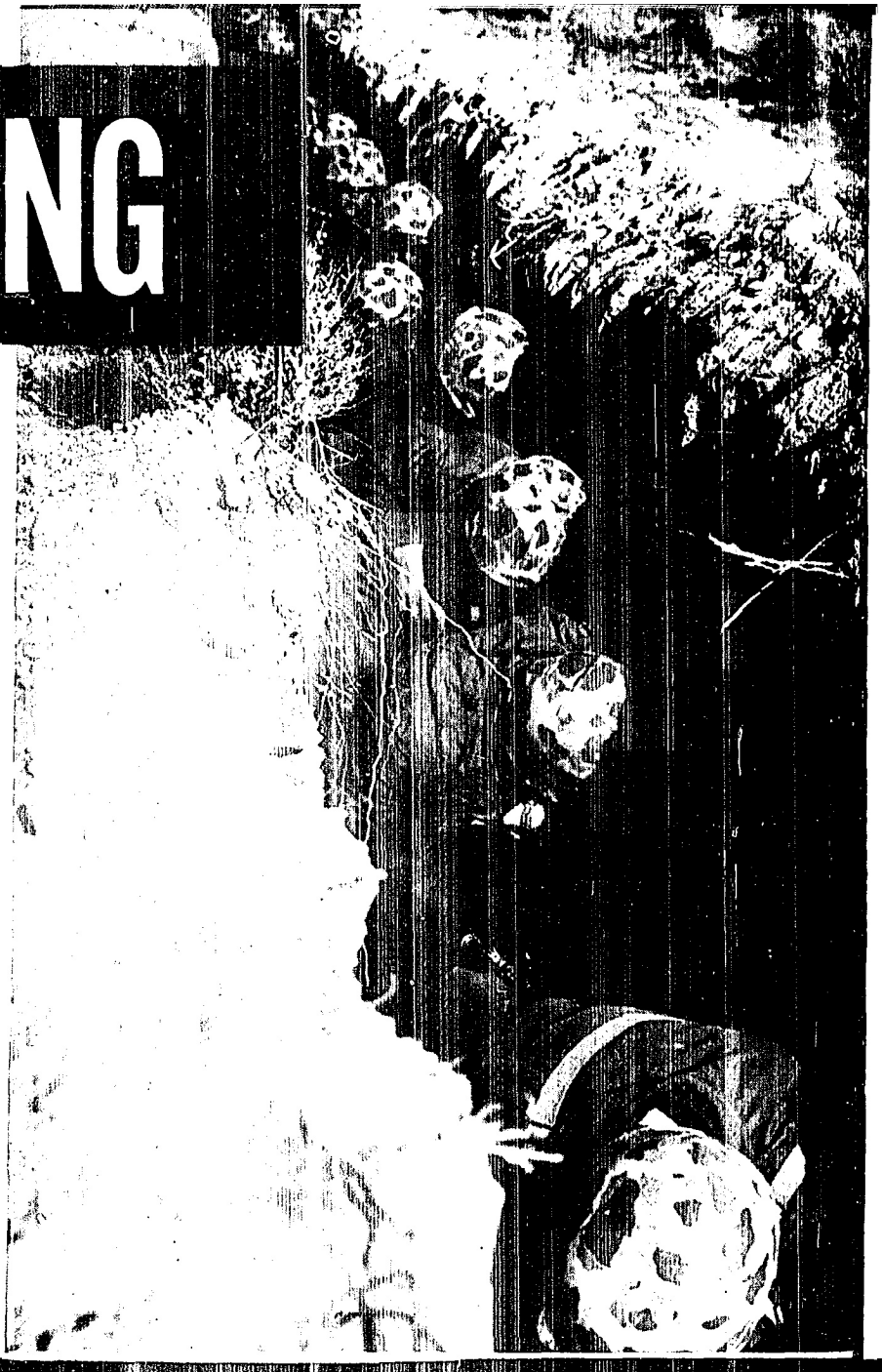
PLANNING FOR ATOMIC WAR



In a passive defense, unpreparedness cannot b

By Maj John J. Reber

WHEN THE FIRST ATOMIC BOMB exploded over Hiroshima thousands of Japanese were injured or killed because they were not prepared for such a disaster. For instance, it was not until 5 days later that outside help finally reached the stricken city. In the meantime, countless thousands died. Today, unpreparedness would not be acceptable as an excuse in similar circumstances.

