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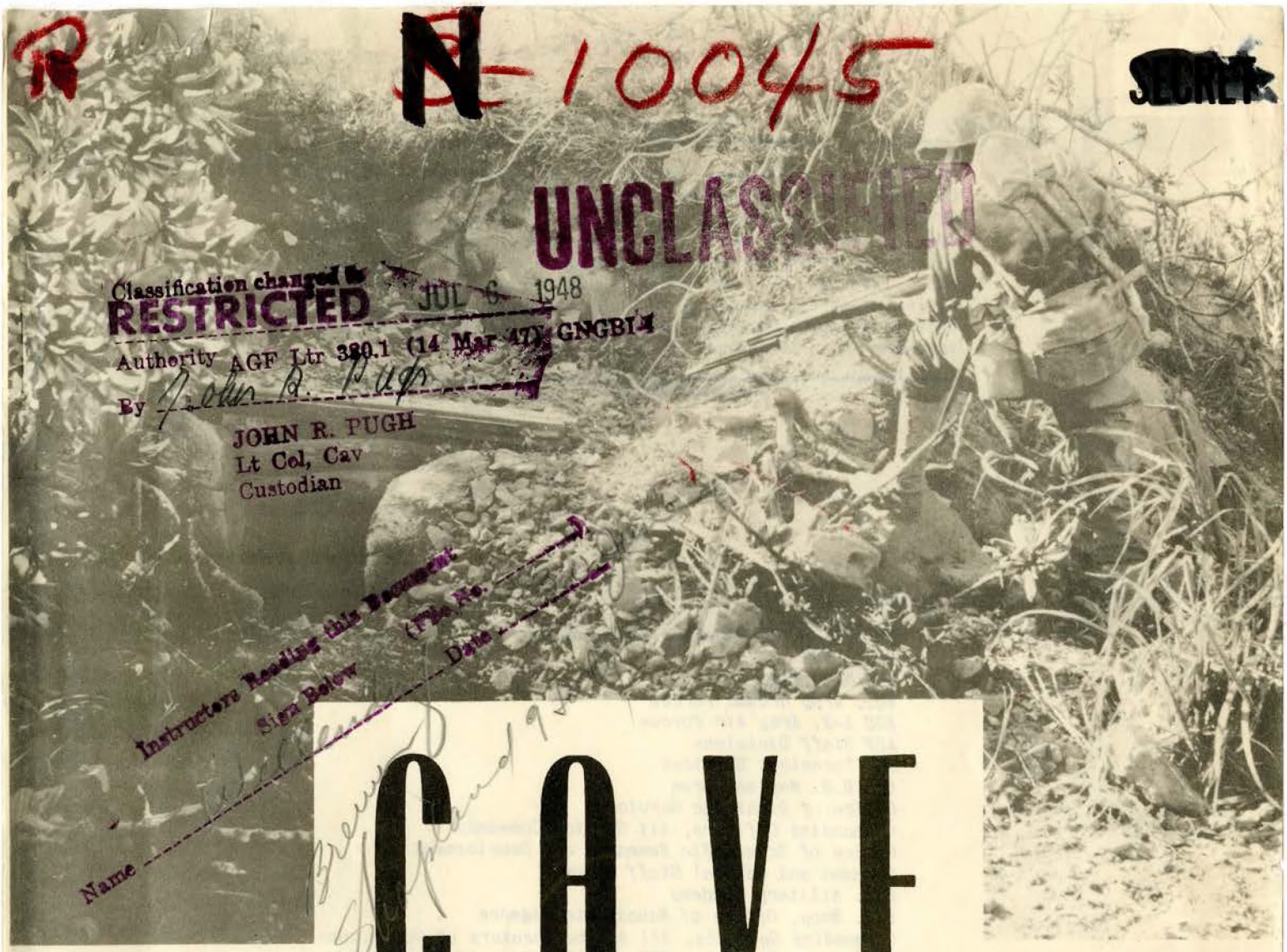

CAVE WAR

PUBLISHED BY OFFICE, DIRECTOR OF INTELLIGENCE
ARMY SERVICE FORCES
SPECIAL TECHNICAL INTELLIGENCE BULLETIN NO.10
24 JUNE 1945

THIS BULLETIN WAS PREPARED IN COLLABORATION WITH NEW DEVELOPMENTS DIVISION, WAR DEPARTMENT SPECIAL STAFF; OPD, WDGS; ARMY GROUND FORCES HEADQUARTERS; ORDNANCE DEPARTMENT, CORPS OF ENGINEERS AND THE CHEMICAL WARFARE SERVICE. IT IS ISSUED TO INFORM APPROPRIATE COMMANDERS OF SOME OF THE PROBLEMS INVOLVED IN CAVE WARFARE, SOME EFFECTIVE METHODS AND EQUIPMENT SO FAR EMPLOYED, AND THE TRENDS OF DEVELOPMENT IN TECHNIQUES AND MATERIEL, IN ORDER TO STIMULATE FURTHER DEVELOPMENT AND SPEED SOLUTION OF THE PROBLEM.

