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0120001277

Australian Army History Unit

12 JULY 2012

# AUSTRALIAN ARMY JOURNAL

*(AFC HOWARD)*

**No. 208 September 1966**



## AUSTRALIAN ARMY JOURNAL

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The Australian Army Journal is printed and published for the Directorate of Military Training by Renown Press Pty. Ltd., and issued through Base Ordnance Depots on the scale of one per officer, officer of cadets, and cadet under officers.

Contributions which should be addressed to the Editor, Australian Army Journal, Directorate of Military Training, Army Headquarters, Canberra, are invited from all ranks of the Army, Cadet Corps and Reserve of Officers.

\$10 will be paid to the author of the best article published in each issue. In addition, annual prizes of \$60 and \$20 respectively will be awarded to the authors gaining first and second places in the year.

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# AUSTRALIAN ARMY JOURNAL

*A periodical review of military literature*

No. 208, SEPTEMBER, 1966

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**MILNE BAY.** In August-September 1942, a principally Australian force of two brigades — one AIF and one militia — commanded by Major-General C. A. Clowes, defeated a Japanese attempt to capture Milne Bay, at the south-eastern tip of Papua. This was the first defeat on land suffered by the Japanese since their offensive had begun nine months before, and the victory had a tonic effect on the Allied ground forces that was widespread.

Photograph: *Australian War Memorial.*

# **Platoon Organization, Rations and Equipment**

*2nd-Lieutenant J. R. Bourke,  
Royal Australian Infantry*

## **Introduction**

THE organization and equipment of a unit is governed to some extent by its environment (using the word 'environment' in its broadest sense to embrace strategic and tactical requirements and in particular, climate, terrain and weather). In our organizations and our allocations of equipment we must be flexible, and in achieving flexibility we must be guided by practical common sense as well as by actual experience.

Probably few readers will disagree that platoons and sections are the basic teeth of an infantry battalion, and that their organization and efficiency should be kept under constant review. The views of a platoon commander on some aspects of the organization and equipment of a platoon operating in the southern half of South Vietnam, based on eight months experience in that area with 1 RAR, might therefore not be unwelcome.

## **Platoon Weapons**

Different armies operating in the same theatre have adopted varying weapon allocations even at platoon level. This is the natural result of divergent tactical reasoning and merely goes to show that we must forever be alert and observant and prepared to vary weapon allocations to and within platoons as the conditions of fighting change (even from one operation to another). Have they changed from Korea to Malaya, from Malaya to Vietnam? Most certainly they have, and different types of weapons have been carried by the platoon to meet these environmental changes.

To fight the Viet Cong in Vietnam our platoons had one M16 (AR15) per section with one on the headquarters, and one M79 grenade launcher per section. One additional weapon, however, which would be useful is the light mortar. The factors necessitating this are:

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*Lieutenant Bourke graduated from OCS in June 1964. He served with 2 RAR until May 1965 and then joined 1 RAR in Vietnam. He was wounded in action in January 1966 and subsequently evacuated to Australia. After a basic parachute course at Williamstown, he was detached from his battalion to the Jungle Training Centre in July 1966.*

- (a) The Viet Cong, when contacted under conditions unfavourable to themselves, will withdraw. We need a more effective method of preventing this and a light mortar seems to be the answer.
- (b) In the ambush (one of the most effective techniques employed against the Viet Cong) 'cut off' is very important. Here again a mortar is the answer.

Speed in laying down this fire support is essential as is accuracy in its correction. It is not always possible to use the 81-mm mortar or the 105 howitzer safely, and at the same time meet these requirements. A light mortar on platoon headquarters would, however, solve the problem of the provision of close, accurate and easily adjustable fire support.