During the past 7 years much has been learned about the effects of an atomic explosion and how these effects can be minimized. Many technical articles have been written on the physics of nuclear fission. This information has been widely disseminated. However, very little has been written on how to plan against an atomic attack. Yet this is the very thing which a commander must know. It is the purpose of this article to point out to commanders and potential commanders, both in the field and at posts and stations, some of the basic considerations of atomic defense planning.

A commander who must prepare an atomic defense plan need not be a qualified nuclear physicist. True, some of the technical knowledge required by a commander is specialized, but as with other functions, such as communications, supply and intelligence, the commander will have staff advisers in atomic defense to supply this specialized knowledge. Therefore, only the main factors to be considered by the commander himself will be presented in this article. These factors may be summarized as follows:

(1) Warning, (2) Rescue, Evacuation and Damage Control Teams, (3) Shelter, (4) Medical Casualty Control Systems, (5) Military Police, (6) Mutual Aid, (7) Radiological Units, (8) Intervention In Civil Affairs, (9) Training.

Before delving into the details of planning, the objective of such a plan must be considered, and also, the situations where the plan might be put into effect.

In general, every military defense plan written, whether it be for defense against chemical attack, incendiary bombs or disasters caused by nature, has had the same objectives. These objectives may be listed as follows:

(1) To enable the unit to carry

out its mission with a minimum of interference.

(2) To prepare the unit concerned to meet the attack or disaster.

(3) To minimize losses in personnel, equipment and facilities.

(4) To render such emergency assistance as may be possible to neighboring units and, when directed, to civilian installations.

It is the duty of the military commander to prepare an atomic defense plan for this particular situation which will attain these objectives.

There are 3 main situations in which a commander might find himself, and in which atomic weapons might be used. These are:

(1) Forward elements of military forces in the field in contact with the enemy.

(2) The zone of communications, such as advanced naval bases and airfields.

(3) Various kinds of military installations within the continental limits of the United States.

The problems presented in an atomic attack differ principally only in magnitude from the already well known problems introduced by saturation bombing with HE and incendiaries during WWII. The radiological hazard is the only new problem introduced by the atomic bomb. It should be clearly understood that the effects of nuclear radiation are not usually the most important aspects of an atomic attack. The atomic bomb is primarily a blast or thermal weapon. Nevertheless, new problems are introduced by the radiological hazard and it is essential that the commander have a clear understanding of these problems in order to plan an effective defense against them.

The plan to be effected will chiefly depend on whether the burst is contaminating, or non-contaminating. For this reason it might be well to describe the various types of bursts.

A high air burst, over 2,000 feet, is non-contaminating and the radiological hazard is at a minimum. The only hazard at this time is the radiation from the ball of fire as it rises rapidly through the atmosphere. Three minutes after the detonation this hazard ceases to exist, and troops may move safely across ground zero —the point on the earth directly below the explosion.

If the atomic cloud has a dark stem, and a cloud of dirt and dust is seen to spread and rise above the point of detonation, it indicates a surface burst. This type of burst presents a serious radiological hazard. Earth and other debris would be thrown into the air and as a result a huge crater would be formed. The hazard will be greatest at the crater; however, the dirt and dust sucked up by the cloud may contaminate an area some distance away depending upon the prevailing winds at the time of the burst.

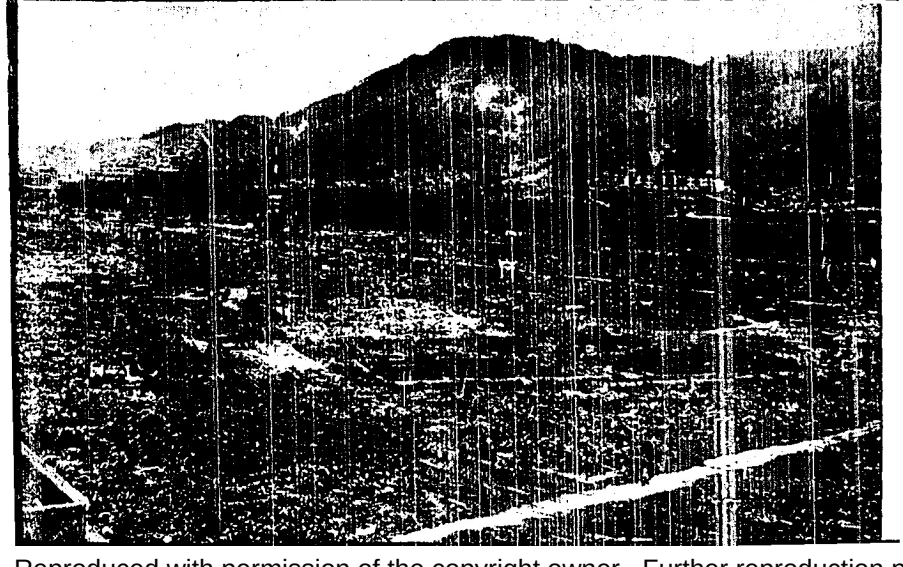
The most significant indication of an underground burst would be the earth shock accompanied by the many thousands of tons of dirt thrown into the air. As the dirt falls back to earth, it produces an expanding cloud of fine dust particles which is very radioactive. Every precaution should be taken to avoid this dust cloud as it presents a difficult decontamination problem and a serious internal hazard. Gas masks and other protective cover, such as the plastic gas bag, offer good protection from the dust.