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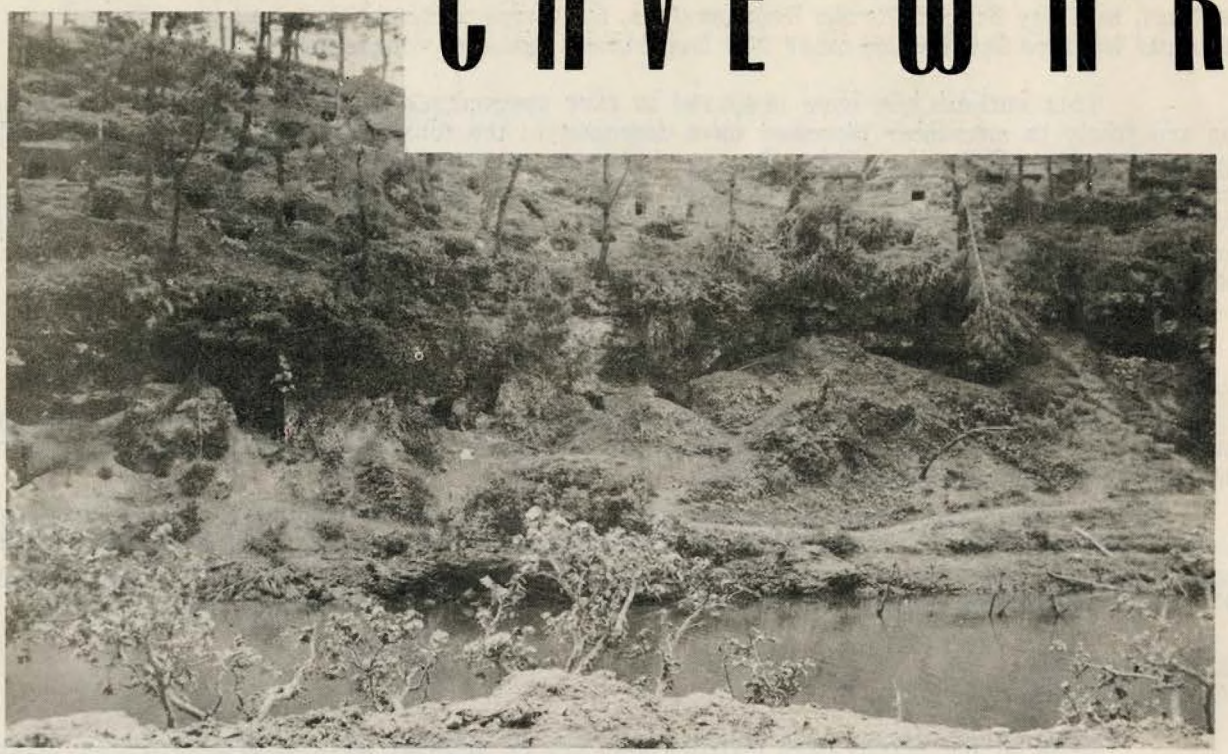


Typical of the intricate Jap cave networks is this hillside on the HISHAGAWA River, Okinawa.

The Japanese have gone underground. They are placing increasing dependence on intricate networks of strongly-defended natural and artificial caves to block American penetration into their vital areas.

On Peleliu, in the Philippines, at Iwo Jima and Okinawa, Japanese commanders relied upon strong cave defenses to inflict prohibitive casualties on U. S. invasion forces, and at the same time to conserve their own forces. While their efforts failed, American casualties and loss of time were serious enough to make clear that Japanese cave tactics are a major problem in future assaults. U. S. casualties both at Iwo Jima and Okinawa were far greater in proportion to Japanese killed, than in previous Pacific campaigns.

Cave Defenses for The Jap Homeland

Pacific commanders expect even more ingenious and widespread use of cave defense tactics as they approach the heart of the Japanese Empire. Japan itself is admirably suited for this mole-like defense -- it is mountainous, with a comparatively poor road net serving restricted plains which are commanded by difficult heights; the heights themselves are crossed by easily-defended passes. It has become clear that the enemy will apply his fanaticism and ingenuity to perfecting cave defenses, and will man them skillfully and tenaciously.

Chief of Staff Orders Action

At the personal direction of the Chief of Staff of the United States Army, appropriate

Army elements have launched an intensive program of analysis and development to provide the most effective techniques and weapons to destroy Japanese cave defenses. Work on this project is now underway, under direction of the New Developments Division of the War Department Special Staff, in Army Ground Forces Headquarters, the Corps of Engineers, Ordnance Department, Chemical Warfare Service and other War Department agencies concerned.

This bulletin has been prepared to give appropriate commanders, especially those who are likely to encounter Japanese cave defenses in the future, all possible information on equipment and methods best suited for the reduction of these defenses in the shortest possible time and with the fewest possible casualties. It emphasizes the weapons and equipment designed and procured by the Army Service Forces; the attendant discussions of tactical operations are based on information from anti-Jap theaters, do not represent official OPD, ASF or War department doctrine, but are included as an essential part of the story of cave warfare.