The M79 grenade launcher was intended as the weapon to provide this type of support. In the direct role it is a pin-point weapon, but the casualty rate inflicted in a 5-metre radius from the point of impact is only about 50 per cent. In close country or at night its range when used in such a role is extremely limited. Although not designed to be used in the indirect role, the weapon when manned by a crew of two experienced grenadiers can launch three grenades before the first strikes the ground. However its effectiveness is still debatable because of the low casualty incidence and the large beaten zone. What is required is a weapon with a reasonable beaten zone and a killing radius compatible with this area—in other words, a light mortar. (This is not to suggest, however, that the M79 should be dispensed with since it is an excellent weapon, used in a direct role on a pin-point target.)

Co-ordination with ground troops and air support is one of the problems associated with having a mortar on platoon establishment but to say that 'the solution is too difficult' is simply to avoid the issue.

Weight of weapons and ammunition may also be advanced in argument against such an allocation. The Gordon Highlanders, however, carried an 81-mm tube and ammunition on operations in Borneo without a re-supply system comparable with that available to 1 RAR in Vietnam. Surely a 60-mm mortar would not be beyond our capabilities.

Before disposing of the subject of platoon weapons, a word on the GPMG M60 may not go astray. This is an excellent platoon weapon in Vietnam: it can pour out or burst off the desired length without the limitations of a magazine containing a fixed number of rounds; it can be lightened for patrols by removing the butt stock group; the ammunition is very portable; the weapon

is reliable when correctly maintained by a conscientious gunner and used by the same man, especially when on active service.

### **Organization**

The organization of a platoon into three sections of ten men leaves much to be desired on operations. With three sub-units it can be embarrassing to move with two up since contact with sizeable opposition will leave only one section available for offensive action. After this has been committed no reserve is left save platoon headquarters. Quite often I found it necessary to use my HQ as a rifle section and to reallocate our weapons accordingly. Four fighting sub-units in a platoon would also make the rotation of half-platoon patrol tasks much simpler, since it would obviate the necessity of breaking down the platoon's normal command structure and working with two groups of three half sections.

Given four sections of eight men (taking into account normal losses in the field due to sickness, casualties and lack of reinforcements, say four sections of six men), a headquarters of a sergeant, a signaller, a mortar crew of two and myself, I personally would be much happier. There is no need for a batman while on operations in Vietnam, though of course one is needed at base. Any navigational assistance (e.g. counting paces) or similar tasks could be allotted to the 2 i/c of the point section. This organization would give the platoon a posted strength of one and 36 as opposed to the one and 33 as at present, and in my opinion would make the platoon in Vietnam a much more effective fighting unit.

### **Equipment**

Although this opinion may not be generally shared, I must say that our forces in Vietnam were well equipped as far as webbing and clothing were concerned. The problem was to train officers and men to extract the maximum value from their issue and to develop a commonsense approach to its use. For example, the old thirty-seven pack is somewhat of an embarrassment when engaging an enemy, and so men must be taught to pack into it non-essential items so that it can be readily discarded under section arrangements as soon as contact is made, without any possibility of impairing a man's fighting potential.

A commonsense approach is also needed to such handicaps to stealthy movement as the noise of a water-bottle top clanging on the side of a water-bottle. All that a soldier needs do to eliminate this noise is to remove the chain connecting the bottle and the top. Result—silence.

One small point of criticism concerning issue clothing is the lack of sufficient pockets in our shirts. A shirt with plenty of pockets, similar to the US combat jacket, would be an improvement, and would provide stowaway places for such minor pieces of litter as cigarette butts, packets, chewing gum papers, and so forth. On the subject of clothing, if a platoon commander's opinion carries any weight, it might help to restore faith in the durability of our jungle greens if I assert that they did not fall to pieces in the climate of South Vietnam. Such reports as were published in Australian newspapers late last year were nothing more than prime examples of the unlovely sensationalism not uncommon in today's press.

Some improvements in our navigational aids, however, would not be unwelcome. There is a pressing need to produce some waterproof maps. The American Special Forces have theirs printed on thin rubber sheets. Contact paper was our method, but the availability of contact was generally limited.

