

CONFIDENTIAL

23 JULY 1945

WKLY INTELL
VOL 2 #2

JAPANESE MILITARY CAVES
ON PELELIU

"KNOW YOUR ENEMY!"

CinCPac-CinCPOA BULLETIN 173-45

CONFIDENTIAL



FOREWORD

This report was compiled by Lieut. W. C. Phelan, USNR, assistant G-2, Island Command, Peleliu, after extensive study and analysis of the cave system found on Peleliu. It presents a complete and well prepared survey of what is believed to be a typical Japanese cave type defense. Although it is evident that there are no hard and fast principles of cave warfare, it can be seen clearly that the Japanese have learned to utilize natural and artificial underground structures to their maximum advantage, and it is believed that this report will facilitate understanding of enemy methods.

//

CONFIDENTIAL



Photo 1.



Photo 2.



Photo 3.

CONFIDENTIAL

JAPANESE MILITARY CAVES ON PELELIU

INTRODUCTION

The island of Peleliu is essentially a coralline-limestone formation as are all the southernmost islands of the Palau Group. In contrast to Peleliu's flat lower portion, the upper half of its western peninsula is almost wholly an irregular series of broken cliffs, narrow valleys and rugged peaks. This formation, which is better known as "Bloody Nose Ridge", originally gave the impression of being one gentle unbroken ridge because of the dense foliage and rain-forest which covered it. But stripped of its cover, it revealed itself as an almost impenetrable mass of sheer

walls and narrow valleys studded with sump pits and natural cavities (see Photo 1). At no place can the ridge line be found continuous for more than a few hundred yards and, although the formation runs generally north and south, small ridges and valleys run in every direction within it (see Photo 2).



Photo 4.

A long process of erosion has resulted in the rock formation appearing sponge-like in many places and has given a razor edge to its jagged crags (see Photo 3). Natural faults and fissures have been formed which are in some places as much as 50 feet deep. Subterranean streams have eroded large cavities and underground passages. These are further complicated by the huge limestone stalactites which have developed within them (see Photo 4). Making maximum use of these formations the Japs were able to prepare an imposing fortress with a minimum of time, material and equipment.

A survey of the ridge area reveals the existence of over 500 caves. These fall into three categories: (A) artificial caves, (B) wholly natural caves, (C) improved natural caves. Approximately 200 caves are artificial and of the 300 natural caves a vast majority have had some improvement. (Note: In all cases where improvements to natural cavities are extensive enough to make them no longer positively distinguishable as natural, they have been treated as artificial caves).

On the attached map of the "Bloody Nose Ridge" area an attempt has been made to locate the caves which remained discernable after the battle. The caves discussed in detail are located by number in sequence as they appear in this report. (Note: This study was concentrated on the northern and southern areas where most of the caves were located. The possibility of some omissions in the central ridge area exists).

CONFIDENTIAL

Some idea of the part played by caves in the defense of Peleliu can be gathered by observing their number and location on the attached map. The area of Final Defense is particularly distinguished by its multitude of caves, as is the naval shelter area at the north end. The number of combat caves on the extremities of the ridge and the depth of the Jap defenses are also clearly shown by a study of the cave locations.

The Japs attempted to make maximum use of the terrain. Artificial caves were dug to take advantage of the protection afforded by the cliffs, and, although the coralline-limestone made digging difficult, it also made the caves impervious to bomb hits and difficult to close or destroy. Actually, the artificial caves were of more value to the Japs than the natural ones, and they contained most of the major installations. This is logical because they were dug in the precise locations necessary, in the exact shape and size desired and with provisions for as many installations as required. The use of natural caves was a hit-or-miss proposition as is exemplified by the fact that the first CP cave used by the Japs after our landing was an excellent natural cave but it had to be quickly abandoned in favor of an artificial cave in a more protected area.

There are some natural caves which the Japs considered unsuitable for defensive purposes and these were found unoccupied. The natural caves are peculiar to this type of geological formation and it is mainly the Jap methods of improving them which is of interest. The artificial caves, on the other hand, present a pattern which could be described as "Jap Military Cave Technique". This pattern may be encountered on other islands and there are certain conclusions we can arrive at from a study of those on Peleliu.

ARTIFICIAL CAVES

Japanese prisoners and other sources of information give evidence that the huge number of man-made caves on Peleliu was not wholly the result of a planned defense. Actually only a small portion of the caves were part of the systematic defense in depth. The majority of the caves were constructed primarily as air raid shelter caves. The presence of a special Naval Tunnel Constructing Unit (Suidotai) commanded by a civilian engineer, is indicated. This unit was composed of men experienced in tunnel construction in Japan and its function was to direct the digging of tunnels for air raid shelters.

Most of the caves appear to have been dug within the last year, with feverish activity in this direction dating from the time the Japs first realized the possibility of air attacks against Peleliu. The lessons learned by the Japs on islands where our pre-invasion bombardment took tremendous toll were strenuously applied. Each unit on the island was assigned an area of the ridge and instructed to prepare its own shelters. This would account for the large number and the many different types, some of which were very simple and crude.

In addition, both the Army and Navy forces had some official caves prepared by construction battalions as air raid shelters and as combat caves in a systematic and well organized defense.

The Jap Army appears to have used natural caves wherever possible, whereas the Navy almost completely ignored these and prepared more comfortable and spacious

PAGE 3

CONFIDENTIAL

shelters for itself. The Naval caves were primarily shelters - few of them were prepared for ground defense - whereas the Army concentrated on combat positions. The construction battalions of the Navy were not available to the Army, and Army personnel apparently were not permitted to use Navy shelters. Some official Navy caves were prepared in the proximity of the Army CP caves for liaison purposes, and each of the Army CP caves had a naval communication cave adjacent to it. But the most intricate Naval shelter caves were at the extreme northern end of the island, removed from the main Army defensive area.

It is evident that the use of the Navy caves as defensive positions came as an afterthought. Army-Navy cooperation with respect to caves developed only with the realization of imminent attack. Toward the end of the battle, an artificial Navy cave which had been constructed as an official liaison cave near the Army CP, was used as the Army CP.

During the pre-invasion bombardment the caves proved to be excellent shelters and the Jap garrison was prepared to meet our assault with personnel, ammunition and food supplies substantially intact. However, the wide dispersal of forces and supplies later proved a handicap when the Japs found it impossible to organize themselves or maintain communications and the final CP was cut off from the numerous food and ammunition caches which had survived our attack. A majority of the naval forces took shelter in caves so far removed from the headquarters caves that during the last stages of the battle their activity was completely uncoordinated with the fighting of the Army garrison and only those naval personnel who were stationed in official caves adjacent to Army defensive positions were utilized to the fullest extent.

In considering artificial caves we should distinguish between those constructed by the Army and those by the Navy.

Navy Caves: All Navy shelter caves were tunnels approximately ten feet wide and six feet high with square excavated areas opening at intervals along both sides and serving as rooms. (Photo 5 shows a typical Navy tunnel). In some cases there were separate rooms for food and ammunition storage, for officers and enlisted men's living quarters and medical rooms. The caves varied from simple one-tunnel types to networks of 10 and 12 tunnels and can be divided roughly into eight different types.

"H" Type Caves: The first of these is the "H" type. It occurred sometimes as a simple "H" and other times in series, either adjacent "H"s or connected "H"s. In some cases the tunnels went completely through the ridge, in others they were blind.

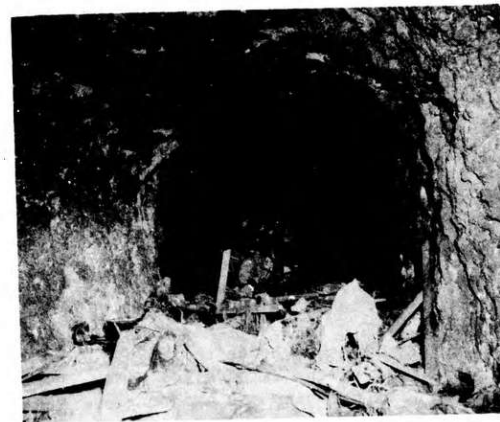
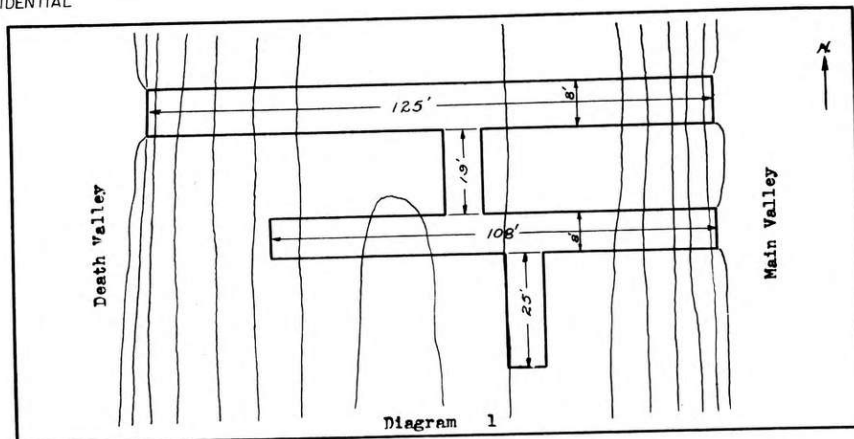


Photo 5.

PAGE 4

CONFIDENTIAL



"H" caves had no prepared defenses other than what the Japs within them improvised during the battle and the major protection afforded the enemy in them was escape into adjoining tunnels, out the other entrances or concealment in the rooms.

The naval communication cave (1 on the cave location map) adjacent to the prepared final defensive CP cave in the Main Valley of "Bloody Nose Ridge" was a simple "H" cave, one arm of which went through the ridge. It had a second horizontal tunnel attached which may have been excavated as a living area or the beginning of an entrance to an adjacent tunnel which was never completed (see Diagram 1).

This cave depended mostly on the inaccessibility of its location for protection against direct assault and it was abandoned when our forces approached it (see Photo 6). Originally it had timber shoring for its sides and a roof and wooden floors. Handcar tracks running into the cave indicate that it may have been part of the old phosphate mine. Radio installations had been provided, as well as water piped from the next valley and electric light provided by a gasoline generator.

The caves selected as a Command Post after the last prepared Command Post had been taken (2 on cave location map) were a series of naval "H" type caves. They were located in the northern part of the Main Valley under the Five Brother Peaks and had originally been constructed as the living quarters of the high ranking naval officers in the final defensive position (see Photo 7). These caves were



Photo 6.

CONFIDENTIAL



Photo 7.



Photo 8.

a series of "H" caves none of which were connected, but there is evidence that connecting tunnels had been started (see Diagram 2). Like other naval caves wood work and electricity existed but, for defense, they depended primarily on location.

The major Navy shelter caves were those in the northern part of the island (3 on cave location map). They were constructed by the Jap 214th Naval Construction Battalion and prior to our assault over a thousand men were living in them. Despite repeated demolitions and flame-thrower attacks, nine of the original group were able to live in the caves for five months after our assault (see Diagram 3). Photo 8 shows the entrance to tunnel 7 (Diagram 3) of these caves after we had blasted away the side of the hill.

