent Jap patrols from observing the perimeter and provide warning for approach of large Japanese attack forces. These patrols were

limited to a distance of 3000 to 4000 yards from the MLR.[18] The purpose of this fixed limitation made coordination with supporting artillery and air easier. The supporting elements were informed of this daily limited security patrol schedule for a definate period of time and thus supporting elements knew the location of forward elements of their supported units with no necessity for a daily complicated coordination. Special operations and distant reconnaissance patrols were coordinated with the supporting units as the conditions occurred. These security patrols were dispatched daily in each battalion sector thus providing a screen in front of the perimeter during daylight hours.

Distant reconnaissance was also continuous in an effort to gain information of the Japanese dispositions, actions and intentions. Most frequently these patrols moved out with the primary mission of obtaining information without fighting for it, if possible, but were so organized as to be able to protect themselves in case of ambush or surprise attack. Usually this type of reconnaissance patrol was about a squad in strength reinforced with additional automatic weapons such as an extra automatic rifle or a stripped down light machine gun modified to be fired from the hip or employed the same manner as an automatic rifle. These small patrols could successfully operate for a period of 3 to 7 days under stress. Under such conditions the "K" ration was the most efficient ration to sustain the men for this period because of its compactness, high nutritive value

18. Report of 37th Div (Bougainville) - Part D - USA 507 (09-al) The Armored School Fort Knox Ky.

and ease of preparation. It was found that when personnel were required to operate in this manner care must be taken to insure an adequate rest period be allowed the men to most quickly recuperate and regain their stamina for future employment. On Guadalcanal, patrol-wise personnel of Marine units were well cared for. One battalion commander made a practice of issuing a two-ounce bottle of brandy to each patrol member on their return. This alcohol relaxed the men from their nervous tension, made interrogation easier, and reports more coherent, in addition to aiding their digestion and inducing much needed sleep.

Combat patrols were effectively employed to destroy Japanese road blocks, observation posts, and ambush patrols. Depending on the mission, these patrols varied from the size of a platoon to sometimes a company (minus) in strength. Emphasis was placed on use of automatic weapons such as the automatic rifle, and the light machine gun (modified). The 60 mm mortar was also a favorite when the distances involved were not beyond a day's travel time round trip. When used for this purpose the mortar was used without the base plate, thus lightning the load and making more backs available for carrying ammunition.

Combat outposts were organized about 300-400 yards in front of the MLR to guard critical key terrain features and approaches to the MLR.[19] These outposts were for warning only and withdrew on contact after warning the MLR, and determing the strength, composition and location of the

19. Report of 37th Div (Bougainville) - Part D - USA 507 (09-al) The Armored School Fort Knox Ky.

Japanese threat. Usually these outposts consisted of about three squads to provide sufficient personnel to protect themselves. Care had to be taken to avoid routine methods in establishing these outposts and not be surprised by an ambush en route to and from outposts or be surprised in the outpost position by lack of reconnaissance around the vicinity of the outpost. To avoid this, care was taken to use alternate routes and alternate outpost positions, if possible, and refrain from a set time schedule of reliefs, and establishment of the outposts. Small detached outposts of this type were withdrawn at darkness as they become almost useless at darkness because of their limited visibility and hearing and provided a vunerable target for the Japanese to cut off and annihilate. However, in some instances when a critical terrain feature controlling a trail, road, or appreach was considered important to the security of the MLR an outpost detachment of platoon size would remain there at all times with a mission of warning the MLR of Japanese approach and holding that position until more forces could be employed against the threat or until relieved. This was true in front of the 182d Infantry position on Bougainville where a platoon outposted a dominating hill mass about 300 yards in front of the MLR just about in the center of the regimental sector.[20] By so placing this platoon the regimental commander prevented a Japanese attack of battalion strength from reaching the MLR. The Japanese attack force pushed the platoon off the top of the hill, but it in turn was pushed off by employing the regimental

20. Recounted by Col. William D. Long former Commander of 182d Infantry Regiment, Americal Division on Bougainville.

reserve battalion as a result of early warning and delay affected by this platoon outpost.

Supplies were kept well forward for immediate availability in large quantities. Forward dumps composed of such items as grenades, rocket lauchers and rockets, flame thrower equipment and refills, engineer tools, barbed wire, mortar, rifle and machine gun ammunition, demolition equipment and sand bags were established directly behind the battalions. To further facilitate rapid movement of these supplies, carrying parties were organized to move the items to the fighting man by utilizing natives and rear echelon or service personnel and thus not reducing the strength of the combat troops by requiring them to carry resupply items to the MLR. However, this service was unusual and not typical.