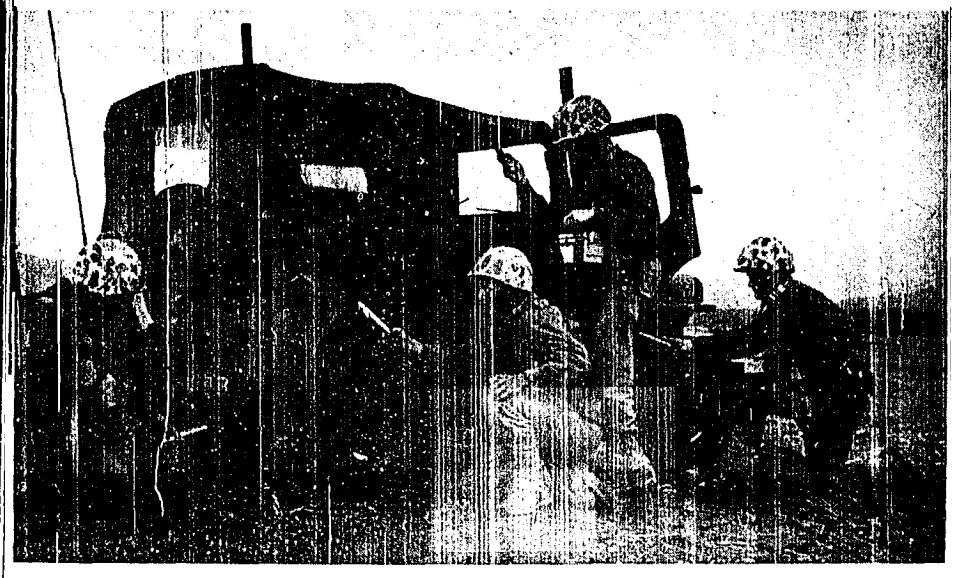
If the command is located near a Navy Yard, or near any coastal installation which is a potential A-bomb target, there is a possibility of an underwater burst. The base surge and fall-out from the burst would produce a very serious radiological hazard on the land areas near the burst.

Keeping this background material in mind, let us now place ourselves in a field commander's shoes and go through, step by step, the factors which must be considered in preparing an effective plan.

As in other planning, an estimate of the situation must first be made. In considering the ways in which an enemy might use the bomb against troops in the field, it becomes fairly clear that it would be used as a thermal weapon, rather than a blast weapon. We can disregard its being used primarily for its radiological effects, since casualties resulting from nuclear radiation are likely to be comparatively few as proven in the Hiroshima and Nagasaki explosions. Likewise, it is highly improbable that the bomb will be used primarily as a blast weapon. Blast injuries are caused mainly by the secondary effects of the blast, collapsing buildings and debris thrown about by the blast. Relatively low blast pressures will cause such injuries. For example, 3.5 pounds per square inch, above atmospheric, will demolish a brick building. Since buildings, or other sources of debris, are practically non-existent in a combat zone, blast injuries will not be a major problem. Likewise it is highly improbable that the bomb will be used as a blast weapon against supply areas. Supplies are normally dispersed sufficiently to make it uneconomical for an enemy to use an A-bomb to destroy them. HE and incendiary shells, or bombs, could be just as effective and much cheaper. Thus we come to the conclusion that the enemy would use the bomb primarily as a thermal

ccepted as an excuse for an atomic disaster





A rough survey of the contaminated area

weapon against troops in the field; that he will select a clear day for the attack, since haze reduces the effectiveness of thermal radiation; and that he will use a high air burst in order to obtain the maximum range of thermal radiation. It must be kept in mind that thermal radiation has a greater range than blast and nuclear radiation.