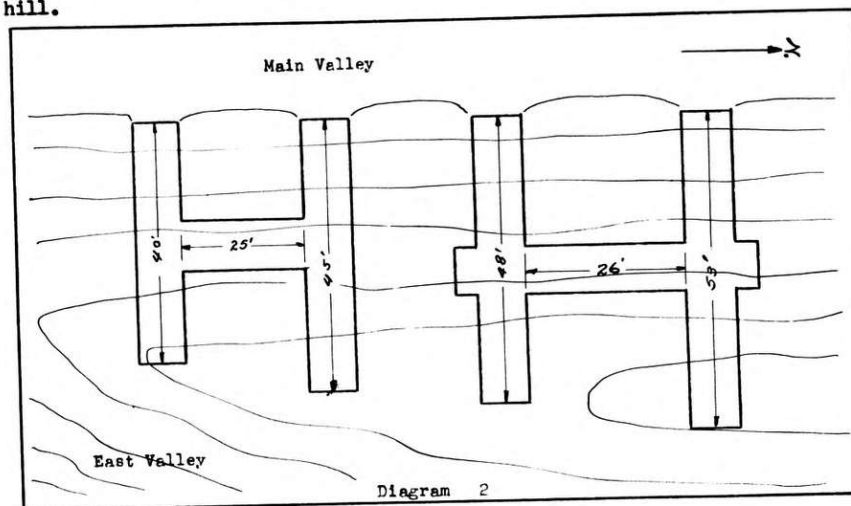
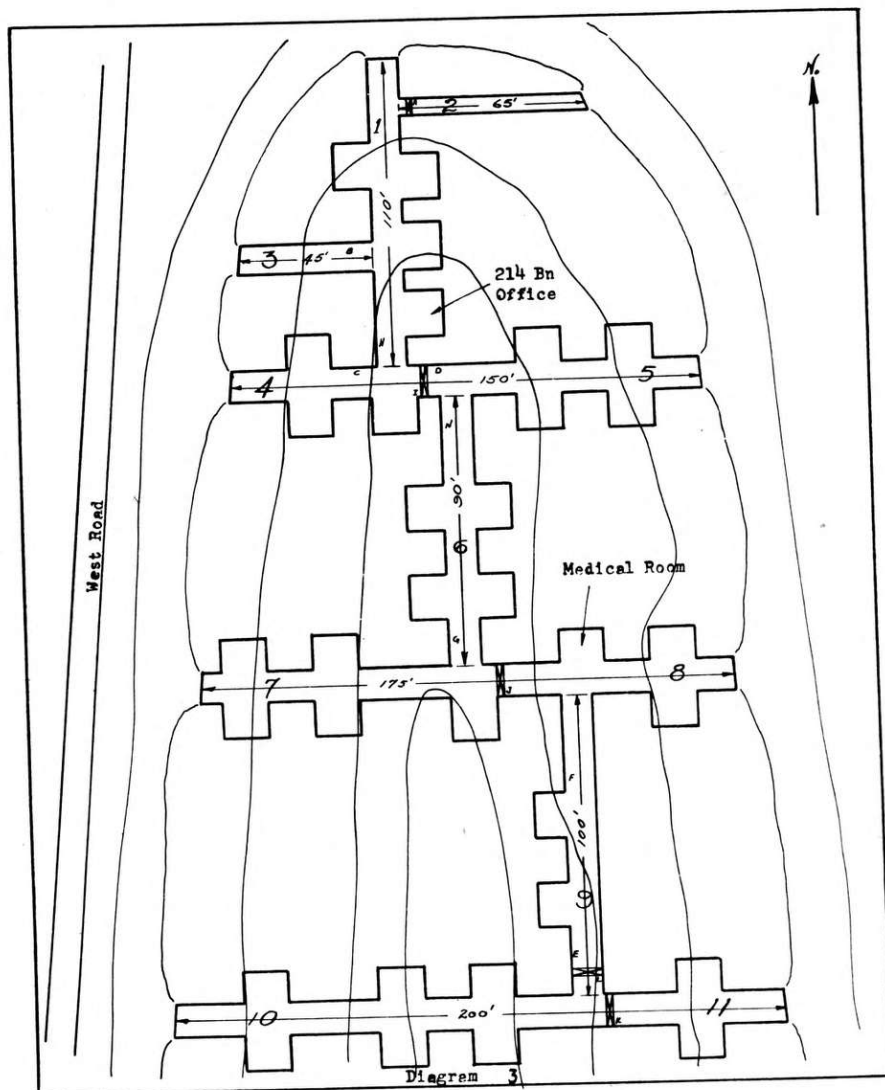


Diagram 2

CONFIDENTIAL



CONFIDENTIAL

These caves were adjoining "H"s with numerous rooms stocked with food and ammunition. They were not built for combat and had no prepared defenses. The numerous passages and entrances plus the deep rooms provided shelter against our attacks.

The detailed story of how these Japs were able to survive is best told in the interrogation report of one of them who was later captured. An excerpt from Peleliu Island Command POW Interrogation Report No. 6 follows:

"On 3 September when the prisoner first entered the caves there were over a thousand men in them . . . On 28 September 1944, (D plus 13) all the military personnel were organized for an attack on the American forces who were holding the hill directly over the caves. They poured forth from all nine tunnels and attacked. He claims they drove the Americans off the hill but suffered many losses. When they re-assembled in the caves there were only about 50 military men left . . .

"The survivors moved the wounded into tunnels 9, 10 and 11, the workers into tunnels 4, 5, 6, 7 and 8 and the military personnel into tunnels 1, 2 and 3. On the morning of 29 September our forces assaulted the entrance to tunnel 1 with a tank, machine guns and flame-throwers. The Japanese military personnel attacked through tunnel 1 and all the military were killed except the prisoner who remained behind an improvised barricade at "A" in tunnel 2, and six others who were in lower passages. The flame-thrower used by our forces penetrated to where he was and burned his left arm and leg. He claims the flame-thrower was our most effective weapon in this attack and that it reached point "A" where he was standing and points "B", "C" and "D" killing some of the workmen who were located in these areas. The tank and machine gun fire was only effective in the immediate tunnel it was firing into.

"Later, tank and flame throwers were used on most of the entrances and when our forces withdrew there were only 30 remaining alive. The wounded in tunnels 9, 10 and 11 were all killed by our flame-throwers which penetrated the entire length of tunnel 7-8 and to points "F" in tunnel 9 and "G" in tunnel 6. Our flame-throwers also penetrated the entire length of tunnel 3 and tunnels 4 and 5 and around to points "N" in tunnel 6 and "H" in tunnel 1. Tunnel 2 was not subjected to the flame-thrower and most of those men who survived had taken refuge in it.

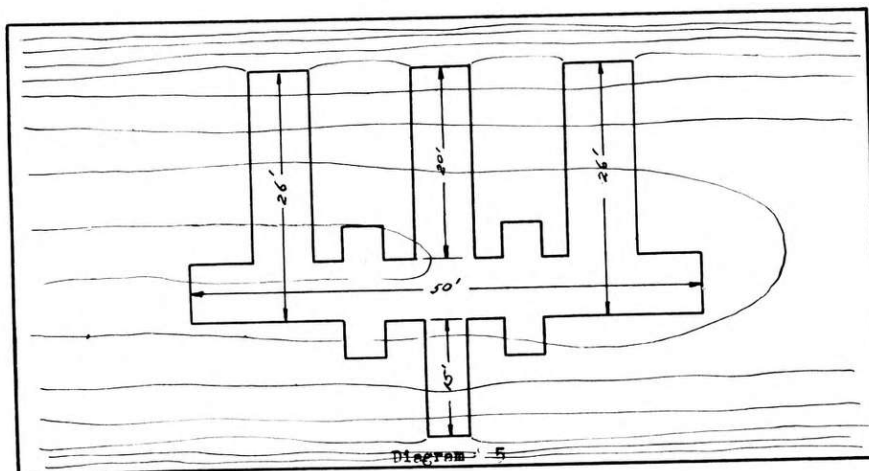
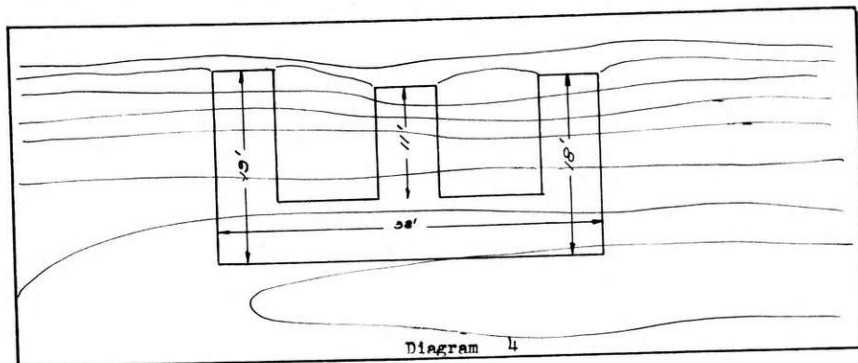
"Our forces then closed all entrances and the Japs moved into tunnel 2 which was the most completely closed. They posted men at points "I" in tunnel 5, "J" in tunnel 8 and "K" in tunnel 11. These men were able to pick off a number of "Foolish Yankees" who wandered into the entrances of tunnels 10, 7 and 4 during November and December (Note: During this period American personnel were killed and wounded in and around this cave). According to the prisoner as soon as they fired at anyone they would withdraw into tunnel 2 and as many times as flame-throwers or demolitions were used on the various tunnels they were always safe because the entrance to this tunnel was completely covered and unrecognizable from the outside.

"Prisoner states that about 1 January 1945, after they shot an American in tunnel 8, very large explosive charges were set off in all the entrances except tunnel 2 and that the force of these explosions was much more penetrative than the flame-throwers. They reached to every part of the cave and shocked those they did not kill. If charges had been put in tunnel 2 all would have been killed. However, 19 of the remaining 30 were killed and three more were badly injured. On 24 January 1945 American "seabees" who were excavating in that area stumbled on two of the Japs at

CONFIDENTIAL

"A" in tunnel 2. The prisoner states that they then moved the three wounded into tunnel 6, left two men at "A" in tunnel 2 as guards, and the others went to tunnel 11, passing point "L" in tunnel 9 where our demolitions had caused the tunnel to partly collapse. The flame-thrower used on tunnel 2 at this time killed the two guards. (Note: Probably gasoline that was used by our forces in an attempt to burn out this cave at that time). The prisoner claims that on the night of 1 February 1945 the five Japs who were in good physical condition dug their way out of tunnel 8"

"E" Type Caves: The "E" shape was also used extensively in Naval areas. It consisted of three parallel entrance tunnels to a perpendicular tunnel. Variations of this form included excavated niches along the sides or rear, and often rear entrances when they were located high on the ridges (see Diagrams 4 and 5). These caves were



CONFIDENTIAL



Photo 9

always smaller in all dimensions than the "H" caves and in most cases gasoline drums or coconut logs were emplaced at their mouth for protection (see Photo 9). Prisoners described them as "enlisted men's shelters. They show very little in the way of installations but all of them contain small stocks of food and ammunition. "E" caves were generally found half way up the ridge as opposed to "H" caves which in all cases had been found at the bottom of the ridge adjacent to a road or level area. During the battle they were used for light automatic weapon positions and rifle positions although it does not appear that they were constructed for this purpose.

"U" And "Y" Type Caves: "U" and "Y" caves appear to be the combat caves in the Naval areas. They were found high and low on the ridges in strategic locations. In some cases their entrances were on different levels, or were concealed behind huge trees or large rocks (see Photo 10). Invariably the tail of the "Y", or revetments in the "U", were the storage and living areas. One of the entrances was a very small escape tunnel and the other the combat entrance. This combat entrance often had a cleared flat area at its mouth to be used for a mortar position, or a log and stone barricade behind which automatic weapons were emplaced (see Diagrams 6 and 7).

In only one or two cases were defenses encountered within the caves. Photo 11 shows a log and stone barricade which was found at the entrance to the tail of the "Y" beyond the fork inside one such cave (4 on the cave location map).

Excellent camouflage existed around most of these caves and prisoners testify that they were often located under large trees in order to prevent their being detected from the air (see Photo 12). There are no cases where aerial bombardment destroyed them and the camouflage proved very successful.



Photo 10.

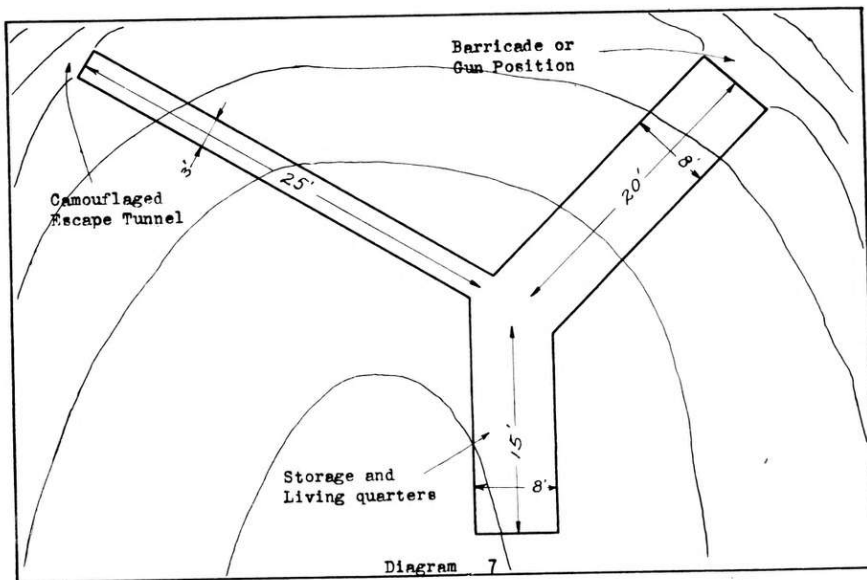
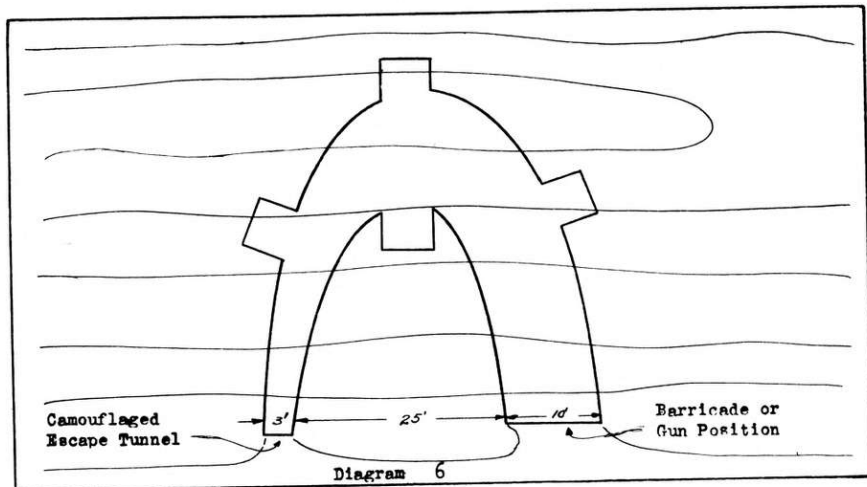


Photo 11.