Our present compass, of course, needs no commendation from anyone. Other aids to navigation, currently in use to identify ground positions to air observers, are the marker balloon and the smoke grenade. The former is definitely not worth its weight and bulk. Surely it is not outside the capacity of our 'boffins' to provide a small alloy cylinder of compressed helium (I believe the American Special Forces use helium) or some other substitute instead of the cumbersome apparatus at present in use. The marker balloon, however, had only one use in Vietnam so far as I know: namely to mark a position precisely for an indefinite period of time (e.g. to co-ordinate air strikes). Temporary marking of a position can be effected either by hoisting an active smoke grenade into a tree by means of a cord or by tying the grenade to a bent springy sapling and releasing it so as to position the source of smoke near the top of the canopy when required.

There is little to be said in favour of our issue map cases. They perhaps might enhance one's professional appearance, but a plastic bag off a 25-set battery will serve the purpose of a map case much better. It is light, waterproof, and less bulky than the issue case.

It is pleasing to note that even at the time of writing, solutions have already been found to some of the equipment problems discussed here. However, the general argument of the need to develop a commonsense approach to the use of equipment still holds good.

### ***Rations and Re-supply***

To make it harder for the enemy to determine our positions and strengths, re-supply during operations should be reduced to the minimum. Re-supply was too frequent in Vietnam, where the American C-rations were designed to last only two days. Soldiers must carry as many rations as possible, and a reasonable range is needed to meet the environmental changes. Such a range already exists within the Allied forces, and the Australian system itself has rations with reasonably different characteristics.

Commanders (including those at the higher levels) must at least be aware of the following characteristics of our rations: the number of days rations a man can be expected to carry over various types of terrain; the amount of water required to make the ration palatable; the time required to prepare a reasonable meal from the pack. Armed with this information, and a range of rations being available, a suitable pack can be ordered for an operation, and indeed for various phases of a particular operation, so that the best performance from the troops will be obtained.

Natural water should be used wherever possible unless known medical risks are involved. Water should not be flown in as a matter of course unless this is absolutely essential (for example, in a static position in a dry area). Rather it should be made the soldier's responsibility to keep his water-bottles full whenever possible, without regular time-consuming platoon and company halts to replenish. Terrain and weather will, of course, be the deciding factors, but the policy outlined above should suit our areas of operation at least between July and February.

### ***Communications***

The 25-set has become the standard means of communication between platoon and company in the field in Vietnam. This set is far superior to the old 10-set; the problems of battery portage and re-supply are considerably diminished; voice is much more audible under similar conditions; squelch is more variable and the whisper carries much more clearly.

So much for platoon to company communications. What of those between platoon and section? In this kind of warfare, where silence yet good control are as essential as ever, and where the proximity of the enemy to commanders (who at present have to reveal their positions to some extent to issue orders) is sometimes quite alarming, there is a pressing need for a platoon net. This is not to advocate the kind of flexibility that would enable a section to wander far and wide and thus revolutionize our tactics, but simply to facilitate the existing platoon manoeuvres under the conditions described above.

There will be problems, of course—the same age-old ones that have been tossed up for years. The voice procedure standard of the average section commander is supposedly doubtful. In my opinion, however, although some NCOs may be a little shy on the set, their procedure is generally as good as that of the average officer. Frequency allocation is another standard objection, yet if we look for a solution one will soon be found. Provided we minimize traffic on the platoon nets, using wireless only for essential tactical communication, the company frequency should suffice for most engagements in Vietnam. Alternative frequencies can be allocated for two platoons so as not to overload the company net if all three sub-units are simultaneously engaged. Also being on the company net at most times will help to give the section commander some idea of the 'big picture'.

Some extremely good sets are available, especially in this age of the transistor. The British SAS were using an effective commercial set; the New Zealand police are contemplating the introduction of one. Admittedly these are specialist organizations, fighting a different enemy in different circumstances. At the same time, the need for a platoon fighting an elusive enemy in Vietnam to have the best possible equipment could hardly be denied.