JAPANESE CAVE DEFENSES

Much of the terrain over which we must fight the Japanese is pocked with natural caves which become strong defense positions for the enemy. Other terrain lends itself to easy construction of such underground defenses.

In the initial stages of an operation, it is likely that the defended caves will fit into a logical pattern, sited to cover approaches to strategic points or areas, and intended to influence the course of operations. But once Japanese resistance has lost its coherence, enemy troops will be found defending caves anywhere, regardless of their effect on the main operations.

Cave Entrances Are Hard to Find

Most of the enemy cave fortifications are so situated as to be protected from direct shell fire. They are usually constructed with several cunningly-hidden entrances to permit escape or counterattack if the main entrance is blocked.

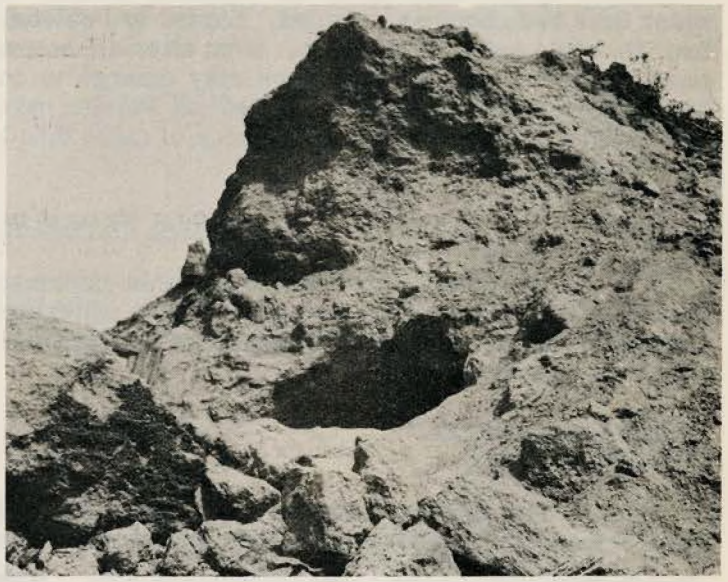
On OKINAWA, burial tombs like this one have been stubbornly defended.

[redacted]

The caves vary widely in size, ranging from small holes barely large enough for a sniper or LMG crew, to tremendous installations with several levels, electric lighting, running water, commissaries and dispensaries. The 43rd Division captured a cave near Manila built on four levels, connected with an intricate stairway system and housing some 1500 men.

Garrisons May Be Protected
Against Flame and Explosives

Most difficult to neutralize are the natural caves with many twisting tunnels, in which the enemy can take refuge from shelling, flame and demolitions. Such natural positions are usually improved by Jap engineers; they may have concrete or steel gun ports and steel doors to the numerous entrances. They may house weapons of all types up to light or medium artillery.



These cave positions found on Iwo Jima were hard to neutralize. The cave on the left led up to an AA position and the cave shown above was formerly a Field Artillery gun emplacement.

Japanese prisoners indicate that cave entrance sites have been planned to make approach of Allied armor difficult or impossible, and an observer from Okinawa reports that cave entrances are often 25 to 50 feet above the level of the surrounding ground, and concealed in terrain so rugged as to bar the use of armor.

All entrances are usually defended by snipers, grenade discharges, obstacles and mined approaches. From these concealed defenses, the Japanese dart out in surprise attacks on flamethrower and demolition teams, or upon groups of attacking forces who appear sufficiently weakened by losses to make such an attack successful.

Coordination of fire from supporting positions is a cardinal point of Japanese doctrine. Hidden AT weapons, snipers, and "human bombs" may be encountered on flanks and rear when attacking a cave position.

Japanese Seeking
Anti-Flame Defenses

Flame has been a major factor in liquidating Japanese cave positions, although it has

[redacted]

been only partially successful in cleaning out large or intricate caves, in which the enemy may take refuge in tunnels or recesses. But it is one weapon the Jap fears, and he is making every effort to combat it. Mention of fire-resistant clothing is made by POW's and in some caves, containers of water are placed to dampen protective matting. There is also evidence that Japanese under flame attack have hidden in 55-gallon drums of water, to emerge unscathed when the flame dies down. Major defense, however, is to attempt to kill the flamethrower operators before they get within range.

Natural Advantages of Caves
Intensified by Jap Tenacity

The natural tactical advantages of a cave defense in difficult terrain are further heightened by the tenacity of the Japanese soldier. Fire may continue to come from positions which have been bombed, shelled, flamed and satchel-charged until it no longer seems possible that life could exist within them. Even after all entrances have apparently been sealed and the position written off, the survivors may emerge to continue resistance or to flee. One group of Japanese remained alive in a sealed-off Peleliu cave from mid-September 1943, to February 1945, when the six survivors of a force of more than 1000 attempted to dig their way out and escape to the North.

BATTLE EXPERIENCES

In order to provide all possible information on this problem, the Combat Analysis Section of OPD WDGS extracted all available material on the subject from combat reports. These extracts point out how cave defenses were employed in specific situations, and the methods by which they were reduced.