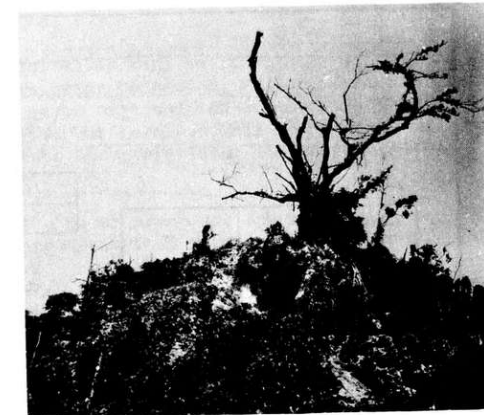


Photo 12.

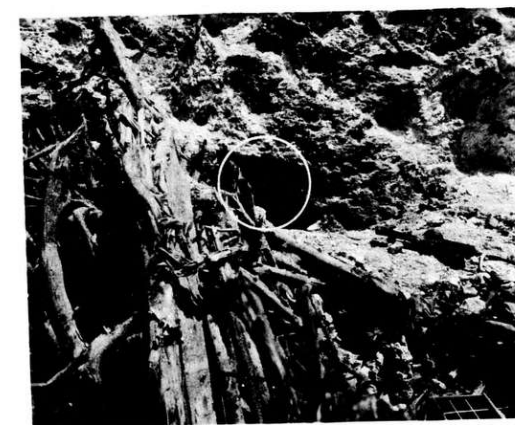


Photo 13.

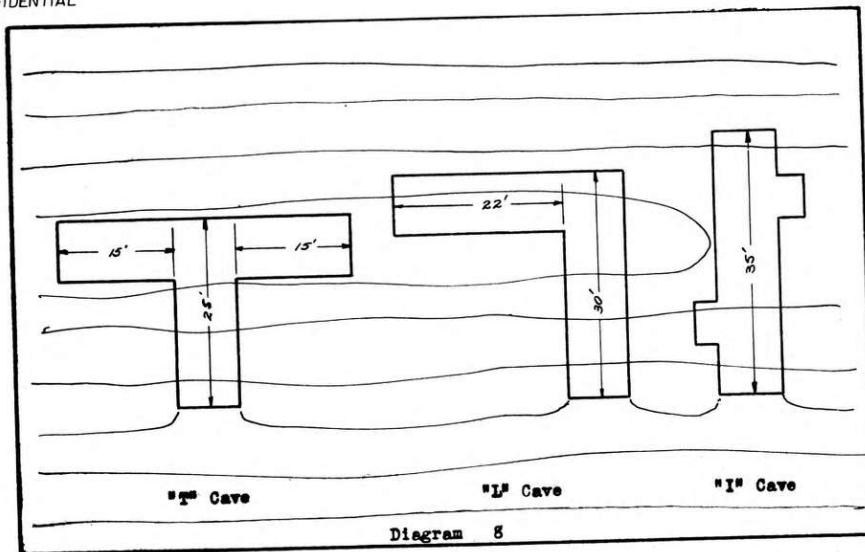


Photo 13 shows such a cave entrance with a flat mortar position area in front of it and a large tree, which was used for camouflage before we destroyed it.

"I", "L" And "T" Caves: Smaller caves used by both the Army and Navy as shelters for small units, food or ammunition storage, LMG or rifle positions, took the form of an "I", "L" or "T". In some instances these were merely holes in the sides of the ridges. Other times they were quite deep and well constructed. In many cases no provisions for defense had been made until just prior to our attack, then mounds of rock or rubble had been thrown up in front of them as barricades (see Diagram 8).

These caves are found quite often in the vicinity of gun emplacements and other important installations and serve as readily accessible shelters for personnel manning such installations. Such caves existed in the vicinity of every artillery piece and in many cases the piece itself was arranged to be drawn into the cave for protection or fired from its mouth.

"I" caves dug one above the other on steep cliffs provided enfilade rifle or MG fire. Situated on opposite walls of narrow valleys they provided cover for each other and prevented our use of the valleys. At least half of the artificial caves on Peleliu were simple "I" or "L" caves and it was their large number and inaccessibility which made them so formidable. When our forces were able to win the approach to the caves they proved death traps for their inhabitants. They could be described as "suicide caves" for in the most cases the Japs within them fought to the end with no possibility of escape. It was in these caves that, according to the 1st Marine Division report, Japs were found chained to their machine guns and here our flame-throwers were most effective. Actually most of them were little more than protection

against naval bombardment and artillery fire.

There are no instances where artificial caves were built with more than two levels. Caves built above one another were never connected, rather there was a tendency to construct numerous small suicide caves high and low in the ridges in preference to series of connected caves on different levels. This was particularly true of the Army areas. Only in the natural caves where provision for numerous levels existed already, were systems of levels developed.

"Rectangular" Caves: Last among the naval group are the rectangular caves. These were used exclusively for storage purposes. They vary in size from 4 feet by 6 feet holes to huge underground warehouses. Here alone do we find the Navy making use of natural cavities, but the improvements made were only the barest essentials such as widening the entrances, levelling the floors, squaring off the walls and ceilings, and laying planking as protection against moisture. Gasoline, ordnance and quartermaster supplies were stored in these caves.

Storage caves were very widely dispersed, and the majority of them were small. In the vicinity of all Jap gun emplacements and defensive positions there were storage caves. In cases where Navy "personnel" caves were not equipped with storage space, the Navy had storage caves nearby. More than any others, these caves were originally air-raid shelters. Their elaborate dispersal potentialities were particularly valuable in this connection, but they proved a handicap in battle as our forces cut off access to them. They were defended only in isolated instances where Japs were cornered in them, and like many other types, they proved to be "suicide caves".

Most interesting of the rectangular caves is one located in the lower ridge adjacent to the airport (5 on the cave location map). This cave was hollowed out of the ridge and finished off with cement walls, ceilings and floors. Its entrance portals were carved in rock 10 feet thick and its entrance and interior were built in tunnel fashion (see Diagram 9). A road ran up to its mouth and horse drawn caissons moved in and out of it easily. Two vents ran up through a hole in its roof at the rear providing ventilation. A system of dome type lights had been installed. It was used as a storage warehouse for large caliber shells and aerial bombs. At the approach of our forces Japs within it emplaced barrels filled with rocks at its entrance and defended it with small arms fire. It had no other defenses. There are evidences of large caliber shells or bomb hits close by but the cave has withstood them and remains intact. Photo 14 shows its huge stone entrance portals and the improvised defenses installed, Photo 15 its tunnel-like entrance passageway hewn from solid rock, and Photo 16 its interior containing the



Photo 14.

CONFIDENTIAL

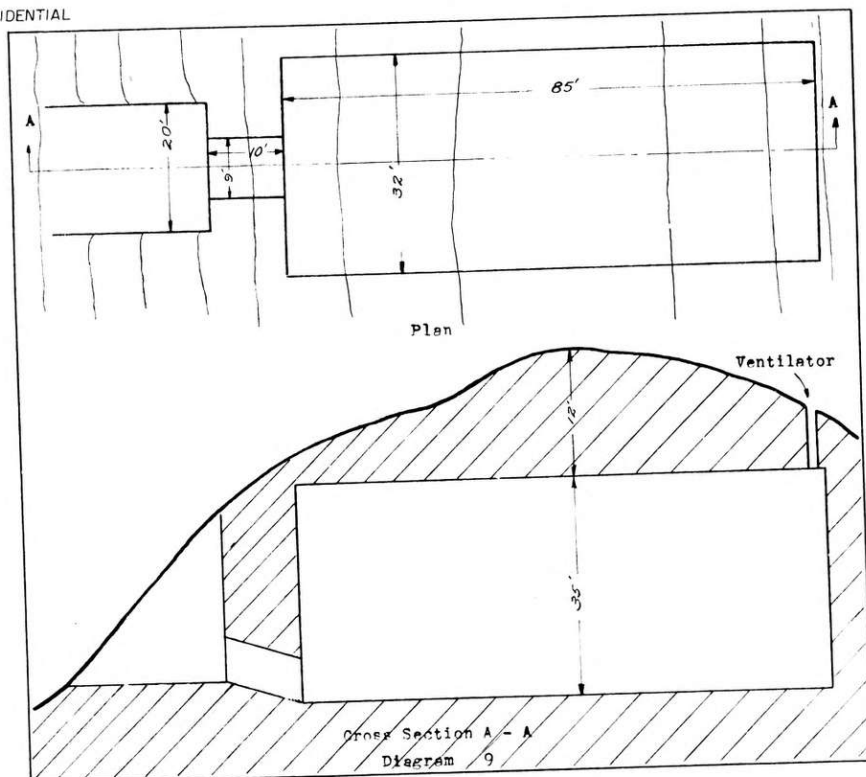


Photo 15.

CONFIDENTIAL

wreckage of the ammunition and caissons. Clearly visible at the rear are the vent ducts.

In some instances rectangular caves were used as field hospitals. Photo 17 shows the entrance to one such cave located low in the ridge, with a barricade of earth protecting it from the south and an entrance path leading in from the north. The withered branches in its mouth were originally part of the palm frond camouflage which stretched from the barricade to the top of the entrance passage.

Artificial Army Caves: The majority of the Army caves were combat positions or storage depots. The Army did not have as many artificial caves as the Navy but utilized a greater percentage of the natural ones.



Photo 16.

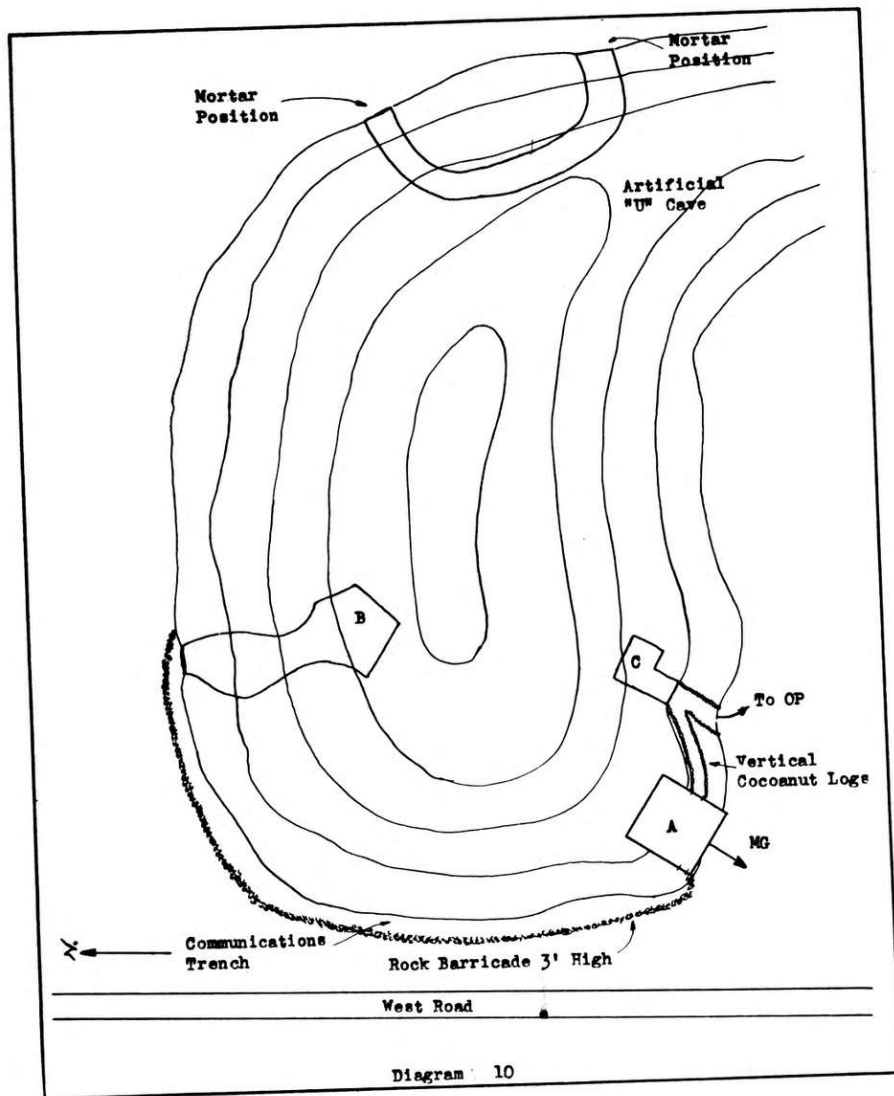


Photo 17.

Obviously, the Army defenses were based on a system of concrete pillboxes, entrenchments, gun emplacements, etc. These were quite naturally located to take advantage of the terrain features and to cover strategic areas without regard for the existence or non-existence of caves nearby. Wherever practical, however, natural caves were taken advantage of to augment this system of man made defenses and a number of artificial caves were dug for the same reason. Of the Army caves only the supply storage caves could be described as air-raid shelters.

Army caves were not as large, complete or ingenious in their construction but they were exceptionally well chosen for tactical purposes. Army supply caves had simple protected lines of communication to gun emplacements. Army personnel caves likewise were adjacent to or immediately behind mortar or MG positions. Observation posts, artillery pieces, pillboxes, tank and truck re-tirements, etc, all had their adjacent caves. In many places the gun installation was in the very mouth of the cave, ammunition and personnel both being located therein. Mortar and artillery emplacements had protective automatic weapon caves

CONFIDENTIAL



PAGE 17

CONFIDENTIAL

located above or beside them. The approaches to command post caves and strategic installations were covered from all angles by fire from cleverly located caves half way up surrounding ridges.