Getting down to the actual provision of the plan itself, one of the first things a commander must do is to provide some means of receiving early warning that an attack is imminent. In most cases, this is provided for by higher echelons in nearby areas. However, he may have to rely mainly on his own intelligence section for this information.

After the warning has been received, the members of the command must be notified that an attack is likely to occur and that the plan is to be put into effect. To accomplish this, some signal, which can be heard by all units of the command, must be provided. The standard red alert consists of a fluctuating or warbling signal of varying pitch by sirens, or a series of short blasts by horns or whistles. The "all-clear" consists of 3 one-minute blasts of sirens, horns, or whistles, interrupted by 2 minutes of silence.

In addition to a warning system, shelter must be provided. Trenches and fox holes offer simple yet effective shelter for the protection of personnel. The main fault being that they do not offer protection from above. However, the deeper they are the better the protection from thermal radiation. Some scattered nuclear radiation may be received in fox holes and trenches, but the dosage will be comparatively small. Bunkers, caves and tunnels offer best shelter in the field. Care must be taken in the use of sand bags around bunkers, and equipment. If they are too close to the explosion, thermal radiation may scorch or burn the burlap, thus spilling the contents. So if atomic warfare is likely, digging in of supplies, equipment and personnel will be better than sandbagging above ground. Advantage of the terrain should be taken where possible. A hill between an individual, or equipment, and the bomb explosion will cut off practically all of thermal radiation and greatly reduce the blast and nuclear radiation. This was demonstrated in the Nagasaki bombing. Clothing provides good protection against thermal radiation and personnel should be instructed to cover as much of their bodies as possible at the first warning of an atomic attack. Finally, in cases where a large number of personnel must remain in the open and cannot take shelter, such as during an amphibious landing, a smoke screen will greatly reduce the effect of thermal radiation and consequently decrease the burn casualties.

One of the major functions which the commander will have to provide for is a Medical Casualty Control System. First Aid Stations will be needed immediately after the attack. In addition to giving first aid, these stations might be considered a medical evaluation center since they will decide on the disposition of casualties. Casualties will be received at these stations and given non-symptomatic treatment; ambulatory cases will be treated and then released; non-ambulatory cases, and those requiring immediate care, will be sent to medical collection centers. Medical collection centers might well be thought of as clearing houses for medical casualties. Casualties arriving at the collection centers are further dispatched to hospitals and clinics for definitive treatment in rear areas.

Military Police will play a very important role after the attack. Their duties will not differ greatly from their normal duties. The primary duty of the MPs, of course, is to control traffic. However, due to the nature of the disaster there will be some special problems introduced. In case of a contaminating burst, the MPs must prevent persons from entering contaminated areas, mainly to prevent them from spreading contamination. Road signs must be posted as soon as possible to mark contaminated areas, as well as evacuation routes to first aid stations and decontamination centers.

If any one factor of the plan could be singled out as the most important, it would be the provision for Mutual Aid. An atomic attack on, or in the vicinity of, a command would effectively saturate its defensive capabilities. In such a case, the stricken unit would depend almost entirely on assistance provided by neighboring units. The Mutual Aid provision of the plan should not only consider assistance most likely to be needed, but should also provide for assistance which the unit might be able to give to others. In order to accomplish this most effectively, close liaison between neighboring units and higher headquarters is imperative.

The principle requirements of the commander with regard to the radiological hazard is that he be able to recognize the existence of the hazard and determine its importance. A preliminary estimate of the hazard

can be obtained by observing the type of burst. For this reason the radiological defense officer should be prepared to observe the burst from his shelter as soon as warning is received that an attack is imminent. He should also be prepared to detect signs of radiological warfare, other than an A-bomb attack.

The radiological organization of the plan should include Survey Teams, Safety Monitors, Instrument Repairmen and Decontamination Teams.

The most immediate objective of the radiological defense organization is to provide data for an estimate of the situation. The Survey Teams gather this data by making a rough, preliminary survey of the contaminated area. In surveying the area, speed and accuracy are the most important considerations. For this reason helicopters will be very effective because of their low speed and maneuverability. However, they are not always available and jeeps will do a good job in their place.