Peleliu Caves Large,
Hard to Neutralize

The Japanese defenders of Peleliu holed up in large limestone caves, many of them used originally as air-raid shelters and storage points. These caves became the backbone of

This Jap cave on the beach at Peleliu served as an observation post and was difficult to find.

Large caves provided living quarters, storage and shelters for the Jap defenders of Peleliu.

their bitter last-ditch stand after air-bursts forced them underground and permitted U. S. troops to advance.

Flamethrowers, tanks, small arms and demolitions were all employed with varying success. Artillery fire against the positions employed WP with good demoralizing but little burning effect, and high velocity ammunition was recommended for use against cave entrances.

Point Blank Fire Forces
Japs Into Cave Recesses

Infantry attacks against cave-defending Japanese on Biak were preceded by tanks firing cannon and machine guns point-blank into located cave entrances, forcing the defenders to abandon the entrances and withdraw into inner recesses, thus permitting the approach of demolition parties. In some instances, gasoline was poured into cave mouths and fired by WP grenades;

The Japanese cave on the left had to be cleared before our troops could secure the Peleliu airfield. Above: A cave entrance on Peleliu after demolitions had been set off in the tunnel.

in other cases, demolition charges were placed under cover of smoke of flamethrowers, or were lowered into entrances or fired electrically or by primacord.

In another attempt to neutralize the caves, clusters of 4.2 inch mortar smoke shells were defuzed and No. 6 detonators substituted, and were then placed in cave entrances and fired electrically. In addition to the harassing effect in confined spaces, the drift of smoke trickling out of heretofore concealed openings revealed the extent of the position.

Flame Destroyed
Caves on Wakde

The flamethrower proved the most effective anti-cave weapon in the Wakde operation, although virtually every other infantry and infantry support weapon was also employed, including bazookas, small arms, mortars, and HE and WP fire. In one action a single flamethrower operator flushed a cave of its defenders, who were protected by a stone parapet across the entrance, by directing his fire at the cave roof. The flaming fuel splashed back and down into the cave, bringing out the defenders.

Last Ditch Saipan
Stand Was in Caves

When the Saipan operation entered its final phase, the Japanese took refuge in natural caves honeycombing the cliffs along the south shore. Frontal attack was frequently impossible, and overhanging ledges protected the caves from overhead approach. Many caves had several openings, and "every one presented a different problem", according to the combat report. It was found necessary in most situations to supplement standard procedure with new and experimental methods, but it was found that "cave attack is like attack against pillboxes, except that it requires more ingenuity on the part of the attacker".

WP fire brought out many cave occupants after bazooka fire from below, and concentrated 40mm fire from offshore LCI's had failed. Where overhanging lips prevented approach from above, drums of diesel oil - - fastened to guide lines to prevent swinging - - were lowered and fired by satchel charges and primacord. In another case, an air compressor with jackhammers drilled the overhang, which was blasted down over the cave opening; aerial bombs provided the explosive. Some deep caves were blasted by lowering aerial bombs into the entrances and exploding them.

The self-propelled 75mm M-8 proved extremely useful on Saipan where terrain permitted its use, but as in many other places where caves have been encountered, armor was definitely handicapped by the difficult approaches to the positions.

Cave Warfare in the Philippines

On both Leyte and Luzon the Japs used cave tactics, although without the same success that their troops in the Ryukyus and Bonins have had.

It was learned on Luzon, and has since been demonstrated at Okinawa, that superquick fuzes are ineffective against this type of defense. Delayed fuzes were used with considerable effect against positions in the Marikina River sector, sometimes closing caves with two or three rounds. Concrete-piercing M-78 (T-105) fuzed ammunition was used with some devastating results, the .05-second delay permitting deep penetration before bursting. Some caves were blasted by direct fire into entrances; others were sealed by shelling above the entrances to cause landslides.

Field expedients were resorted to with great frequency, and with varying degrees of success. In at least one instance drums of oil and gasoline were hurled at cave mouths by catapult, and the fuel then ignited by incendiaries.

A Luzon observer recommended that when cave defenses are organized in depth, smoke should be employed to blind observed support fire, and HE, WP, and flamethrowers should blast and burn away screening foliage. He considered demolition charges the most effective means of dealing with deep caves, and emphasized the need for careful reconnaissance before assault on dug-in-positions.

Cave Tactics on Iwo and Okinawa

The defenses of Iwo Jima and Okinawa saw Jap cave tactics brought to their peak to

Burial unit was Jap pillbox on Okinawa.

Jap cave entrance is fired on by a mortar.

date. On Iwo the Japs remained in their deep defenses during the heavy preliminary barrage, and pushed troops and weapons to the surface only when the ground assault jumped off. Prisoners reported the preliminary bombardment was "terrifying", but it did not produce many casualties.