Diagram 10 shows a typical Army defensive position composed of a concrete pillbox, an artificial rectangular storage cave and a natural cave all connected by a protected communication trench (6 on cave location map). A heavy machine gun located in the pillbox at "A", which is in a strategic location overlooking a possible landing beach, was manned by personnel living in natural cave "B", utilizing ammunition stored in artificial cave "C". On the reverse slope of this knoll there were two mortar position caves and a short distance to the south there was an OP with telephone communication to the pillbox.

The communication trench to "B" had been constructed by using the face of the ridge and piling a row of stones two feet away from the face following the natural contours.

Photo 18.

From "A" to "C" the trench consisted of a row of coconut logs emplaced upright in the ground, the area between them having been excavated. Portions of this trench are shown in Photos 18 and 19. In Photo 18 the coral hill may be seen on the right and the stone wall of the communication trench on the left. In Photo 19 the coconut log entrance passage and storage cave "C" are shown.

At vital locations there can be no doubt the Army caves behind automatic weapons were constructed as suicide caves. Very few of them had escape tunnels. In most cases they depended on the weapons in their mouths or in their vicinity and the inaccessibility of the terrain for protection. They had few interior defenses, but some of them had protected interior passages or large niches in which personnel could take shelter once we had gained the entrance.

They were located generally in the lower half of the ridges on all sides, providing supporting fire for each other by their great number, and cross fire from opposite sides in the valleys. Army combat caves were very

Photo 19.

PAGE 18

CONFIDENTIAL

rarely found on the floors of valleys as Navy caves were, nor were they ever high on the ridges where they would be exposed to bombs or naval gunfire.

Entrances to Army caves were usually very small and easily camouflaged. Guns emplaced in and around them were excellently camouflaged and the cave mouth into which gun crews retired was never visible until immediately approached.

Typical of the small, easy-to-camouflage cave entrances is the one shown in Diagram 11. This entrance was constructed as part of the hill line and from the outside the cave behind it is invisible. An up-right, protected firing position exists at its mouth and retaliative fire will not penetrate the cave except from the mouth itself.

Storage and mortar position caves were in the interior areas on reverse slopes and artillery caves on the eastern, western and southern forward slopes of the ridges. Most of the Army positions defended against attack from the south or airport region. Occasional combat caves gave access to the inner valleys for supply and evacuation purposes. Two trails were constructed running the length of the ridges through the interior valleys. Photo 20 shows an artificial pass along one of these trails (7 on the cave location map). Army storage caves were disbursed along these trails.

The primary defense within Army caves was calculated for protection against direct small arms fire. It consisted of entrances which sloped down sharply from the mouth, or turns and deep niches for personnel to take refuge in. These provisions were not

sufficient protection against flame-throwers. It is doubtful that the Japs considered the possibilities of flame-throwers, or the range ours had, in their defense preparations and the number of caves which were invulnerable to them could be attributed to accident. Usually caves which withstood flame-throwers were of the same type as those which did not, only they were deeper and longer. For instance, the "H" caves in Diagram 2 did not withstand flame-throwers, but those in Diagram 3, which are longer and deeper, did. Likewise, some of the larger "W" type caves, which will be discussed later, were proof against flame-throwers, whereas the smaller ones were not. Caves with shallow vertical entrances often caused flame-throwers to flash back and thus hindered their

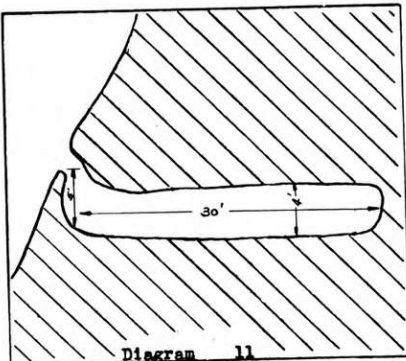


Diagram 11



Photo 20.

effectiveness. The success of our flame-throwers was also partly due to the fact that a more powerful flame-thrower than had been used on caves before was mounted on an LVT for use in this campaign.

The floors of caves in most instances were not designed against attacks using liquid weapons. Those which sloped down were easily cleared out by pumping gasoline and oil into them once we were able to gain access to their mouths. Occasionally these caves had ditches dug at the bottom of their sloping entrances which served to catch such liquids. There are also caves whose level room floors were raised above the entrance slope possibly for the same reason (see Diagram 12). There are very few caves whose floors slope upward. Caves whose floors were completely level were proof against liquid weapons only when they were very long. There are cases of such caves having mounds of earth thrown up inside their mouths which stopped liquids but it is probable these were constructed as barricades for riflemen.

Army artificial caves can be classified in seven distinct types. Some of these are modifications of Navy types used for different purposes.

"I" "L" And "T" Caves: "I", "L" and "T" caves occurred most frequently at automatic weapon and artillery positions. They differed from those of the Navy in that they had smaller entrances, fewer interior refuge areas and more protected access from the exterior. They were not as widely dispersed as are the Navy caves but located in clusters at strategic points, often with communication trenches connecting them. Photo 21 shows the entrance to a typical Army artificial cave. "I" caves were used



Photo 21.

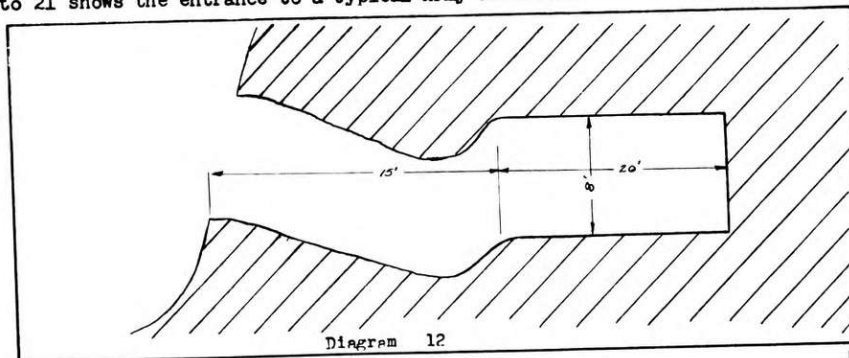


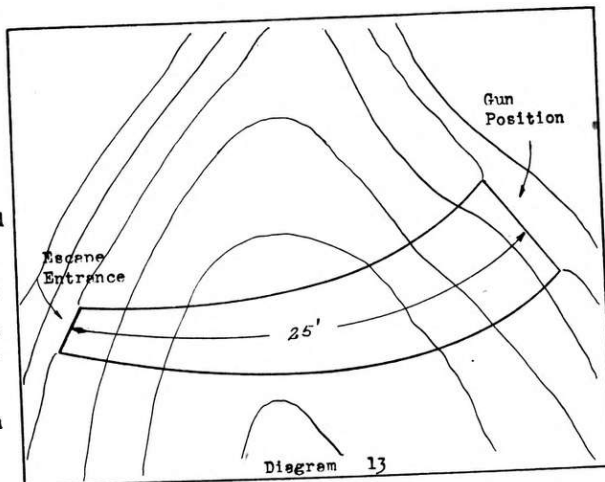
Diagram 12

CONFIDENTIAL

CONFIDENTIAL

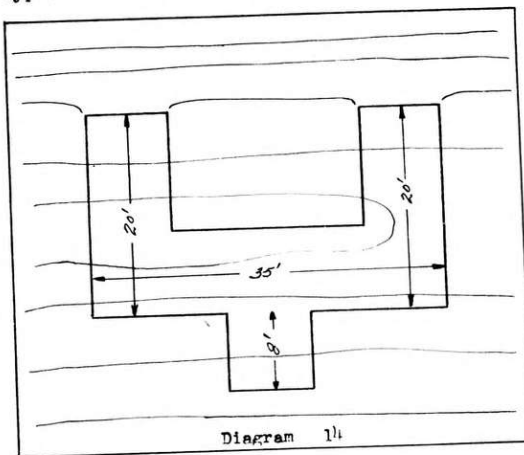
for storage purposes and suicide sniper positions. "I" and "T" caves were at mortar and artillery positions where large numbers of men and supplies had to be protected.

Army "U" Caves: A "U" type cave, similar to that found in Navy areas, was used by the Army for combat. Weapons are emplaced in or near one or both entrances. Where only one entrance was used for combat, the other was a small personnel entrance. This "personnel" entrance often gave access to a protected area not visible from the area of the other entrance (see Diagram 13). There were few protected niches found in these caves and they were not proof against flame-throwers used from the outside.

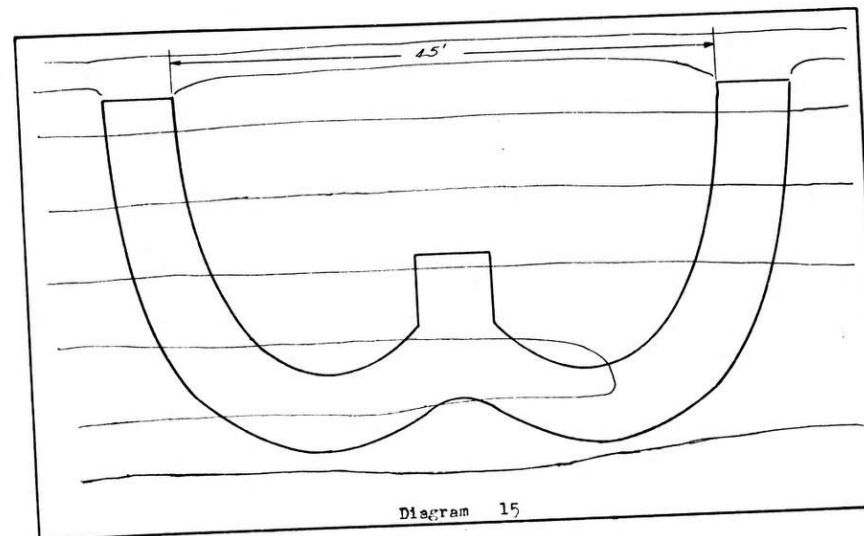


However, a more efficient "U" cave was developed by squaring the corners and digging protected niches at the rear (see Diagram 14). The squared corners hindered the effectiveness of flame-throwers. This caused flash-backs against the operator and gave comparative safety for those hiding in the niches.

"W" Type Caves: The Army modified the Navy "E" type cave by using a "W" type. In the Army version there were only two entrances, the third one being blocked and serving as a storage or protection area. In cases where the arms were more than 50 feet long and the turns sharp our flame-throwers were not able to penetrate into this area and it afforded perfect shelter (see Diagram 15). This was one of the few types of caves in which the Jap could survive after we had taken the entrance. Caves of this type were not often used in connection with automatic weapon installations but were found in the Main Valley of the final defensive position where the Japs mobilized for a last ditch stand. They are presumed to have been used for shelter for reserve troops. "W" shaped caves were also used as hospital caves. Photo 22 was taken inside a "W" shaped hospital cave; it illustrates the width and



CONFIDENTIAL



height of such caves and shows particularly the tin roofing installed as protection against seepage.

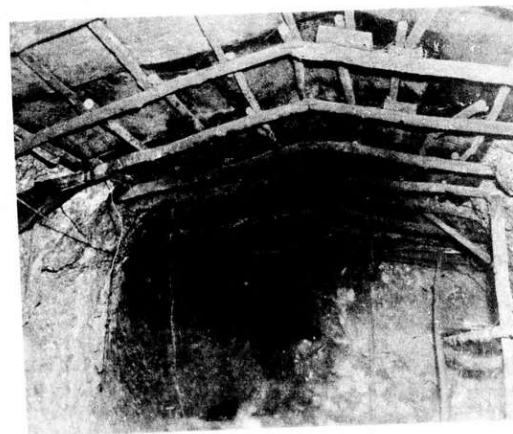


Photo 22.

Army "J" Caves: To provide shelter against direct fire for personnel manning weapons, the Army modified the Navy simple "I" cave by building it in "J" shape. These caves were required to be deeper than the "I" caves and their effectiveness was based on this depth and the degrees of turn used. In no cases were they effective against flame-throwers since they were never more than 60 feet deep. But they were effective against small arms in many instances and the task of winning their approach always existed. Diagram 16A shows a small "J" cave with a short turn which proved no better than the "I" type cave. Diagram 16B illustrates a longer one with a complete turn which is obviously more effective.