The minimum number of men needed for each Survey Team is 3 — an instrument man, a recorder and a communicator. The number of Survey Teams needed will depend upon the situation. However, sufficient personnel must be provided to take care of team casualties, as well as to allow rotation of personnel working in high intensity areas. The instrument man should be equipped with both an ion chamber-type radiac instrument for high intensity areas, as well as a G-M type instrument for low intensity work. The recorder should be supplied with data sheets, a watch, flashlight and pencils. The communicator will need a handy-walky radio set such as the AN/PRC-6. All members of the team should wear outer protective clothing covering as much of the body as possible with a minimum of openings; disposable canvas boots over their shoes; as well as gloves, headgear and in some cases, gas masks. Much of this material is available from regular sources of supply, the rest can be improvised.

Foxhole . . . simple, effective

After the rough survey has been completed and the extent of the hazard has been determined, boundaries must be established around contaminated areas and definite traffic route must be set up. This is a function of the MPs as explained earlier. At times it may be necessary to send emergency crews into contaminated areas to rescue trapped persons or to recover equipment. Safety Monitors must be included in the plan to provide protection for these crews. These monitors will warn the crews when they have received the maximum allowable dosage thereby allowing the crews to perform the maximum amount of work before they are relieved, and also prevent them from becoming radiation casualties.

The work of the Safety Monitors can be performed by one man. He should be equipped with a G-M type instrument, a proportional counter to measure the alpha hazard and a pocket chamber or dosimeter. The latter instruments make a quantitative measurement and will tell instantly the amount of radiation an individual has accumulated over a period of time. The Safety Monitor should wear protective clothing similar to those worn by the Survey Teams.

Before discussing the mission of the decontamination teams, some concept of the nature of the contaminent must be understood. It should be emphasized at the beginning that contamination cannot be destroyed. To reduce the radiological hazard 2 things can be done. First, allow the contamination to age and thereby decay to a safe level. Second, remove the contamination from one area to an area which is not important. For example, the contaminant can be buried at sea or in the earth, or it can be entombed in abandoned caves or mines. Removing the contaminant even in the most simple case is a very difficult, and usually an ineffective process requiring the use of special equipment and techniques. If the tactical situation permits, contaminated equipment should be allowed to decay by aging until it reaches a safe level. Beta and gamma radiation decay rapidly and the hazard is greatly reduced in a few days. However, the danger of alpha radiation may —and usually will be—still present. Although the activity of the alpha particle does not decrease very rapidly, they have very little penetrating power and a good coat of paint, plastic, asphalt or other sealing compound will form a very effective shield against these radiations.

A preventive measure which the commander might take, depending upon the circumstances, is to coat his equipment with a plastic material similar to that used in mothballing ships after WWII. If the equipment then becomes contaminated, the plastic coating can be stripped off and disposed of by one of the means previously mentioned. Most of the alpha particles will be contained in the stripped off coating. Then the equipment can be decontaminated by one of the standard methods, depending upon the type of surface.

Decontamination teams should be of 2 types—Personnel Decontamination and Material Decontamination. Material and Decontamination Teams may make either a rough or a detailed decontamination. Rough decontamination is essentially an emergency measure; its purpose is to reduce contamination to a level which will permit personnel to work with the equipment for a limited period. Rough decontamination can usually be effected by the use of steam or water. Since the waste water will be highly contaminated, drainage will be a problem.

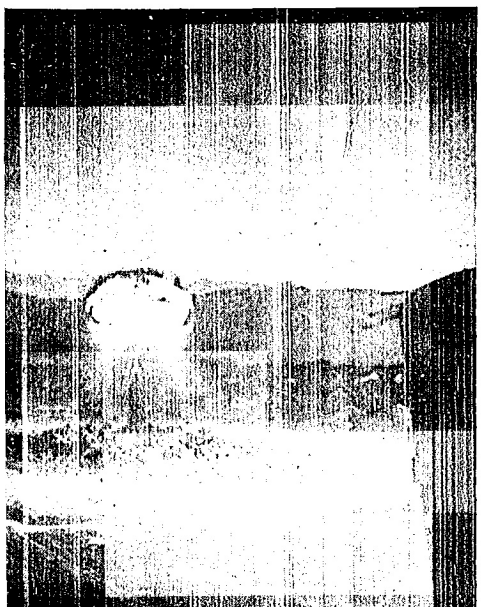
Detailed decontamination is a complex process involving a great variety of materials and equipment even for the most simple cases. The techniques and materials to be used are largely determined by the type of surface which is to be decontaminated. In short, the purpose is to remove the contaminated surface. Once the surface is removed it must be buried or entombed. For example, a painted metal surface can be decontaminated by burning the paint, scraping off the ashes, and then burying or entombing the radioactive ashes. For decontamina-

tion, personnel need waterproof clothing such as the Navy's foul weather gear. A respirator or gas mask will prevent inhalation of contaminated particles.