### **Special Equipment**

In this section items of equipment have been included which would be invaluable for a particular type of operation as well as some which would be valuable at all times.

*Directional antenna.* When patrolling over flat terrain where the field of view is limited, as is the case in many areas of operation in South Vietnam, it is frequently difficult to establish one's position accurately on the map. The old 'paces and bearing' method is fully appreciated, but when one is following a spoor or an unmarked track or trying to remain concealed in a timberline, this is not always easy. Similarly when attempting to co-ordinate positions for RV, without the assistance of an air observer, or when trying speedily and accurately to determine one's location for the purpose of fire support in similar terrain, it can be difficult and dangerous. This problem could be easily overcome by the use of a direction-finding antenna. A compact commercial device, weighing about 2 pounds, and of sufficient accuracy for the proposed use is available. It also operates on voice and gives the platoon commander a spare set to receive orders from company if the normal means of communication becomes damaged; it also gives him the flexibility to monitor into the battalion net.

*Wrist compass.* This is a handy little device with which to obtain a quick bearing when time, or the fact that one has both hands full, does not permit the use of the normal issue compass, e.g., during an attack.

*Camera.* At least one per platoon is essential. I belatedly purchased a Minolta 16 to carry with me on operations, but lacking one early led to my missing out on pictures which might have had reasonable intelligence value.

*Notebooks.* 'A notebook of plastic covers' for formats is excellent. The sheets of formats can be slipped into the covers and thus effectively water-proofed. Such a notebook can be purchased in Bien Hoa at a reasonable price. For orders, any notebook kept in the 'plastic bag' map case will suffice.

*Silencers.* How sweet it would have been at times to be able to dispose in comparative silence of that odd Viet Cong sentry or the lone VC returning to his unit from leave. Surely it is not beyond our capacity to issue a hundred or so effective devices to our platoons in Vietnam for use on those occasions when the need for silence and secrecy are paramount.

*Booby Traps and Mines.* There is a need for some sort of recoverable booby-trap device or mine for issue to platoons for use in ambushes as 'cut off' or for springing the ambush. The Claymore mine would be ideal. Such weapons, in my opinion, would be much more effective than small arms fire for this purpose.

*Demolition equipment.* To facilitate the destruction of enemy bunkers, captured grenades and mines, each platoon should have a member trained in demolitions, and some explosive should be carried on operations.

### **Conclusion**

It is perhaps worth remembering that the points discussed above should be considered as applicable to the environment of the southern half of South Vietnam. The changes in organization and the additional equipment suggested are the outcome of the operational experience of various 1 RAR platoon commanders. They are advanced with the thought that they might not only improve our efficiency, but be helpful to those who have succeeded us in Vietnam. □

# **Systems of Replenishment Within South-East Asia**

*Major R. L. Buntine,  
Royal Australian Army Ordnance Corps*

## **Introduction**

A military force is only effective whilst it has the ability to fight (power), to move with speed and in any direction (mobility), and to travel far (range); continuity of power, mobility and range depends on the materiel supplied to that force. And because any system of replenishment has a capacity limit there is, therefore, competition between power, mobility and range for any materiel supplied.<sup>1</sup> One of the major reasons that the French Union forces lost to the Vietminh was that in the conflict between power, mobility and range, mobility lost. Thus any system of replenishment devised must ensure that the combat element of a force has the mobility required for warfare in South-East Asia, as well as the necessary power and range.

Since the introduction in 1866 of the system of replenishment from bases<sup>2</sup>, transport has determined the quantity and type of materiel that could be delivered to any force belonging to an industrial nation. And transport in turn depends upon the type and quantity of vehicles available, the distance to be travelled and the nature of the routes, whether water, land or air.