CONFIDENTIAL

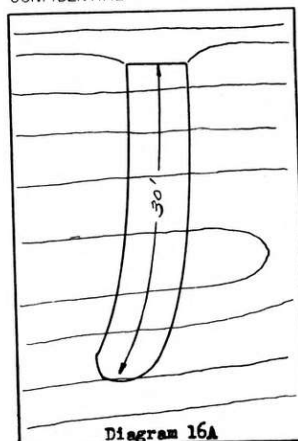


Diagram 16A

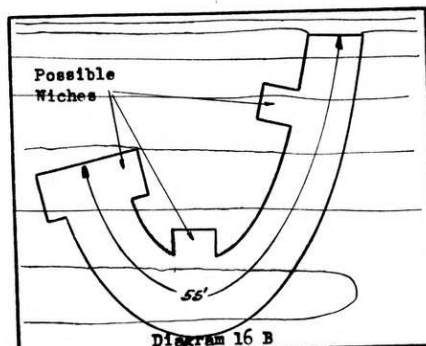


Diagram 16 B

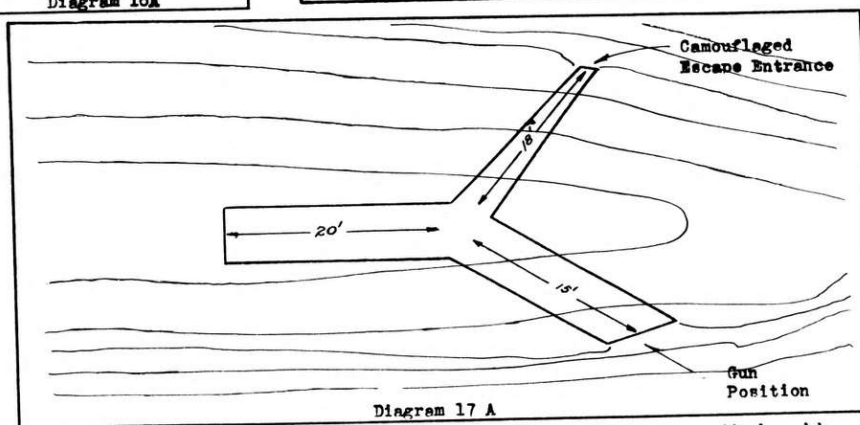


Diagram 17 A

Built in tunnel fashion, the "J" caves often had niches along their sides which provided storage space and shelter. In no two cases were the niches located in the same place. Sometimes they were close to the mouth, but usually they were at the turn or behind it.

Their floors were almost always level or sloped slightly downward. Log and rubble barricades or fortified automatic weapon positions were often found at their mouths. They were never used completely for storage purposes but are strictly combat caves. As such they were always cleverly camouflaged and strategically located.

"Y" Type Caves: There are two distinct types of Army "Y" caves. One is similar to the Navy "Y" cave in that both the arms afford entrance to the living and storage area which is the tail of the Y. As shown in Diagram 17A, typical Army usage was to mount a weapon at or near one entrance and to use the other as an escape tunnel

CONFIDENTIAL

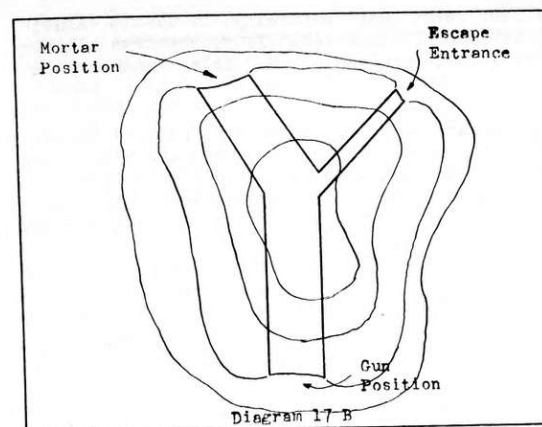


Diagram 17 B

to an area which could not be observed from the area of the weapon's field of fire.

A further modification of the Navy "Y" cave was the development of the tail into a third entrance (see Diagram 17B). These were particularly suited to the small round knolls which occur all too frequently on Peleliu. The three-entrance "Y" cave was found located in the lower portion of ridges or knolls, whereas the two-entrance ones were always at least one quarter of the way up the ridge. Some three-entrance "Y" caves had automatic weapons in one entrance which looked over level ground, and mortars at the rear entrance on the reverse slope close to the main ridge.

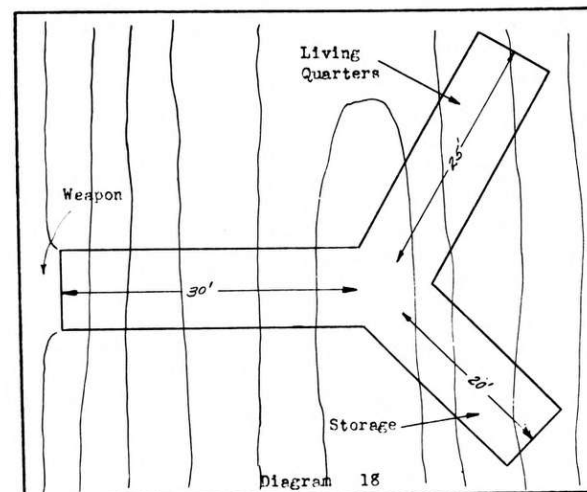


Diagram 18

The second type of Army "Y" cave is an exact reversal of the first. In these caves the tail of the "Y" serves as a single entrance to the arms which are dead end (see Diagram 8). The two arms provided protection for the occupants against small arms fire and gave additional storage and living space. But these eventually proved just another type of suicide cave because there was no protection against flame-thrower attacks and no escape for the occupants. That the Japs partially realized these shortcomings is evident from the fact that "Y" caves with escape tunnels were found on the perimeter of the Jap defenses and "suicide Y" caves

only at the most vital positions and in the area of the final defensive position.

NATURAL CAVES

Natural cracks, caves and crevices are numberless on Peleliu. Ranging from tiny holes to those large enough to accommodate a platoon of men, they exist everywhere. Yet many of them were not very suitable for military purposes and were not originally

CONFIDENTIAL

selected and prepared as such. The smallest were, quite naturally, of little value; others were discounted for reasons such as complete inaccessibility, hopeless military location, dampness, exposure to attack or interior ruggedness requiring extensive improvement.

However, just prior to our assault the Japs hurriedly piled into many of these cavities everything for which shelter had not previously been prepared and which they desired to protect from our bombardment. It could be said that they "threw" these things into holes without proper planning or even the barest improvements. Thus the many unimproved natural caves played at least some small role of advantage to the Japs.

In addition to this, the Japs, as they were driven from their prepared positions, took refuge in many of these natural caves and tenaciously clung to every inch of the ridge by sniping from and defending every crack and crevice which a man could squeeze into. Therefore, although these caves cannot be considered part of the Jap prepared defenses we must recognize that they were of great value and that the Japs undoubtedly considered them, in their wholly natural state, a part of the impregnability of this island fortress.

Their location in and around the areas of prepared defense was their greatest asset and since there is nothing to be learned about Jap cave technique by minutely examining them, they can best be appreciated by studying their locations on the attached "cave location map" with reference to their proximity to the defensive positions and areas.

IMPROVED NATURAL CAVES

Nowhere is the Jap more ingenious than in his selection and improvement of natural caves for military purposes. Few possibilities were overlooked. The enemy chose his caves primarily from the point of view of location; weapons caves for their field of fire, personnel caves for their protection and location in defense areas and storage caves for their accessibility and dispersal. Each cave selected was developed with these purposes in mind.

Many of the cave types discussed as artificial were originally small natural cavities which were developed for military use. Some of the shapes selected were undoubtedly dictated by the terrain features which served as starting points for digging caves.

Certain improvements had to be made in every cave such as levelling floors, removing hanging rocks, preparing the entrance, camouflage, providing against seepage and enlarging the interiors. In addition, however, there always were other improvements peculiar to the purpose which the cave was intended.

Combat caves had gun positions prepared in their mouths and their entrances were altered accordingly. Sometimes this necessitated digging rear entrances or passages into nearby caves or tunnels. Other times it involved preparing lines of communication or digging supporting artificial caves. Living and storage areas or adjoining caves for similar purposes had to be developed. Fields and angles of fire were computed and

CONFIDENTIAL

supporting caves were selected or dug. A familiar Jap technique was to prepare connecting tunnels between natural caves or between natural and artificial caves. These tunnels were always small and twisting. A system of levels in caves was devised by joining natural cavities. Natural caves were prepared as alternate positions for artificial caves.

Personnel caves or living areas in other type caves were usually equipped with wooden floors, tin roofs and lights. Cooking areas and cooking equipment were made available. Sleeping mats or steel cots were provided, but proper ventilation and sanitation were overlooked. Ventilation was probably overlooked intentionally because of the possibility of ventilators being highly vulnerable and reducing the defensive possibilities of the caves. Living areas were the most protected locations, providing safety from counter-battery fire. Where personnel were required to live in the cave they fought from, protected niches were always constructed. Where they used adjacent caves, the living cave was always larger, more comfortable and just as well camouflaged.

Storage caves displayed less improvement than the others. Primarily they were leveled and squared off and occasionally widened or lengthened. Wooden flooring and other protection against dampness is evident, and often shelving. These caves only provided protection against bombardment and were rarely camouflaged. Small natural caves adjacent to combat positions were developed for storage purposes and a few huge cavities were prepared as underground warehouses.

In general there are three types of natural caves on Peleliu.

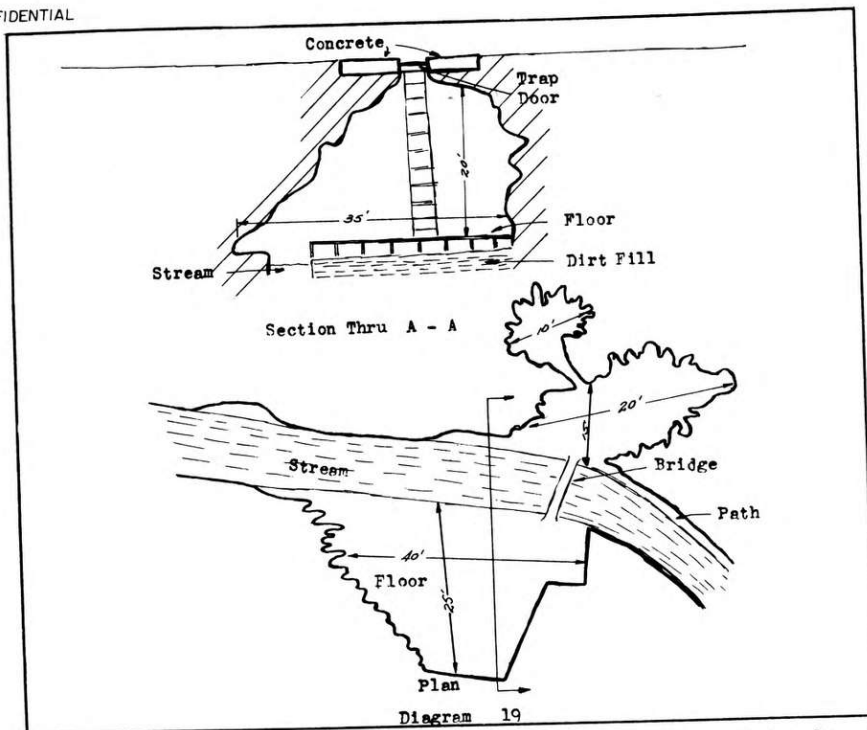
The first is primarily a "water cavity", eroded underground by seepage and subterranean streams. Entrance to these caves is made by breaking through the crust to a vertical shaft which must be transversed by means of ladders. The interior may consist of one huge cavity, as series of cavities or a tunnel following the course of the stream. Some portion of the floor is always covered with water if not the greater part of it. Constant seepage of water from the roof exists. Countless natural niches and crevices are found on all sides.

The Japs were quick to capitalize on the expansiveness of these cavities and the multitude of hiding places existing within them. They afforded a ready water supply, protection from bombing and were located in low areas easily accessible. A large number of troops could be quartered in them, camouflage was simple and there were areas within them which were invulnerable to direct fire and flame-throwers.

One such cave was located on flat ground adjacent to the ridge in a strategic area (8 on cave location map). Here the Japs constructed a concrete cover 10 feet square and three feet thick to fit over the entrance and serve as protection. A trap door fitted into this cover gave access to the main cavity. Twenty feet down from ground level the floor of the cavity had been filled in, forcing the stream to run along that side of the cavity where its roof was lowest. A board floor had been built over the fill and corrugated tin roofing installed which slanted the stream and gave access to smaller cavities on the other side. Numerous crevices ran off from this one and a path ran along the edge of the stream for another 30 feet (see Diagram 19).

Material used for the floor fill and path was obtained by squaring off the walls

CONFIDENTIAL



and hollowing out the crevices and niches. The completed cave provided refuge for at least 50 Japs all of whom were able to keep from being observed from the main room. However, no weapon could have been installed in such a cave and there was little to prevent our gaining the approaches to it. Personnel within the cave were then trapped. Its concrete cover held up perfectly but an entrance was obtained by digging around the outside of the cover.

Of the improved caves, the second type could be best described as a "balcony cavity". It is found along the sides of the ridge usually about half way up and it runs parallel to the line of the ridge. A longitudinal crack formed by the falling away of the lower portion of the ridge accounts for its formation.

It may vary in length from ten to over a hundred feet, with a wide opening extending most of its length. Rarely is it more than 30 feet in depth.

Photo 23 shows the largest example of such a formation on Peleliu. In this instance the mouth opening varied in height from one foot to 20, its length being 105 feet and its depth 42 feet.

The floors of these caves invariably fall away sharply from their lip, providing

CONFIDENTIAL

natural cover for their inhabitants. And the huge stalactites which form in their mouths present a barricade against small arms fire.