The mission of the Personnel Decontamination Team is not only to decontaminate the individual but to prevent the individual from spreading the contamination. The focal point of the team is the change house which should be located at the point of exit from the contaminated area. Briefly, the decontamination procedure consists of monitoring the individual; disposing of his clothing if contaminated; showering and then monitoring again. After he is decontaminated, he is issued clean clothing. Here again the contaminated waste water from the showers, as well as the contaminated clothing, must be removed or it will create a hazard. Personnel monitors should use proportional counters. Soap, water and clean clothing are the principal items of supply. A new soap recently developed for the services contains a complexing agent and detergent which is of special value for decontaminating purposes. The soap is to be in bar, flake and powder form.

To complete the organization of the radiological unit, facilities for instrument repair must be available. Faulty instruments can be worse than no instruments at all. The signal repair shop will usually have a qualified raidac instrument repairman. Many of the radio repairmen and radio technicians (MOS 2611 and 2619) have qualified as radiac repairmen by attending one of the Armed Forces schools.

Plan a complete defense



On the whole, the tactical situation will determine the course of action to be taken when contamination is present. But intelligent decisions by the commander, based on the advice of the Radiological Defense Officer, may well prevent endangering his entire command. Shell or small arms fire may kill 10 per cent of command, injure 20 per cent but spare the remaining 70 per cent. On the other hand, while nuclear radiation may kill 10 per cent of the command, the remaining 90 per cent will not have escaped some injury.

The problems facing the commander of a military installation within the continental limits of the US especially if it is located near a civilian community, differ in many respects from the problems facing a field commander.

In most cases he will not be responsible for preparing a complete atomic defense plan for his command. Depending upon the size of his command, he may be required to prepare anything from a company order up to a fairly detailed supporting plan for the overall sector plan. The Marine commander will undoubtedly be called upon to furnish personnel and equipment in support of the sector, or sub-sector, plan. The sector plan will be prepared by the Army or Navy co-ordinator of the sector. Sectors of responsibility, coinciding with Army Areas, are set up for co-ordinating the planning for catastrophes such as earthquakes, floods, fires and atomic explosions. The utilization of Naval or Marine personnel in an Army plan presents a rather unusual situation. The Joint Chiefs of Staff ruled there would be no joint commands within the continental limits of the US, therefore, the Army commander who is responsible for a certain sector is referred to as a "co-ordinator" rather than a "commander."

Before delving into the details of the plan, an estimate of how the enemy might use the bomb must be made in order that the types of equipment, shelter and the duties of personnel can be determined.

An enemy would use the bomb primarily as a blast weapon against a military installation in the US. There are a few exceptions which will be brought out later. The secondary effects of the blast, that is collapsing buildings and flying debris, will cause the major personnel casualties. Disrupted utility service and damaged equipment will also result from the blast; water, gas and fuel pipes will be ruptured, power plants will be damaged. These are some of the problems which a field commander would not ordinarily have to plan for; however, they become major factors in the plan of the commander in the US. So in addition to the teams which the field commander must provide, the commander in the US must include many other teams to take care of the additional problems. Rescue and Evacuation Teams will be needed to release trapped persons and guide them out of the stricken area. Damage Control Teams will be needed to fight fires and cap off utilities such as gas, fuel, water and electric power. Such action will not only help prevent compounding the damage which might otherwise result, but will also aid in saving these precious items.

While a high air burst would probably be used against the majority of the military targets in the US, a surface or subsurface burst would be very effective when used to crater major airfields, block narrow channels to important harbors, or destory submarine pens. Radio activity becomes a serious factor in the surface or subsurface burst. In addition to the instantaneous nuclear radiation, there will be the even more serious residual radioactivity. A 20 KT bomb detonated 50 feet underground would produce an extremely radioactive crater about 100 feet deep and 800 feet in diameter. The radioactive dirt thrown out of such a crater would contaminate the area around the crater. Residual radioactivity in, and in the vicinity of, the crater would thus prevent personnel from working in the area for some time, thereby denying us the use of the airfield, harbor, or other installation. If the commander is located near a target area where a surface or subsurface burst is likely to be used, he must provide for more radiological teams than he would otherwise.