It can be expected that an enemy in South-East Asia will make the maximum use of any terrain which may reduce the advantage of greater industrial strength possessed by more 'de-developed' nations. Thus in the terrain chosen by the enemy, surface lines of communication (road, rail, water and pipeline) are likely to be few, of a poor standard and costly in time and resources to construct and maintain. Therefore available surface lines of communication will have a low movement capacity on which it will be difficult to improve. These lines of communication, being fixed in one position, are easily subjected to surface and air attack which will either reduce the limited capacity available or deny it altogether.

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*Major Buntine graduated from the Royal Military College in 1954 and was allotted to the RAAOC. All his appointments, some of the more recent of which include Staff Captain, MGO Branch AHQ (1963-64) and OC and COO 6 Command Ammunition Depot (1964-65), have been in that corps. He is at present OC 2 Camp Ordnance Depot, AAFV.*

*This paper was written as a thesis during his attendance at Staff College in 1965.*

Lines of communication join a force to its base, and any base is a huge area, crowded with men, and often containing camps, wharves, rail and road junctions, marshalling yards, air-fields, hospitals, depots, canteens, laundries and workshops. Thus a base is usually fixed, obvious, and a target to air and ground attack, and often attack from the sea. Because an enemy in South-East Asia is most likely to have more manpower available in the area than Australia and her allies, and because of the teachings of Mao and Giap, the enemy will continue to allocate an ever-increasing part of his force to 'warfare in the rear'. He will do this because of the benefits that he can gain. Some of these benefits are:

- (a) Employment of a larger number of his troops than he would be able to deploy if restricted to a front<sup>3</sup>.
- (b) The cutting of surface routes to the Allied Force from its bases and thus separation of the force from its materiel and manpower.
- (c) Reduced susceptibility to nuclear weapons by dispersion of his force.
- (d) A decrease in the effectiveness of the Allied force caused by use of a part thereof to protect the lines of communication and bases.
- (e) Disruption of the political, social and economic structure of the country in which, and with whom, the Allied force is fighting, and a better use of any dissident elements in the population.

It is necessary, therefore, that the Australian Army with its limited manpower, should devise a system of replenishment which not only ensures delivery of materiel to a force despite enemy action, but also minimizes the use of troops to protect surface routes and bases in the communications and combat zone. Such a system is vital if a force in South-East Asia is to have not only power and range but also, that essential characteristic, mobility.

### **Aim**

The aim of this paper, therefore, is to discuss systems of replenishment and their suitability for use within South-East Asia by an Australian force. Before proceeding to the aim, it is important that certain terms used in this paper be defined.

*Materiel* is used to describe all those items which enable a force to live (food, forage, water, clothing, shelter and medical

<sup>1</sup>Encyclopaedia Britannica (1963 edition), Logistics, Section III, para 1.

<sup>2</sup>G. C. Shaw, *Supply in Modern War*, p. 79.

<sup>3</sup>Otto Heilbrunn, *Conventional Warfare in the Nuclear Age*, p. 89.

supplies), to move (transport and fuel) and to fight (weapons, combat equipment, defensive materiel and ammunition).<sup>4</sup>

*Classes of Materiel.* Irrespective of the use to which materiel is put (i.e., living, moving or fighting), there are items such as clothing, trucks and weapons that are issued initially, and then used repeatedly. These items need only to be replaced when lost, destroyed or worn out. Besides the items which need replacing there are other items such as food, fuel and ammunition that are consumed or expended, and therefore must be continuously or periodically re-supplied. From these replenishment characteristics are derived the materiel classes of initial issue, replacement and re-supply.

A *reserve* is that materiel required to be held to ensure against emergency, unforeseen fluctuations in expenditure, delays in production and transit misfortune, etc.<sup>5</sup> Initial issue is not being dealt with in this paper, because it is assumed that an Australian force going to South-East Asia would receive its initial issue of at least the majority of its entitlement of materiel before leaving the Australian Support Area.

Replacement, re-supply and reserves will be dealt with, and the term *replenishment* will be used when both replacement and re-supply are involved.<sup>6</sup> The aim of replenishment is to provide essential materiel at the right place and at the right time; to ensure that the combat element has no doubt that the necessary materiel will be provided, and that a minimum number of troops need to be allocated to get the materiel forward.