"Balcony" caves were used by the Japs in every instance where they occur. At the lowest level they were squared off to provide living and storage space. Sheds and complete wooden rooms were built down in them. They were partitioned off with lumber and sand bags to provide separate rooms. Machine gun, artillery and mortar positions were installed in their mouths. Often tunnels were dug connecting them with interior vertical cavities or adjacent balcony caves. In some instances the connecting caves were in the same side of the ridge, in others where natural cavities existed on opposite sides of the ridge, back to back, connecting tunnels were also dug.



Photo 23.

Because of their high location on the ridges they made excellent sniper and MG locations. They relied on their inaccessability, vastness and ruggedness for defense. Constant water seepage from the roof provided ample water supplies and the porous nature of the rock gave sufficient ventilation. By tying pieces of string to numerous stalactites and leading these strings down into a water barrel the Japs were able to catch every drop of seepage for drinking purposes and also eliminate its nuisance.

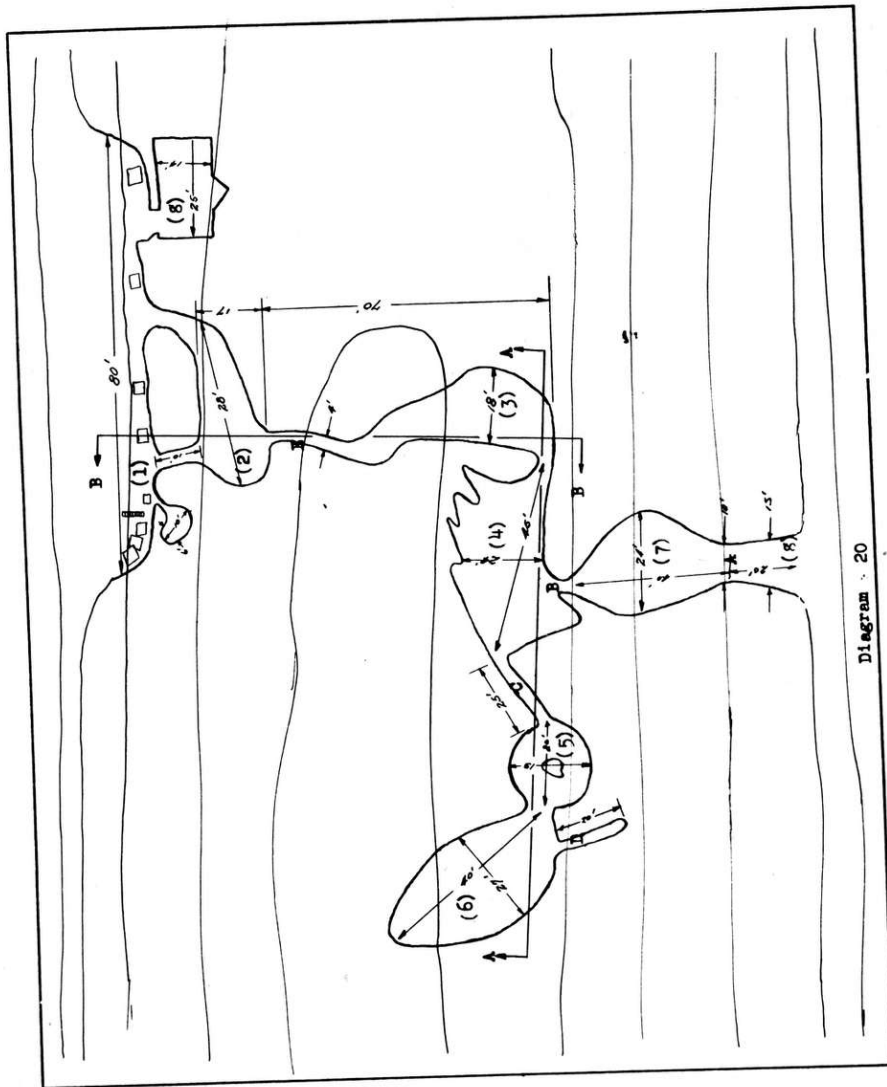
Many small "balcony" caves stretched along the highest portions of the ridges. These were usually narrow and shallow but large enough to accomodate dozens of snipers who provided themselves with food and ammunition and fought in them to the end. In areas where "balcony" faults were found, there were always numerous natural cavities and the Japs moved from one to the other, always provided with alternate positions and escape facilities.

"Balcony" caves were extremely difficult to close because the porous nature of the rock absorbed shock and the hugeness of their mouths made extensive demolition necessary to be effective. As natural

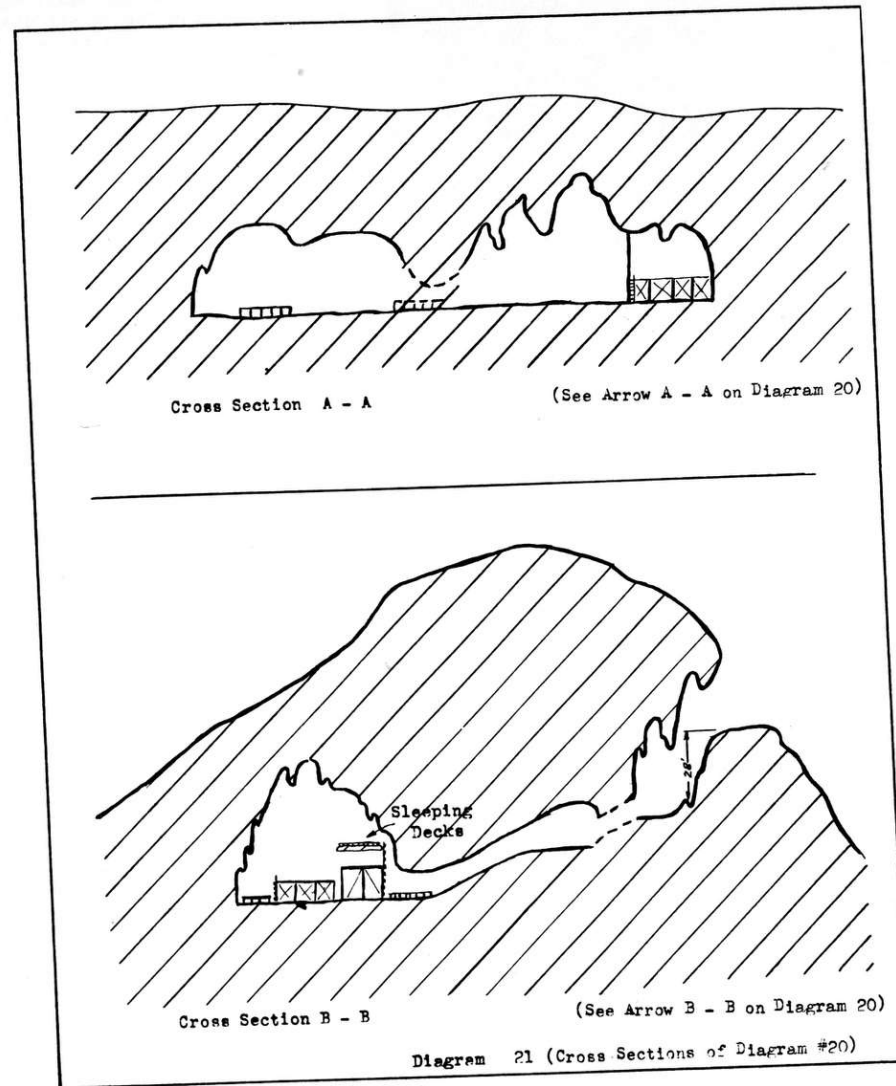


Photo 24.

CONFIDENTIAL



CONFIDENTIAL



CONFIDENTIAL



Photo 25.

as sand bag partitions and automatic weapons (see Photo 24). This mouth is located high on the ridge in an interior valley. Directly behind the mouth was a large natural room (area 2 of Diagram 20) which had at one time been part of the mouth. The Japs had closed all but two small entrances to it and used it as a protected area for personnel functioning in the mouth. Photo 25 shows the tunnel and stairway leading into area 2 from area 1 (Diagram 20). An OP existed above the cave and interior lines of communication ran through the valley from it.



Photo 26.

caves their interiors were always provided with numerous small holes and crevices running in all directions which could be used as protected hiding places.

The cave mouth shown in Photo 23 is part of a series of natural caves which were prepared as the battle CP of the Jap Army forces (9 on cave location map) (see Diagram 20). Because of their location in the lower ridge area, they were exposed to considerable fire and the possibility of their being bypassed dictated evacuation early in the battle in favor of the alternate battle CP in the final defensive area.

Within the "balcony" mouth (area 1 of Diagram 20) numerous rooms had been installed as well as sand bag partitions and automatic weapons (see Photo 24). This mouth is located high on the ridge in an interior valley. Directly behind the mouth was a large natural room (area 2 of Diagram 20) which had at one time been part of the mouth. The Japs had closed all but two small entrances to it and used it as a protected area for personnel functioning in the mouth. Photo 25 shows the tunnel and stairway leading into area 2 from area 1 (Diagram 20). An OP existed above the cave and interior lines of communication ran through the valley from it. From the lowest portion of the balcony area a tunnel ran down to a series of six large vertical cavities on various levels down and through the ridge. The last cavity (8 on Diagram 20) gave access to the eastern side of the ridge looking over the flat area of the island. In the mouth of this cavity a 75 mm gun was emplaced and a group of mortars was located nearby. Cavity 8 (Diagram 20) is both the eastern entrance and the combat portion of the caves. Room 7 was an ammunition storage and refuge area for the gun crews. It was protected by a bottle-neck tunnel (A). Room 4 served as a food storage compartment and mess hall (see Photo 26), rooms 5 and 6 were enlisted men's quarters and tunnel "D" was in the process of being constructed as a private entrance to the enlisted men's area

CONFIDENTIAL

Photo 27.



Photo 28.



Photo 29.



CONFIDENTIAL

and an alternate escape route. Room 3 was provided with floors, roof and furniture. It has wood-partitioned rooms built one above the other. It served as the officers' quarters while area 1 was the administrative center. At the upper part of the balcony mouth an artificial room had been constructed with wooden floors and closets and tin walls and roof. It probably served as the living quarters of Col. Nakagawa, CO of the Japanese 2nd Regiment (see Photo 27).

Throughout the entire cave many natural pockets and fissures are found. They served as small ante-rooms and hiding places. Tunnels "A", "B", "C" and "E" were built in bottle-neck fashion and provided a defense. Tunnel "B" had a 3-foot high threshold as defense against liquid weapons (Photo 28 shows tunnel "B" from room 7 to 4 through tunnel "B"). Tunnel "C" was protected by a sharp turn and tunnel "E" by a steep slope. A flame-thrower used in area 1 did not penetrate room 3. Similarly one used in room 7 did not penetrate to room 4. Numerous bomb and artillery hits around the cave knocked out the 75 mm gun in the mouth of 8 but did no further damage. Demolitions used in 1 and 8 only served to open the mouths wider.

These caves successfully withstood the aerial and naval bombardment, artillery and portable flame-thrower attacks. Their weakness was their insecure tactical location which is a frequent disadvantage of natural caves.

Of similar formation was a cave system which existed in the northwestern sector of the final defensive area (10 on cave location map). One of the lines of communication running north and south in the interior valleys passed close by it. It had an excellent commanding location and view of the northwest sector. A 75 mm mountain gun was emplaced behind a huge rock near its mouth covering the west beaches and west coast road (see Photo 29).

This "balcony" cave was located at the rear of a horseshoe shaped ridge, and artificial tunnels led to large vertical cavities in each arm of the horseshoe. In Diagram 22, "A" is the "balcony" cave, "B" and "C" are the vertical caves connected to it. The tunnel which runs to "B" had a small escape hatch at "D" which served as ready refuge for the men manning the 75 mm gun. "B" was considerably lower in the ridge than "A" and served as a storage room. At the mouth of "B" in the valley, a mortar position was located and a short artificial tunnel from the mortar positions into "B" provided available refuge for the mortar crews. A steep cliff separated this remote little valley from the road on the west. The tunnel leading to "C" was narrow and winding. Room "C" was a large vertical cavity, deep within the ridge, which served as a completely sheltered personnel cave.

In order to take these caves we were first required to fight to their entrances. Portable flame-throwers cleared "A" and "B", demolitions sealed both entrances to "B" and the entrance to "C". Later Japs dug out of them and gasoline was poured into "A" and into both tunnels, with good effect. However, as late as March 1945, 6 months after our original assault, a live Jap was found hiding in a natural crevice deep in "A". This mouth was 85 feet long and twenty feet high from its lip to its overhang. From its lip the floor descended sharply 40 feet down, and throughout it was a maze of cracks, crevices and small hidden rooms.