Trenches, foxholes and pillboxes were tied into the cave network and the underground passageways whereever possible, so that destruction of an emplacement did not necessarily mean destruction of its defenders. Repeatedly the Japs pinned down the attackers with heavy fire, only to withdraw into the ground when the attacking commander called down artillery and air support. When the position was overrun, it was found to contain only a few dead Japs. Few Japs were seen in the open during the entire operation and this pattern was repeated at Okinawa, where neither Japs nor Jap weapons were often visible during daylight hours.

Jap Tactics Caused Heavy Casualties and Ammo Expenditures

These tactics caused comparatively heavy losses to the attackers, a terrific expenditure of ammunition, and the loss of time. On Iwo the Jap commander expressly forbade any mass heroics such as a banzai charge and his troops clung to their positions to the end, to prolong the defense and to exact as heavy a toll as possible. Once a position had been neutralized, it was by no means safe -- Japs infiltrated at night on the surface and under the surface -- and would reoccupy the positions.

Counter-Battery Fire Difficult on Okinawa

Counter-battery operations against cave-protected enemy guns on Okinawa proved extremely difficult, but it was learned that caves in this terrain could be neutralized by precision adjustment of artillery fire, using one gun to bring in the rest of the battery, with Cub plane observation.

"We need light weapons that can deliver a heavy volume of fire", said one observer from Okinawa. "The terrain prohibits use of much heavy equipment and weapons with not much firepower are without value. We hope that the new recoilless weapons may provide part of the answer.

View of reverse slope cave entrance on Iwo Jima

[redacted]

"The Japanese have taken full advantage of the terrain. They are well protected and when we do get to the top of a ridge, we have to fight every inch of the way down the other side, as well. Each cave costs us heavily in time and casualties. We can knock off the camouflage and put smoke into his position; we have done this with tanks -- but we have lost a lot of tanks doing it".

"It took us 18 days to get one gun firing on our airfield, 20 days to take a hill the size of the Pentagon Building. Self-propelled equipment that could not be knocked out by anything the Japs have may provide another part of the answer".

Colored smoke signal grenades were used effectively by the Okinawa assault forces. Billowing through a cave, it would issue from hidden entrances -- and then we would know the size of the job we had to do".

Combat Reports
Emphasize Coordination

The combat analysis reports indicate beyond doubt that the Japanese are capable of a tenacious well planned and well coordinated defense from both natural and artificial subterranean positions. Their use of terrain advantages is skillful and they have apparently abandoned the banzai charge, forcing us to go to them.

To combat these tactics, which are having increasing success, it has become apparent that no single weapon or technique is sufficient in itself. The answer lies in the complete coordination of all available weapons which can be employed, and above all in the exercise of ingenuity and careful planning.

Poor Planning
Likely to be Costly

A study of combat reports indicates that poorly planned attacks on Japanese cave positions, without adequate reconnaissance or coordination of weapons, will usually result in a repulse with heavy losses. The attack must be planned in advance, after thorough reconnaissance, and after all supporting weapons have been brought into the pattern of fire support. Every effort must be made, once the position is taken, to mop it up completely and to leave it in such a condition that the enemy cannot reoccupy it. (See FM 31-50)

WEAPONS AND TECHNIQUES

Army Ground Forces Headquarters points out that many problems of breaking cave defenses may be solved by careful application of the principles set out in FM 31-50, the basic field manual for attacking a fortified position. Army Ground Forces recommended an intense refocusing of attention on the methods outlined in this manual pointing out that the doctrine laid down here has proved successful in other situations involving many of the problems presented in cave warfare. Army Ground Forces pointed out that it was this doctrine that was employed so successfully in breaking the heaviest of the Germans westwall fortifications.

A comprehensive study of existing weapons and equipment and the manner in which they may be employed is under way to determine whether they are suitable for use against the defenses which we expect to meet in increasing strength and numbers. Modifications of some of these weapons are being considered, and at the same time new weapons and equipment are being designed and tested in the development of our anti-cave tactics. Existing materiel, and its modifications have been given priority over new materiel, because of availability and the time factor.

Chemical Warfare Service Attacks the Cave Problem

CWS has organized an intensive study of the problem; flame and smoke have both played an important role in the neutralization of underground defenses.

Flame is perhaps the most spectacular weapon thus far employed. CWS has undertaken to learn how flame kills. Tests using live goats, which resemble man in susceptibility to heat and gases, indicate that defenders of a large, well-ventilated cave will not be killed unless the flame is thrown directly on them. But in poorly ventilated caves-like the majority which

On Okinawa, this burial tomb housing Jap troops is fired by the portable flamethrower.

have been encountered - death will occur without the flame directly touching the defenders; it is caused by a combination of oxygen deficiency, heat, and high carbon monoxide and dioxide content. Lethal conditions persist in such a space for three or four minutes, governed by the volume of ventilation. These carefully-controlled experiments used all types of thickened and unthickened fuels.

Thickened Fuel More Effective

Killing effect of thickened and unthickened fuel are similar, the tests showed, but thickened fuel has proved more effective because of its ability to penetrate small recesses and openings. It was learned that in the average, poorly-ventilated caves one to one and a half gallons

of fuel per 1000 cubic feet of space within the cave must be delivered; four to five times that much is needed in well-ventilated caves.