### **Basic systems of Replenishment**

Throughout history, only three basic systems of replenishment have been used, either singly or in combination. They are self-containment, local replenishment and replenishment from bases.<sup>7</sup>

*Self-containment.* In self-containment the force takes all its needs along with it. The available transport is fully loaded before movement, and is therefore a mobile storehouse which is steadily depleted as stocks are used up by the force. Self-containment was the main system of replenishment used during the withdrawal of the British force from Burma to India in 1942.<sup>8</sup>

The advantages of this system are that the force is not tied to lines of communications and can thus go in any direction

<sup>4</sup>Encyclopaedia Britannica, Logistics, Section II, Supply, para 2.

<sup>5</sup>Joint Services Glossary, p. 78.

<sup>6</sup>The Pentropic Division in Battle (Provisional), Part 2, Administration, p. xxx, para 7.

<sup>7</sup>Encyclopaedia Britannica, Logistics, Section III, para 1, and G. C. Shaw, Supply in Modern War, p. 37.

<sup>8</sup>Supplement to the London Gazette, 5 Mar 1948 (Operations in Burma from 15 Dec 41 to 20 May 42), p. 1709, para 82.

where there is a route capable of carrying the transport integral to the force. When the amount of materiel to be carried does not cause the force to become cumbersome, this system of replenishment can also give speed because there are no delays or detours to replenish materiel. In essence, self-containment gives a force the ability to move (sometimes with speed) by an otherwise difficult and perhaps unexpected route. Future developments in cross-country or air vehicles may allow an even greater choice in direction of movement.

The disadvantages are that the range of a force depends upon the stocks that can be carried, and each increase in stocks reduces the mobility of the force. If the size of a force is limited, its power is reduced because more service troops are included at the expense of combat troops, and combat troops may have to be allotted for protection of the self-contained 'base'. If the transport used can only operate on fixed surface routes, transport capacity is wasted because, as materiel is used up, the empty transport must either continue with the force, or be abandoned. However, if the transport provided can travel cross-country, fly or use the sea, then as each vehicle empties it can be returned to an outside base.

In summary self-containment is at present the least economical in transport of the three basic systems of replenishment. The economy of this system will improve, however, as more versatile vehicles are brought into use in the Australian Army. Mobility is hard to obtain using this system, and easily lost; it can only be obtained when the amount of materiel is limited, and suitable routes and vehicles are available. In a restricted sense, self-containment can increase range and give some mobility, as in the case of dismounted patrols.

*Local Replenishment.* Local replenishment is the system used when materiel is obtained from sources nearby or along the route of march. The materiel can be got from the local population (friendly or hostile), the countryside (game, fish, wild fruits), salvage, repair, allies located nearby, or captured enemy dumps. The Viet Cong have used local replenishment as a major part of their replenishment system.

Obtaining materiel locally obviates transporting it from a base; and when efficiently organized to reduce delays and diversions, it can provide a high degree of mobility, by reducing the load to be carried, although this is restricted to areas where sources are available. Resorting to local replenishment when the flow of materiel from bases is restricted or interrupted can reduce the requirement for reserves to be held forward, and local replenishment can sometimes extend the range of a force.

Unfortunately, many, if not most items required are unlikely to be readily available locally: e.g., fuel, ammunition, and weapons. Thus a force using local replenishment could easily lose power. A force living off the country tends to straggle and to burden itself with things it may require. If it moves too slowly, or is held up by the enemy, the force might denude the area and starve. In bad seasons or in poor country, local replenishment limits the size of the force. A hostile population could bring disaster to an enemy army that had to scrounge for its food; and where there is competition between a force and the local population for materiel available locally, then that population is likely to become hostile.

Unless or until all items can be obtained locally in sufficient quantities to support an Australian force, this system is unlikely to provide more than a small proportion of the total materiel required. However, if organized properly, it is economical and can be an important means of reducing transport requirements and reserves, increasing mobility, and perhaps increasing range. However, some power could be lost.