If the military installation is lo-

. . . and aid to civilians

cated near a civilian community, the commander may have the additional problem of intervening in civil affairs. Although aid to civilians may at first appear to be almost entirely a civil defense responsibility, the commander must be realistic in his planning for this part of his mission. While many civic-minded individuals are doing their utmost to make civil defense a capable organization, it is far from being such at the present time. Today it could not begin to cope with the many problems resulting from an atomic attack. However, the commander must use discretion when dealing with civilian communities. If possible, he should wait until state authorities make a request to the President for military aid, or until the President, by proclamation, has the military intervene for some reason or another. Under military aid, the military can take no punitive action but can take preventative action. As to the authority of senior naval officers present taking action in emergencies resulting from catastrophes, the decisions of the JAG have been to the effect that the senior naval officer present could take such action as the necessity of the case may require. However, it has been stated further that the extent and character of the action was one for the exercise of sound discretion, bearing in mind that the officer may be held personally responsible for unreasonable or excessive exercise of authority.

Thus we have some idea of the type of equipment and the duties of the personnel needed.

In preparing his plan, the first thing which the Marine commander must do is consult the plan of the higher echelon in his sector and determine his responsibilities as set forth in that plan. In addition to furnishing personnel and equipment to higher echelons, he must also take care of the immediate needs of his own unit at the time of the attack. Principally this will include warning and shelter. No commander is expected, nor would he be able, to furnish all equipment and personnel necessary to care for all his needs after an atomic attack. It is repeated that mutual aid, in this case provided for in the sector plan, is the most important factor of the overall planning.

The commander should be prepared to either furnish the following teams to higher echelons, or make use of them within his own command immediately after the attack; Rescue, Evacuation and Damage Control teams, First Aid and other Medical teams, Military Police Units and Radiological Teams. Different commanders might give other names to the various teams, but regardless of what they are called, their missions will be the same. The number of teams for immediate use within the command would vary according to the size of the command and its physical location with regard to other military installations.

In addition to these teams, the commander must include in his plan; provisions for receiving warning of an attack, notifying the members of the command that an attack is likely to occur, and that the plan is to be put into effect and sheltering of personnel. With regard to shelter, a survey must be made of existing buildings and areas which would provide the best protection. Generally it is best to get as much thick, heavy materiel as possible between the individual and the blast. This provides maximum protection. The best protection can be obtained in the lowest floor or basement of a reinforced concrete or steel framed building. It is best to get near the walls, or supporting columns and to stay away from windows. Wooden buildings are not only very vulnerable to blast and fire, but they also provide little shelter against nuclear radiation. Such buildings are to be avoided. Tunnels, storm drains and subways should not be overlooked as possible shelter assignments.

As with any other plan, its effectiveness is mainly determined by the training of the personnel. Training can be placed in 2 different categories. First, general indoctrination of all hands; second, special individual training needed by members of the various teams. In both cases emphasis should be palaced on what the individual should do and not (as it often is) on statistical information of the bomb's effects, or the psysics of nuclear reactions. The author especially recommends the training film, "Survival Under Atomic Attack" (MN-7325, 25 minutes running time) to be included in any general indoctrination course. The mission of most of the teams will be in line with their regular duties. This holds true for all except decontamination, monitor and survey teams. Personnel from these teams will need special training. After the individual training has reached a satisfactory level, drills and practice alerts should be held to smooth out details in co-ordination.

A few final words about the plan. Make the plan brief and simple so that the immediate basic actions can be readily memorized. Too lengthy a document will discourage people from reading it. Be sure that it can be carried out with the forces available, that it can be accomplished within the required time limit and that the results are worth the cost. Make it realistic. Have it as detailed as possible but do not build it around any hypothetical situation. And—this is most important—write the plan so that it need not be classified. A plan which must be locked up in a safe—instead of being published on every bulletin board — will probably fail the instant the commander tries to put it into effect.

It is hoped that no commander will ever have to put his plan into effect. But a good workable plan is excellent insurance against an atomic attack. USMC