To epitomize the experiences of the troops in the Guadalcanal and Bouganville Campaigns the organization of a perimeter defense in jungle warfare is dependent in itself upon many conditions. Some of these conditions to be considered are: the closeness of contact with the enemy, the type terrain in which the action had taken place, the unit mission, supporting troops and supply status, and combat efficiency. To be applied to these factors, are the simple basic principles of tactical defense. Chronologically the establishment of a perimeter defense may be summed up briefly as follows. Reconnoiter for the most dominating terrain suitable to the defense of your particular unit with consideration given to your mission, size, combat efficiency and the enemy. Prepare your positions with all around defense with a preponderance of automatic weapons as your

back bone of defense. Fill in between your automatic weapons to provide a continuous line of defense. Prepare alternate key positions. At night dig in and stay in, except for designated security personnel who have the only freedom of action and movement in the perimeter without direction from the commander concerned. Maintain strict fire discipline. Organize fires perpendicular to the direction of movement or attack. Arrange for your command to get sufficient rest by distribution of tasks and economy of alert security personnel employed. Insure that you have an adequate and simple communication system to control your unit. Make provision for a warning system in front of the perimeter. Patrol continuously and aggressively during the daylight hours. Move outposts and ambushes well forward during daylight and withdraw them at night. Utilize supporting fires to the maximum. Deny the enemy observation and reconnaissance of your perimeter by use of screening forces, smoke and natural concealment and cover. Keep adequate supplies well forward for immediate availability.

Throughout this discussion of perimeter defense measures in jungle warfare great stress has been placed on the importance of remaining in place during the hours of darkness to best secure the perimeter to be defended. This required fire discipline, control and the minimum of movement by only personnel so designated by the commander concerned. This "dig in and stay in" method at night met with some opposition in the Mariannas (Guam, Saipan, Tinian) operation in that observers reported that habitual passing of the initiative to the Japanese at night should be discontinued and use of aggressive patrols and outposts during the hours of

darkness coordinated with perimeter defenses should be practiced.[21] Granted, as the terrain becomes more open, as was true on Guam, Saipan and Tinian, to some extent, outposts may be pushed out and left out during the night in addition to occassional night patrols. However, I believe any efforts to move around at night in order to chase down an undetermined and unlocated enemy, as is usually the case in "island hopping", cause more loss and damage to our own Forces than would be inflicted by the Japanese in a night attack against an organized perimeter defense with our own troops remaining in place. Coordination and control of troop movements during the hours of darkness is in itself a difficult task to accomplish. The restrictions of the jungle terrain and vegetation further add to the complexities of movement at night and present an unsurmountable problem of control. Because movement at night accomplishes very little for all the effort expended to accomplish it, I recommend that during the hours of darkness troops remain in their respective perimeters of defense. Movement of patrols and other troops during the night should be only of dire necessity in maintenance of a perimeter defense in jungle warfare.

In conclusion, this treatise is limited in its aspect of considering only perimeter defense in jungle warfare and by no means is it intended to imply that jungle warfare is entirely defensive. The tactical situations in the examples cited embodied a combination of actions. On Guadalcanal

21. Extract from Regiment Reports on Forager Operation Hq. AGF (G-2) 5 October 1944.

there was the static defense of the airfield areas and the active and static defense of the western extension of this perimeter to protect offensive supply lines necessitated by offensive actions to drive the Jap from the dominating terrain that observed almost the entire area occupied by the American forces. On Bougainville, the mission was to establish and secure an advance air base. This required a sustained defense of the airfield areas entailing a prolonged stationery perimeter defense that denied the Japanese access to this area. Perimeter defense against the Japanese may be likened basically to the white man's defense against the Indians in their immigration west during the expansion of our country in the 1800's. Maintain a continuous reconnaissance, organize the defense in a close self-contained unit, have a coordinated fire plan, maintain fire discipline, conserve personnel, and implement a simple but adequate communication system for control. The principles for the organization of a perimeter defense in jungle warfare specifically follow those of our defensive doctrine for the organization of a battle position. Defense in the jungle is peculiar only in that these principles must be applied with consideration of the limitations imposed by the extremely restricted terrain and employment of small unit tactics necessitated by these terrain conditions.