Last among the improved natural caves are the vertical fault type. These are numerous and are found in all areas either high or low in the ridge. Some are on the outside surface of the ridge and have natural openings, others are deep within the

CONFIDENTIAL

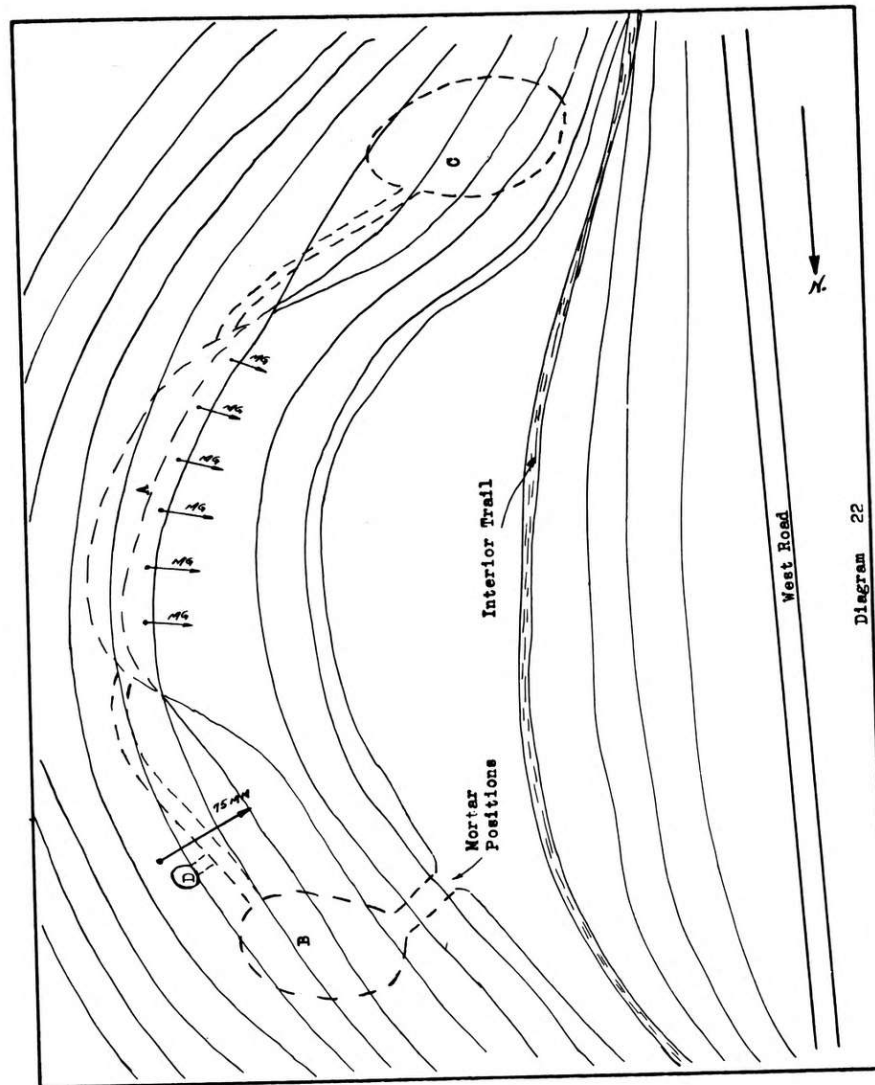


Diagram 22

CONFIDENTIAL

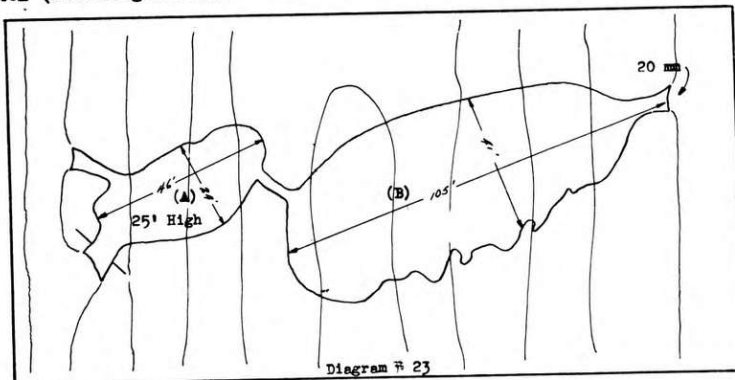
ridge and had to be tunneled into. Rooms 3, 4, 5 and 6 of the caves in Diagram 20 are of this type. They are best described as caves whose height is greater than their length or breadth.

Vertical caves were usually larger than the other types. They served as personnel and storage caves, as hospital caves and as excellent artillery emplacements when they had large natural mouths. A few of them were too poorly located to be of use to the Japs, but most of them had been occupied and improved. For general storage purposes considerable improvement was necessary. Rarely did they have the numerous horizontal holes and hiding places within them, which were so important in the others. Their high roofs made the removal of stalactites unnecessary. As in the case of others, the floors had to be leveled, walls squared and entrances improved.

The wide entrances of those on the outside of the ridges made them easy to locate, impossible to camouflage. These were difficult to defend and did not provide sufficient protection for personnel, requiring the digging of escape tunnels or passages into other cavities. Where they existed in close proximity to each other or other type natural caves, they were connected to them. Where they stood alone, adjoining artificial caves had to be constructed.

Those located deep within the ridges were also used by the Japs. By digging narrow winding entrance tunnels, the Japs made available large comfortable rooms protected from attack. These were not as useful for artillery or small arms positions but they were excellent personnel and hospital caves. However, the small twisting entrance tunnels were easy to seal up and many of them became tombs. Cave "C" in Diagram 22 illustrates such a cave. They were perfect for the type of warfare the Jap defense degenerated into, "the hiding and protected places by day and moving about only at night". Logically, therefore, the caves in which resistance was finally ended were of this type. As was the cave in which Col. Nakagawa and Major General Murai committed "seppuku".

Foremost of the vertical caves were the ones used as the naval communications center (11 on cave location map) adjacent to the CP cave shown in Diagram 20. The communication center consisted of two large vertical caves which had been connected by a tunnel (see Diagram 23). Cave "A" served as a living area; it was complete with



CONFIDENTIAL



Photo 30.

When the Japs evacuated their primary battle CP there was no longer a necessity for a communication center in this area; they therefore abandoned this one simultaneously. They did not abandon it, however, without leisurely smashing the radio equipment and switchboard. They left a handful of men behind to man the 20 mm guns and to hold us off by sniping. Thus the caves served alternately as a communications center

kitchen equipment, steel cots and electricity and gave access to an interior valley with a protected line of communication. Photo 30 shows a portion of this room after it had been wrecked by small arms fire and flame-throwers. Photo 31 is the entrance to cave "A" (Diagram 23) and it illustrates the tremendous mouths some of these caves had. A mouth of this type is difficult to camouflage, but is impervious to demolitions prepared to close it. Cave "B" gave access to the eastern flat area of the island; 20 mm cannon were mounted in its mouth, and radio equipment and a telephone switchboard, connected to vital points by a system of steel cable laid on the ground, were located within it.



Photo 31.



Photo 32.

CONFIDENTIAL

and as a strong point.

Forty nine Japs were able to successfully hide in one "vertical cave" (12 on cave location map) until approximately D plus 100 when a POW confessed to their whereabouts. Every available type of weapon, except the mobile flame-thrower which could

not traverse the difficult terrain, was used on this cave without effect (see Photo 32). As a last alternative the entrance tunnel was plugged with cement, yet months later the Japs scooped out the ledge under the cement and some of them escaped. Located in a very inaccessible area, a small twisting tunnel completely camouflaged, gave access to a vertical shaft which went down into the main room (a on Diagram 24). An ante-room (b) led off from the entrance tunnel and served as a perfect sniper's position to pick off anyone daring to squirm through the entrance. Water and air seepage, combined with food foraged at night and stored in the cave, enabled the Japs to live in it so long, even after it had been closed.

The cave had no use other than as a hideout. There were no guns or sniper positions at its mouth although its occupants could have, and probably did, cause considerable damage by sniping

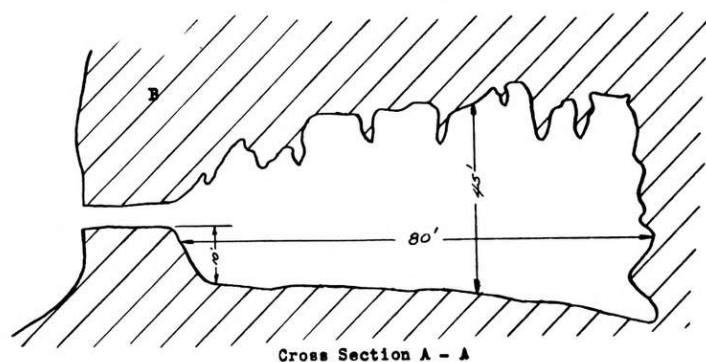
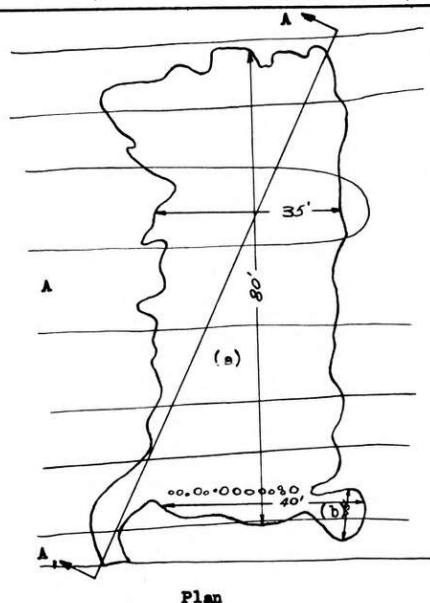


Diagram 24

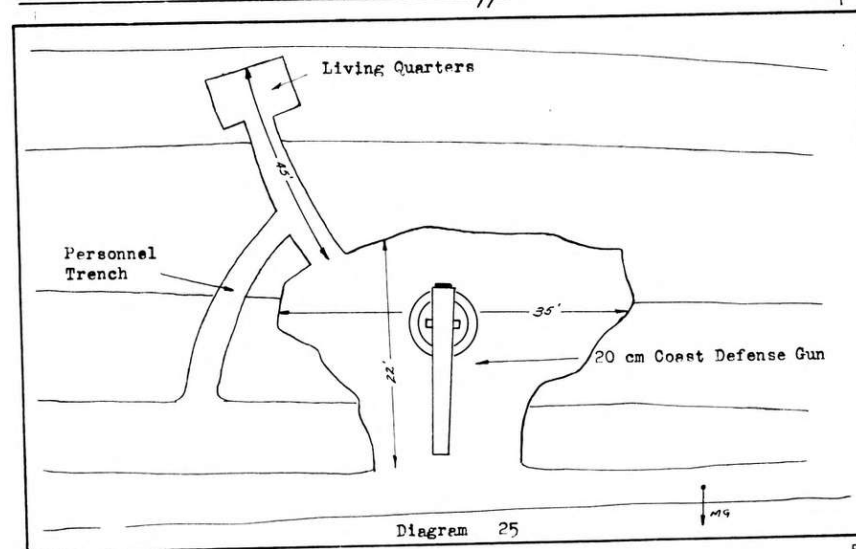
CONFIDENTIAL

from nearby trees and then scurrying into the cave.

An ingenious use of wide-mouthed vertical caves was the Jap trick of emplacing heavy artillery within them. One such cave contained a permanently emplaced 20 cm naval gun which was located on the lower east slope of "Bloody Nose Ridge", calculated to fire over the eastern beaches (13 on cave location map). This cave was perfectly



Photo 33.



CONFIDENTIAL

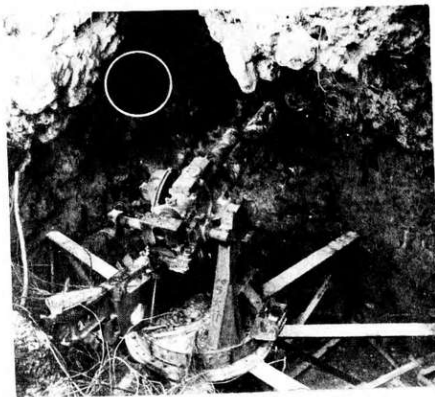


Photo 34.

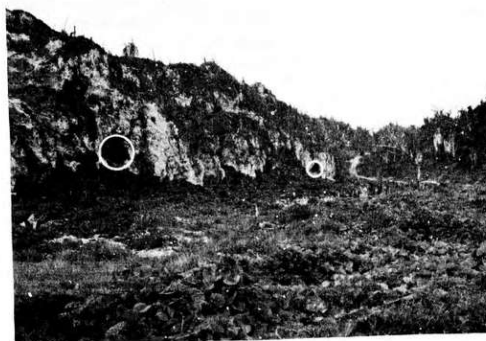


Photo 35.



Photo 36.



Photo 37.

CONFIDENTIAL

In the area of the final Jap defense, the "Hell's Pocket" sector of "Bloody Nose Ridge", vertical caves are also found. The Japs mounted antitank guns in two vertical caves on the western wall of East Valley facing south to cover the bridge across the swamp, which was the logical entrance to this valley (14 and 15 on cave location map). Photo 35 illustrates the position of these two caves as seen from the south.

The Main Valley of the Pocket was similarly defended from a vertical cave (16 on cave location map). At its northern end the vertical cave shown in Photo 36 was situated so as to be able to cover the entire valley and the southern draw giving access to it. By mounting a 75 mm gun in this cave the Japs prevented our mechanized equipment from entering the valley for many days. Photo 37 gives a general idea of the location of this cave at the head of the valley and illustrates its point blank field of fire.