Flamethrowers Are Effective
But Have Limitations In Cave War

Tests on all flame weapons are under way to determine their effectiveness and reliability in cave warfare. While flamethrowers have been one of the most widely used as well as one of the most effective anti-cave weapons, the complex construction of some Japanese defenses have occasionally prevented their successful use. Moreover, Japanese concentration upon eliminating flamethrower operators, and wider use of mined approaches and obstacles, may hamper the use of flame even more in the future.

(See ASF Special Technical Intelligence Bulletin No. 9. "FLAME", dated 2 June 1945, for a more complete discussion of the material and methods of flame warfare.)

One line of research is aimed at providing larger fuel containers, capable of being mounted on small carts and pulled forward, or left in the rear and connected to the flamegun by means of a hose extension. The manifold flamethrower is an example. Generally speaking, the limited fuel capacity of present models seriously inhibits their use against deep or complex fortifications.

Major success of portable flamethrowers has been in their employment to neutralize the target during the approach of a demolition party. The flame itself has been effective only against comparatively shallow and poorly-ventilated defenses where the defenders cannot withdraw to deep tunnels.

Mechanized Flamethrowers
Provide Large Fuel Capacity

Mechanized flamethrowers have been employed with considerable success at Saipan, Iwo Jima and Okinawa wherever terrain permitted them to get within firing range of cave entrances. Their large fuel capacity (300-gallons) permits them to give prolonged "heat treatment" that eventually may penetrate into virtually every recess. For this reason the main-armament mechanized flamethrower, E12-7R1, mounting a flamegun in a dummy 75mm gun tube, is ex-

Mechanized Flamethrower attacks cave entrance near Naha, Okinawa.

pected to be at least a partial answer to cave tactics. Auxiliary flamegun tanks, with their flame weapons mounted in the bow or periscope, are used to supplement the firepower of standard tank units.

One modification of the flamethrowing tank, developed by POA-CWS which also led in development of the flame tank itself- has been to attach a 500-foot length of hose to the large fuel container of the tank. The hose, attached to a standard flamegun, is then carried into terrain which the tank cannot penetrate, permitting delivery of a large volume of flame into enemy positions.

Cave positions have been bombed with droppable gasoline tanks filled with gelgas or some other highly inflammable mixture, but have not been very successful.

New CWS Weapons Are
in Field Test Status

Among new CWS weapons now in field test stage is the recoilless 4.2 mortar and 7.2 inch chemically-filled rocket shells for the single-rail launcher.

The 4.2 recoilless mortar, of which 1000 now are on limited procurement, is expected to provide supporting fire and can be moved close to the target.

A single-rail launcher for the 7.2 inch chemical rocket is believed to hold considerable promise in anti-cave attack, because it can be man-packed across rough terrain and will provide firepower comparable to field artillery.

Engineers Study Cave
Assault Equipment

The Corps of Engineers has several methods, techniques and types of equipment under study now to determine which are most effective against cave fortifications.

One method, although severely limited in application, is the "Water Treatment". If a considerable quantity of water is available, and if the structure of the cave is such that it will hold a sufficient amount without draining, flooding the cave is exceedingly effective. This method has been used, but is time-consuming and generally impracticable.

High Explosives
Effective

The use of high explosives has been probably the most effective method of all, but like every other method tried so far, it has its limitations, The accurate placing of explosive charges where they will do the most good is possible only after the outer defenses have been neutralized and adequate cover given the demolition crew. Charges have been placed by hand, by rope, by catapult and by poles, and have been fired electrically and by primacord.

Effect of the explosive will either kill the defenders by concussion, or more likely if well-placed, seal the mouth of the cave and let the defenders perish within. One U. S. division in the Philippines sealed 446 outlets of 137 caves in two days, and similar performances have been reported from Okinawa.

"Dragon" Has Not Been Effective

The "Dragon" -- 450 feet of hose projected from a tank and pumped full of liquid explosive -- has been tested but was unsatisfactory. This device designed to be hurled across minefields and then detonated to clear a path, is inaccurate and lacks sufficient range for cave operations.

The same objections apply to the use of the "Snake" against caves, since the "Snake" must be pushed into position and its lack of flexibility prohibits its use in rough terrain or on a steep slope.

Armored Bulldozers Seal Up Cave Mouths

The armored bulldozer and its cousin the tank dozer, both have shown themselves of considerable use. Protected by armor against small arms fire and fragments, they can approach

Armored bulldozer displays its value for closing caves.

The tank dozer is shown closing a cave entrance. Armored bulldozer is also illustrated.

close enough to cave entrances to use their powerful dozer blades in covering up the holes.

Armored cabs for bulldozers are requisitioned separately, and can be assembled and mounted in approximately 36 hours.

The tank dozer has been extremely useful, being able to approach cave entrances which are still defended. The blade mounting does not reduce the effectiveness of the tank, which can still use its weapons, and the blade can be jettisoned within 10 seconds. Antitank weapons and mines must be neutralized before the tank dozer can operate in safety.