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## ACKNOWLEGEMENTS

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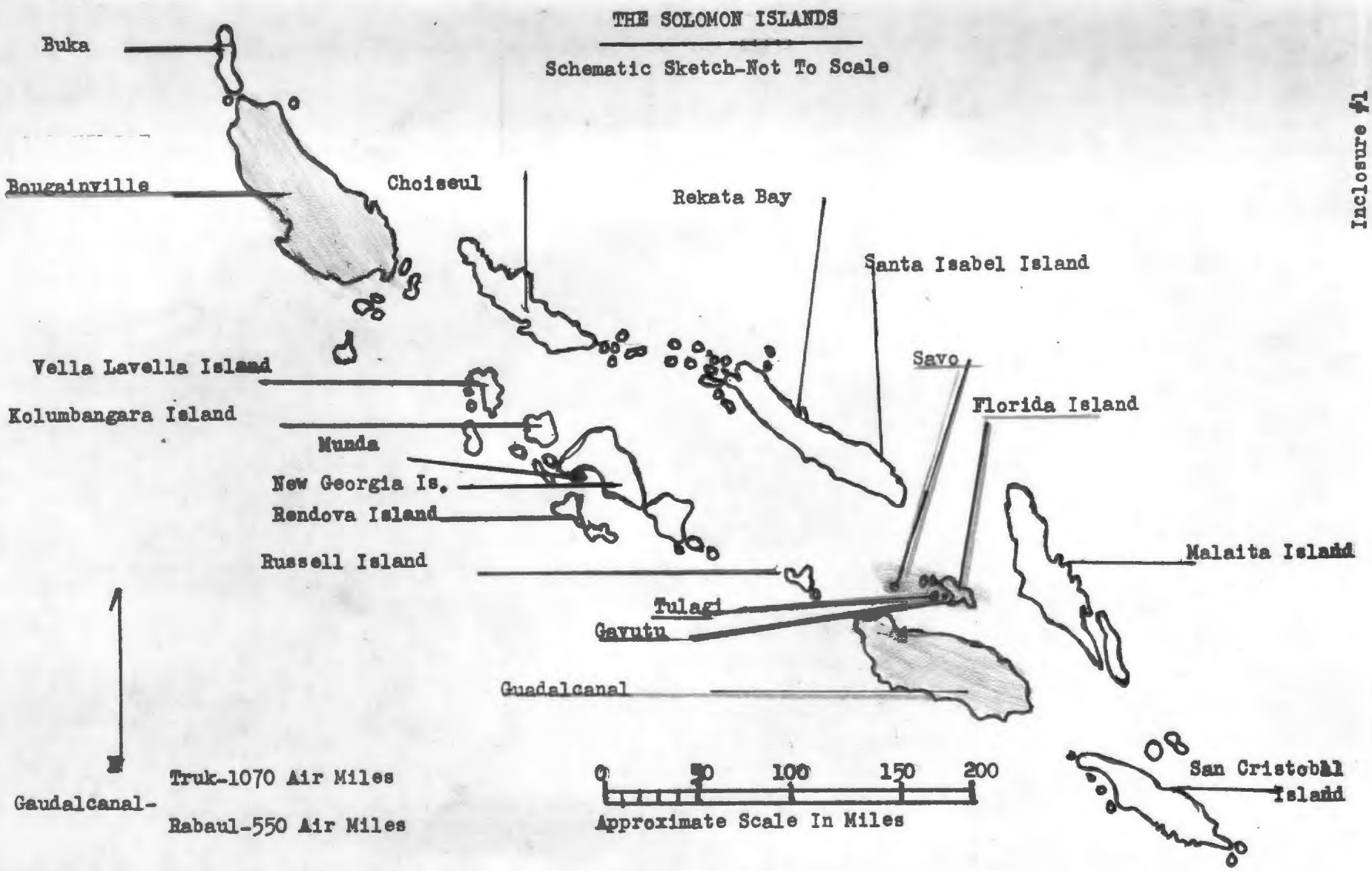
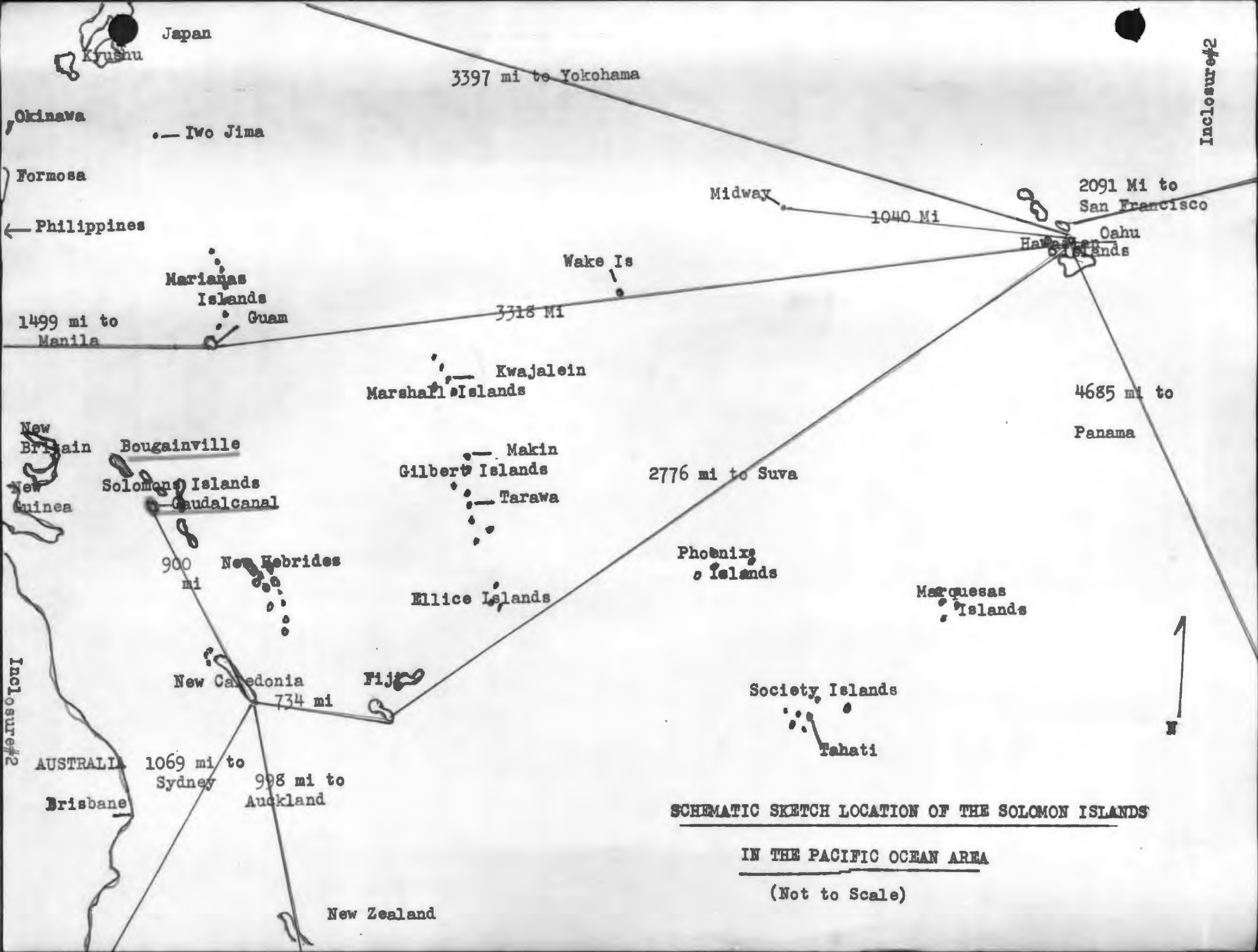
Major Roderick MacEachen - Former Platoon leader and Commander of Reconnaissance Troop and a Special Task Force Commander of the 37th Infantry Division on Bougainville and in the Philippines.