The hub of the Jap defensive fortifications and the spot where resistance finally ended, was the most inaccessible pocket of the entire ridge. Here a natural formation resembling a well 25 feet in diameter and containing three small vertical caves, was used as a final command post (17 on cave location map). Diagram 26 illustrates how perfectly nature had protected this area. Cave "B" served as a communication center. It had a complete radio installation and a sniper's port over its entrance which protected the opening at 2. Cave "A" was the administration cave. It was protected by two sniper ports defending entrance 1. A vertical tunnel led from cave "A" to cave "C", where Col. Nakagawa and Major General Mural were hiding. Both of them committed hari-kiri when the radio ceased to function and we had won the approaches to this position. In Photo 38 (through A-A on Diagram 26) cave "A" is seen on the left with the sniper port to its right, entrance 2 with another small cave beyond it is in the center and cave "B" is on the right.

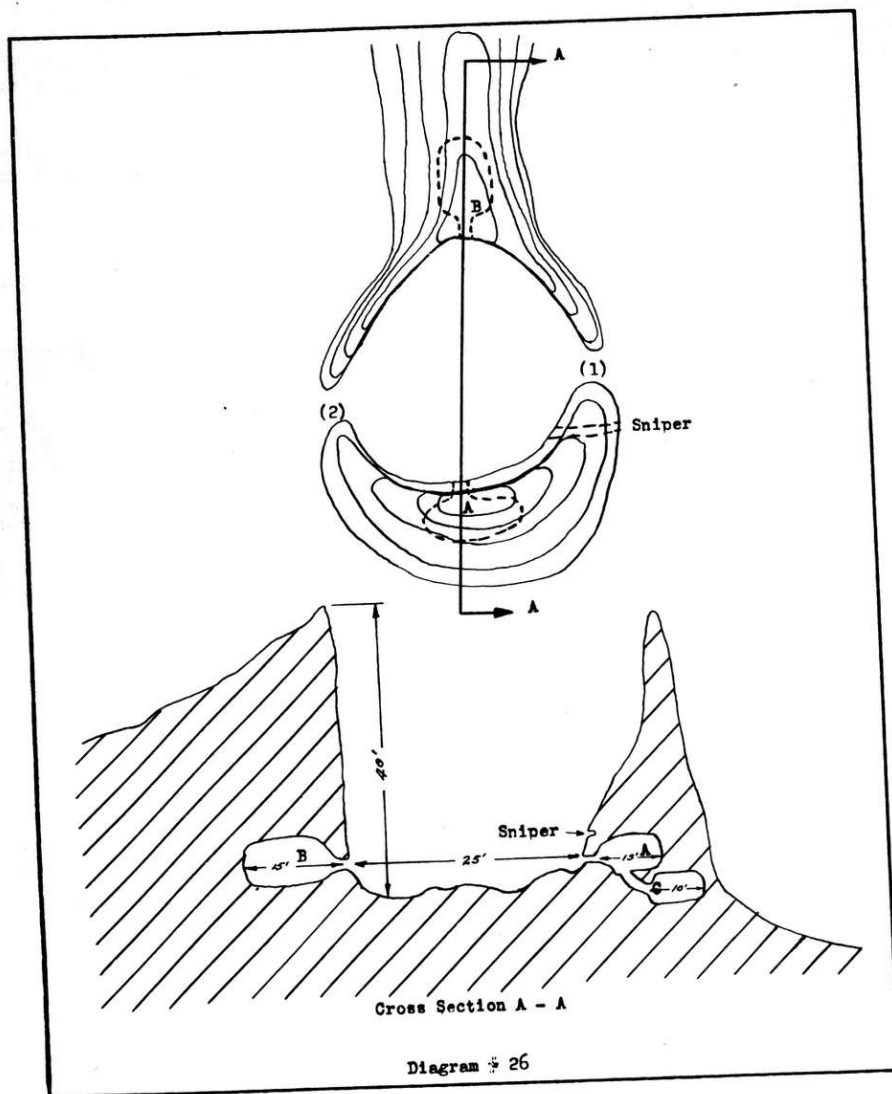


Photo 38.

CONCLUSION

No attempt is made here to deduce any hard and fast principles of Jap military cave technique, but the following seven points are worth considering:

The Jap has profited by his bitter experiences and is determined to defend the islands he still holds by utilizing ever natural cavity and augmenting these with



underground installations as complete as time and equipment will allow.

He will prepare his underground defenses cleverly, to take advantage of terrain features, will camouflage them against aerial and ground observation - perhaps with live trees and natural foliage as on Peleliu; and will be prepared to fight in them to the last man.

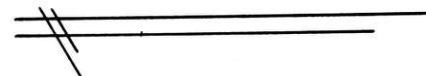
We cannot depend on naval and aerial bombardment or field artillery to dislodge him from his prepared positions but will have to assault and reduce them one by one.

His artificial caves in other areas may be similar to the shapes and sizes found on Peleliu and described herein.

Caves in naval areas will usually be extensive air raid shelters or coast artillery emplacements.

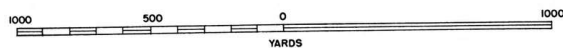
Army caves will be smaller, more numerous, will be interlocked with pillboxes and communications trenches, and will contain prepared defenses against ground attack.

Long range flame-throwers, mobile enough to traverse very rugged terrain and equipped to ricochet liquid around turns and corners, will be the best solution. Rifle grenades and phosphorous grenades will be effective in some instances but ordinary small arms fire will be comparatively ineffective.



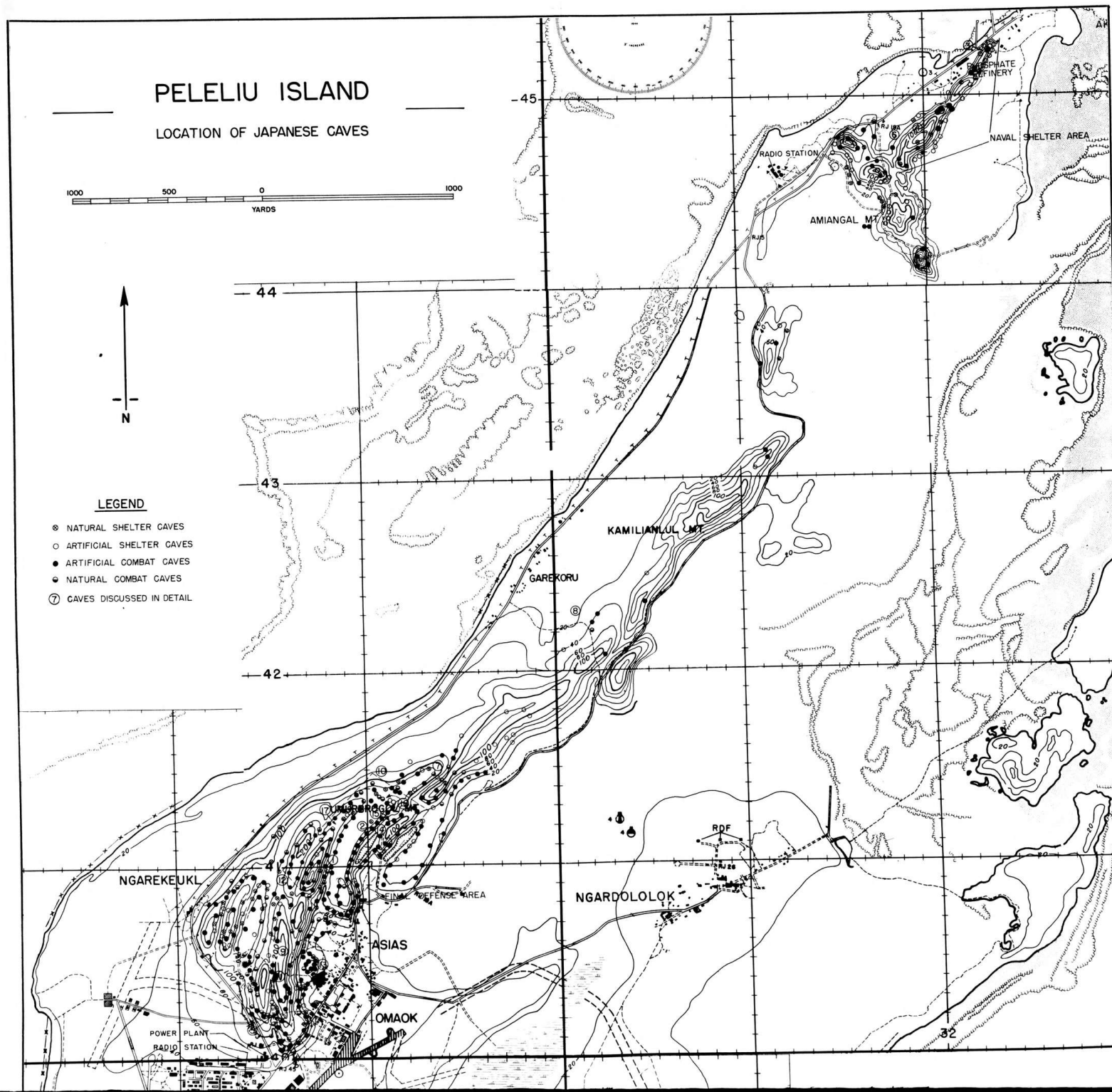
PELELIU ISLAND

LOCATION OF JAPANESE CAVES

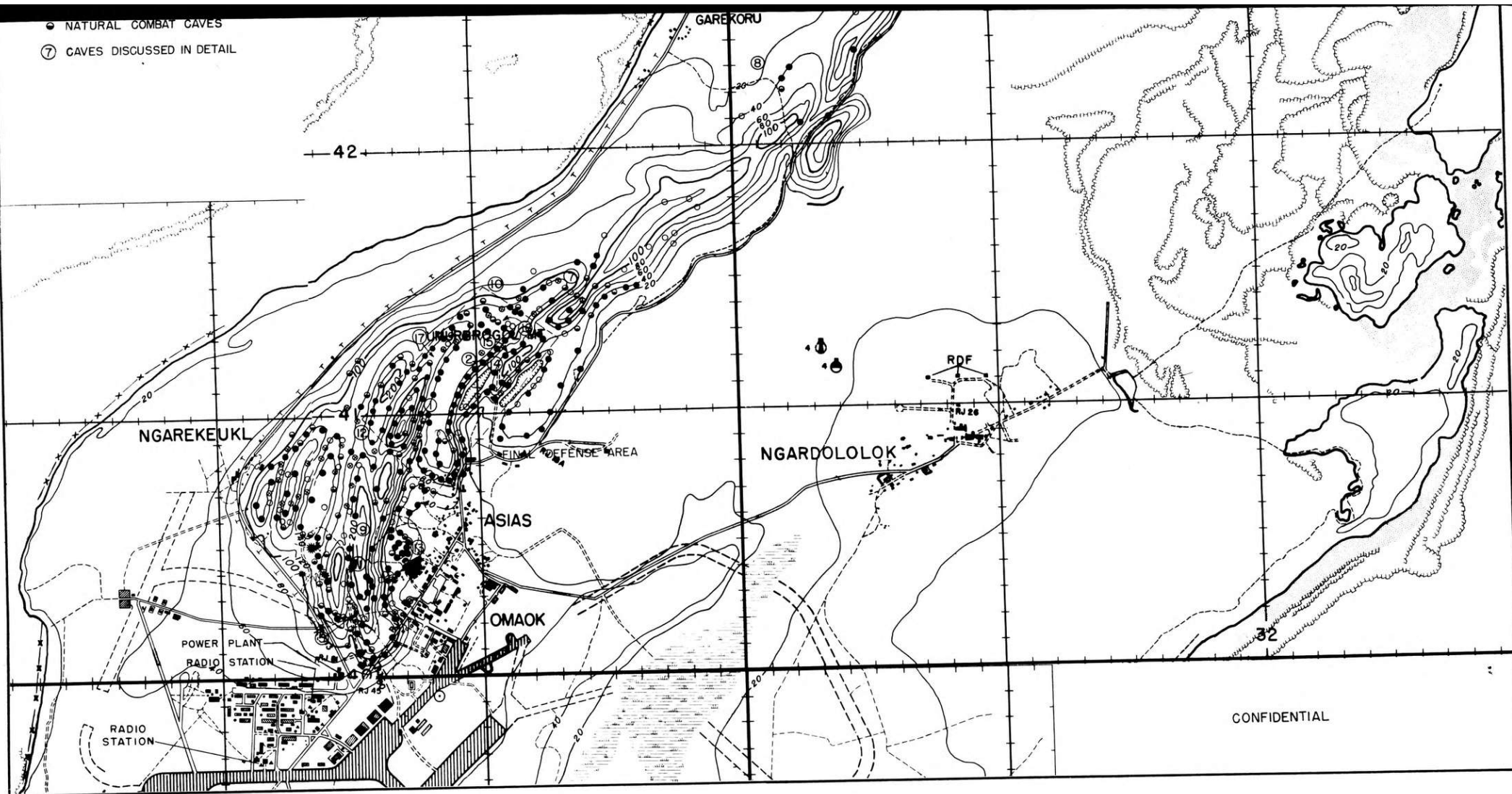


LEGEND

- ⊗ NATURAL SHELTER CAVES
- ARTIFICIAL SHELTER CAVES
- ARTIFICIAL COMBAT CAVES
- ◐ NATURAL COMBAT CAVES
- ⑦ CAVES DISCUSSED IN DETAIL



- NATURAL COMBAT CAVES
- ⑦ CAVES DISCUSSED IN DETAIL



CONFIDENTIAL