New Ordnance Material

The Ordnance Department feels that it has existing weapons capable of destroying any type of Japanese fortifications. Many of these are now present in the theater and others are on the way.

These weapons include the Pershing M26 heavy tank, some of which are already on the way to the Pacific combat areas, the M40 155mm Gun Motor Carriage, M36 90mm Gun Motor Carriage, M18 76mm Gun Motor Carriage, M24 Light Tank, T89 8-inch Howitzer Motor Carriage, 57mm and 75mm Recoilless Rifles, T66 4.5-inch Multiple Rocket Launcher, and the ground launched 250-pound rocket propelled GP aerial bomb using unit jet propulsion, T-13.

The Pershing tank, heavily armored and mounting a high-velocity 90mm gun, should prove effective against such positions that it can reach. Its broad tracks and comparatively low ground pressure will permit it to penetrate terrain heretofore barred to armor, while the flat trajectory of its M3 gun makes it an excellent weapon against pin-point targets. Ammunition recommended by Ordnance is the 90mm HE shell with CP, M78, fuze and 90mm APC projectile, M82.

The new Pershing tank

Self-propelled 8-inch howitzer

Self-propelled 155mm gun, M40

4.5-inch multiple Rocket Launcher, T66

M40 and T89
Provide Heavy Fire

The M40 155mm Gun Motor Carriage and 8-inch self-propelled howitzer T89 will be capable of putting down a terrific volume of fire on Japanese defenses, if the terrain permits their use. The M40 is mounted on a chassis similar to the M40 Sherman tank, but lighter, longer and lower. Highly mobile and protected by some armor, the M40 should prove valuable.

The T89 is mounted on a chassis of the M20 series, with torsion-bar suspension and wide tracks, permitting it greater maneuverability than is usually associated with such a heavy weapon.

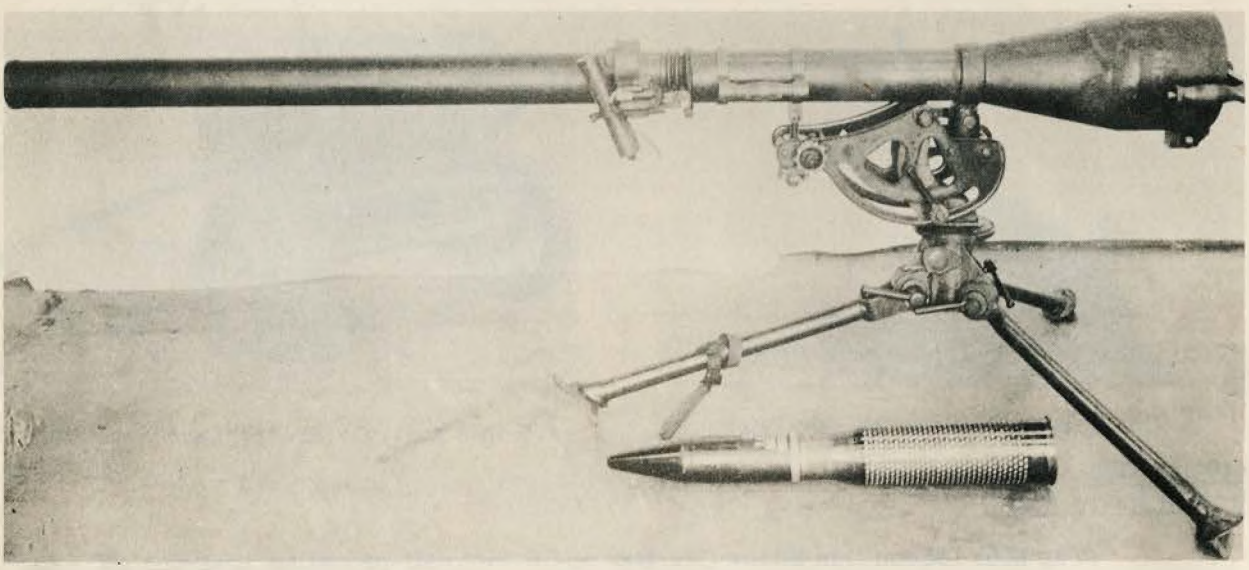
The new tank destroyers M18 and M36, mounting the high-velocity 76mm and 90mm guns respectively, are expected to be valuable. Flat trajectory fire employing the M78 concrete-piercing fuze, should prove effective.

The M24 light tank, which is supplementing the M5, mounts a 75mm gun and is highly maneuverable in rough terrain.

Recoilless Rifles
Open New Field

It is in this field that the newly-standardized 57mm and 75mm recoilless rifles now being demonstrated in four theaters, are expected to supply highly mobile weapons of great effectiveness. The 57mm, standardized as the M18 (T15E13), weighs 40.25 pounds and can be

57mm Recoilless Rifle, M18



75mm Recoilless Rifle, M20, and complete round of HE A/T ammo

carried and fired by one man, either from a bipod or tripod mount or from the shoulder. Its 5.30-pound projectile has a muzzle velocity of 1200 feet per second and a maximum range of 4300 yards. The weapon will be placed in the T/O & E of the rifle company, infantry regiment.