THE SOLOMON ISLANDS
Schematic Sketch-Not To Scale
Inclosure #1
Buka
Bougainville
Choiseul
Rekata Bay
Santa Isabel Island
Savo
Florida Island
Vella Lavella Island
Kolumbangara Island
Munda
New Georgia Is.
Rendova Island
Russell Island
Malaita Island
Tulagi
Gavutu
Guadalcanal
San Cristobal Island
Truk-1070 Air Miles
Gaudalcanal-
Rabaul-550 Air Miles
0
50
100
150
200
Approximate Scale In Miles
Inclosure #1




Inclosure#2

Inclosure#2

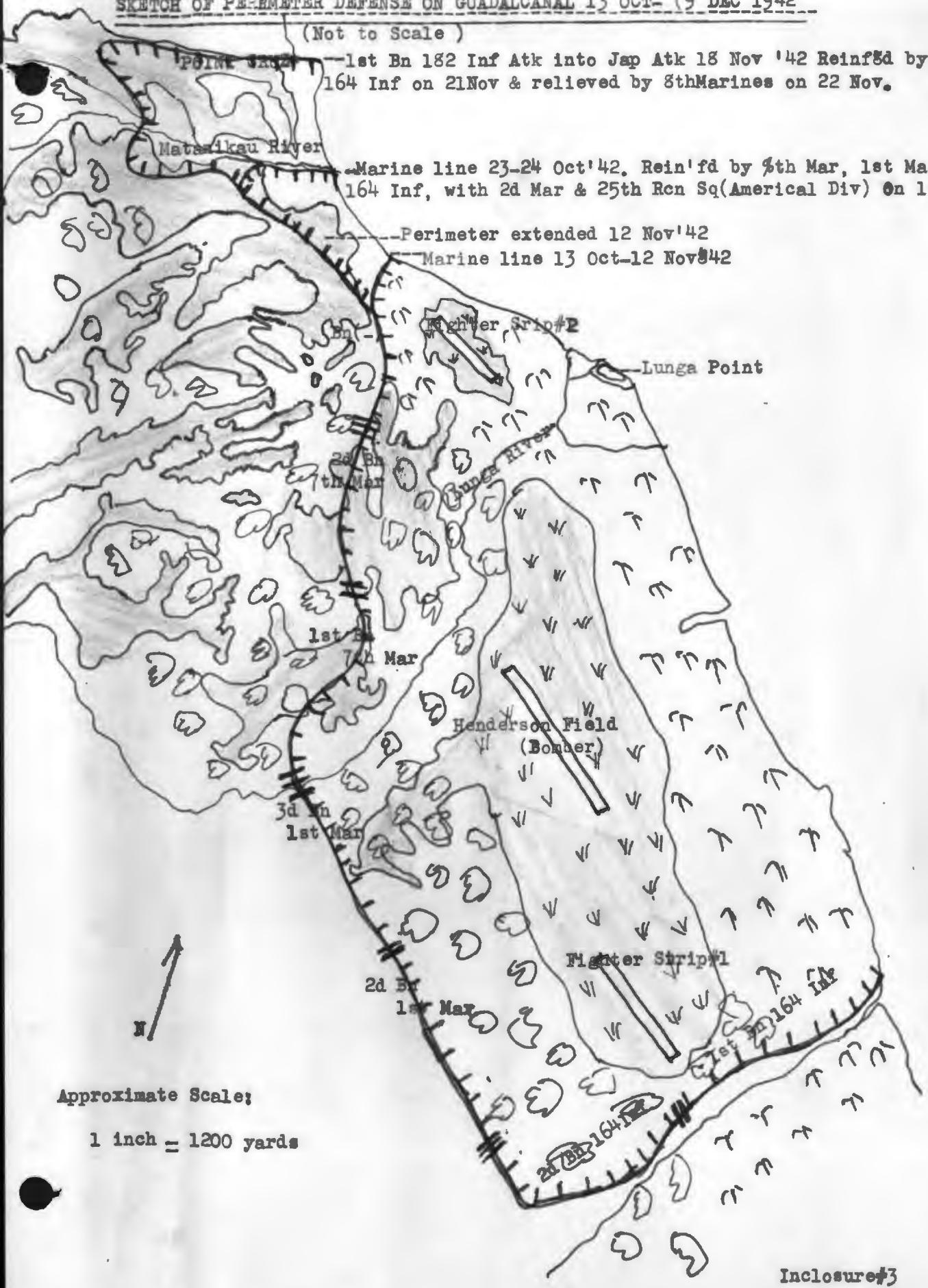
SCHEMATIC SKETCH LOCATION OF THE SOLOMON ISLANDS

IN THE PACIFIC OCEAN AREA

(Not to Scale)

SKETCH OF PERIMETER DEFENSE ON GUADALCANAL 13 OCT- (9 DEC 1942

(Not to Scale )




---1st Bn 182 Inf Atk into Jap Atk 18 Nov '42 Reinf'd by 3d Bn 164 Inf on 21Nov & relieved by 8thMarines on 22 Nov.

---Marine line 23-24 Oct'42. Rein'fd by 7th Mar, 1st Mar &1st Bn 164 Inf, with 2d Mar & 25th Rcn Sq(Americal Div) on left flank.

-------Perimeter extended 12 Nov'42

---Marine line 13 Oct-12 Nov'42

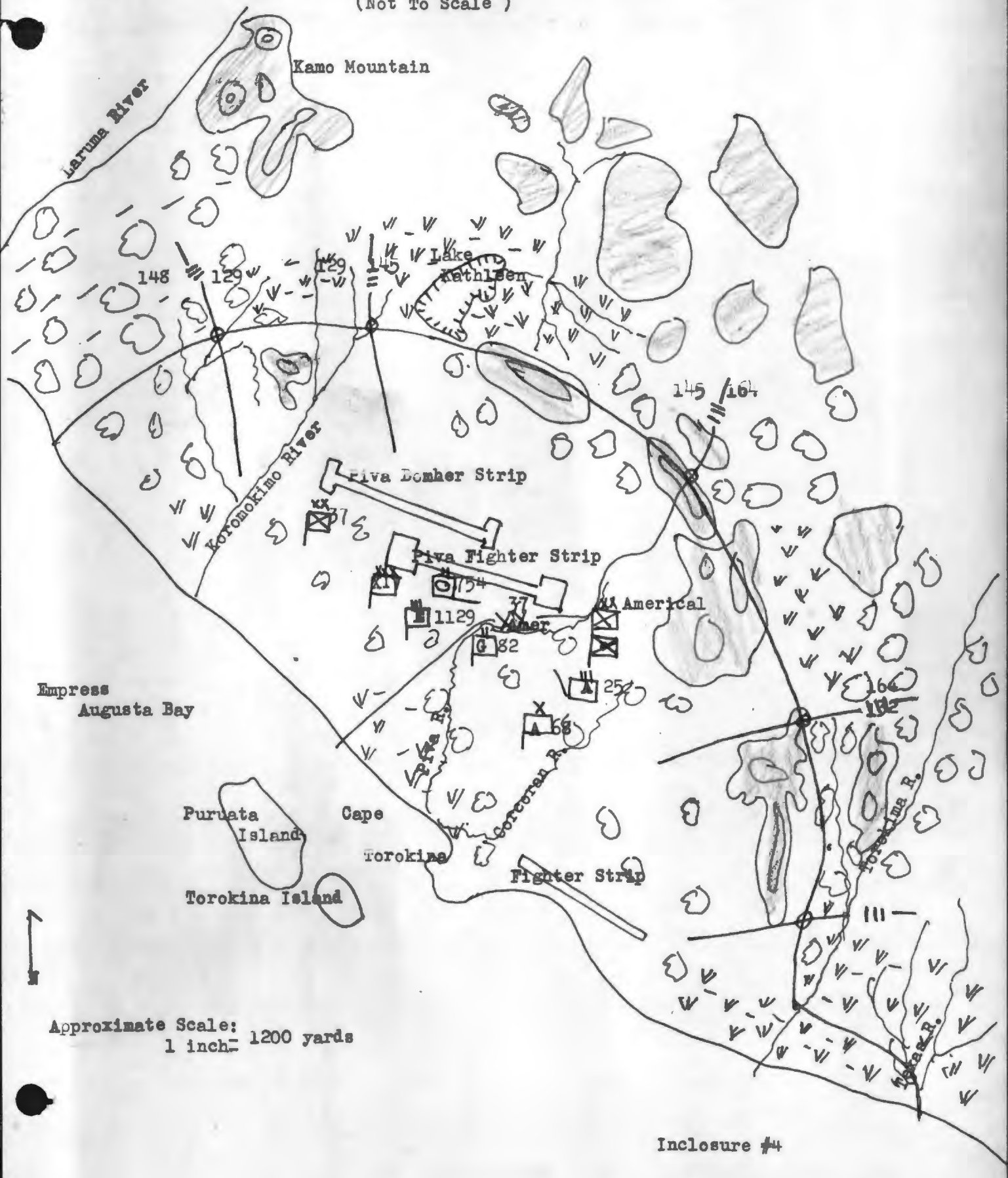
Approximate Scale:

1 inch = 1200 yards

Inclosure#3

Schematic Sketch Of The Perimeter Defense On Bougainville-31 Oct '43

(Not To Scale )




Inclosure #4

Commander's Conference On Guadalcanal-- January 1943
Former Maj. Gen. A.M. Patch- Commander XIV Corps
Admiral Nimitz- Commander of The Pacific Fleet
Former Secretary of Navy Knox

Bridge Constructed Across The Matanikau River In The Extension Of The Perimeter For The Ultimate Mop-Up Of Gaudacanal

Inclosure # 5




Photostat Copies Of Photographs Of Three Japanese Commanders On Guadalcanal. These Photographs Were Found On A Dead Japanese Soldier During The Matanikau River Crossing In November 1942.

Inclosure #6