The 75mm M20 recoilless rifle, provides the infantry with another powerful weapon. Preliminary reports indicate the weapon is definitely superior, and emphasize the need for immediate distribution not only to troops in the field but also for redeployment training. This tripod-mounted gun fires a projectile with a muzzle velocity of 1000 feet per second and a maximum range of 7400 yards. Weight of the complete HE round is 21.85 pounds, and of the smoke shell is 22.61 pounds.

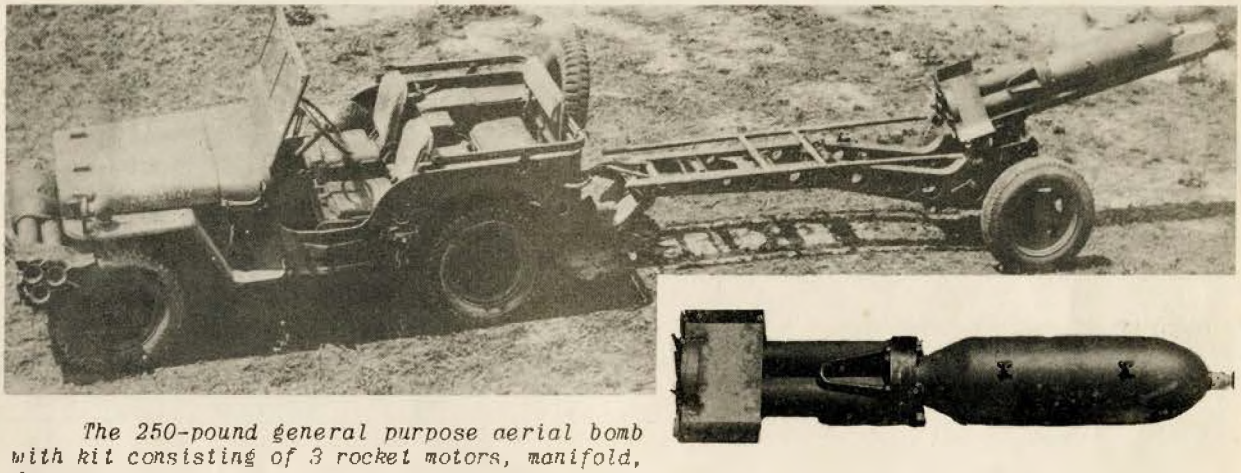
A tenative basis of issue for the 75mm rifle calls for issue to infantry division Headquarters and Headquarters Companies, to infantry battalion anti-tank platoons. Armored divisions will receive them for Armored Infantry Battalion rifle companies and for divisional headquarters Company. (For tactical employment see WDTC No. 25, June 1945).

A similar weapon, the 105mm recoilless rifle is under limited procurement and will become available at a later date. (January 1946.)

Rockets Have Potentialities

The 1050-pound, 24-tube T66 multiple rocket launcher, mounted on a light two-wheel carriage, can blanket a target with its 4.5-inch rockets fired in ripples at 0.5-second intervals, with a range up to 5250 yards.

The Pacific Theater has been offered an introductory team and equipment to demonstrate a new weapon -- the ground-launched, rocket-propelled 250-pound general purpose aerial



The 250-pound general purpose aerial bomb with kit consisting of 3 rocket motors, manifold, fin assembly and fuze substituted for the regular tail fin assembly is towed on the pack howitzer launcher. The bomb litter rides on the carriage trail. Inset, enlarged view of the bomb, experimental model now being tested.

bomb. This weapon, consists of a single rail which replaces the gun tube and breech on the 105mm howitzer carriage M3 or the 75mm pack howitzer M8. A kit provides a fuze, a manifold, three rocket motors and a fin assembly, all of which are attached to the tail of a standard 250-pound GP bomb, from which the tail assembly has been removed. Tests have shown an effective range of approximately 500 yards with a dispersion area of 20 yards by 25 yards.

The rail assembly weighs 300 pounds, the kit 93 pounds, the equipment is expected to be maneuverable in virtually any terrain.

Body Armor Provides Protection For Assault Teams

Experiments with body armor have resulted in development of comparatively lightweight armor which is capable of providing limited protection against shell fragments. Two types have been designed. One, the T62 armored vest, is fabricated of aluminum plates padded with nylon, and weighs nine pounds, one ounce. The other, the T64 armored vest, is fabricated from the same materials and weighs 11 pounds, 10 ounces. Both afford a protec-

Body Armor

[redacted]

tion area of approximately three and a half square feet and may be folded into a package four by ten inches. Provision is made for attachment of a protection apron. The armor may be worn over or under combat clothing, and will not interfere with the use of other equipment. The apron provides .65 sq. ft. protection to lower abdomen, triangle shaped and weighs approximately 1.5 pounds.

Four thousand of each type, plus 8000 aprons, have been authorized for immediate shipment to USAFFE for field test, and an additional 100,000 T64s have been authorized for procurement. The schedule for completion is 10% June, 40% July, 50% August, 1945.

[redacted]