*Replenishment from Bases.* This is a system in which materiel is brought forward as needed, and is the continuous or periodic replenishment of a force from stocks of materiel pre-positioned in bases. The efficiency of the system depends upon vehicles, rail, road and water routes, pipelines and airfields. Bases are stocked and replenished from support areas. This system was used by the Australians on the Kokoda Trail.

The advantages of the system are that bases can be stocked with any desired quantity and type of materiel. They can also be placed in the location best suited to the tactical and logistical requirements. The size of a force is only limited by the materiel available in the support areas and capacity to transport it. Replenishment from bases can allow maximum power to be brought to bear on the enemy and, in most cases, replenishment from bases also increases the range of a force.

On the other hand, the movement of supplies along the lines of communication joining the base to a force may be interrupted or cut off by the enemy; and where surface routes are used they are exceptionally difficult to defend. Also, a force shackled to its base by surface routes lacks flexibility and moves slowly; and, the transportation costs of maintaining the flow of materiel even over short distances are heavy. These costs rise as the distance between force and base increases; since in order to deliver a load of materiel each vehicle must travel to the force and return; thus additional food and fuel must be carried for the return trip. In South-East Asia, too, an enormous effort is re-

quired to construct and maintain surface lines of communication and airfields. Additionally, the base itself is relatively static, has to be protected, and depends on a flow of materiel inwards from support areas; it often has to be supplemented by extra bases along the lines of communication.

To sum up, this system can ensure that materiel of the right type and quantity is available at a base, but that base could be vulnerable to enemy attack. However, a base can be made mobile if ships are used as floating storehouses as was done by the United States Army in the Pacific, during the latter stages of World War II<sup>9</sup>; or it can be made fairly safe from attack by guerillas if it is put on an island. At present the operation of the lines of communication requires much manpower, equipment, food and fuel. The manpower and equipment so used also require more manpower and equipment for service and protection, and these in turn need more food and fuel. The people in bases and along the lines of communication thus come to exceed the combat troops forward. The use of cross-country or air vehicles, however, could cut out much of the effort expended between the base and the forward troops (for example, on construction, maintenance and protection of routes); but by their nature they could cause more effort to be expended at both the base and forward areas, particularly at the base. This is not necessarily a disadvantage, as centralization of work can mean greater efficiency, especially in providing flexibility to meet any tactical regrouping of forces in the combat zone.

### ***Flexibility in the Use of Replenishment***

A system of replenishment has often been employed for no other reason than that it followed standard doctrine and previous practice. When devised, a system of replenishment could have been a brilliant and successful organization, best suited to prevailing conditions. But, as has often happened, the system has had to be changed under the stress of war to meet a different set of circumstances. Perhaps the best example of successful changes from one replenishment system to another was the campaign in German East Africa by Vorbeck in 1914-18<sup>10</sup>. On the other hand, a good example of a failure to change a system of replenishment is the action of the Japanese on the Kokoda Trail in New Guinea; this failure sowed the seeds of the Japanese defeat.

*German East Africa.* When war broke out almost all contact with Germany was lost and guerilla operations were soon started by Vorbeck's force. The country was large and tropical, and the

<sup>9</sup>Encyclopaedia Britannica, Logistics, Section V, para 5.

<sup>10</sup>Leonard Mosley, *Duel for Kilimanjaro*, and Brian Gardner, *German East*.

population was friendly or at least obedient. The native force was lightly equipped, economical and physically fit, but few in numbers. Replenishment from bases was used, with the base sited in the northern part of the country. Carriers were used for transportation. Eventually the German force was compelled to move towards the centre of German East Africa, where bases were again set up. When this system was threatened by the British, the German force was streamlined by removing as many service troops as possible. It then moved hundreds of miles south to Mozambique as a self-contained force. There Vorbeck instituted local replenishment. What could not be obtained on the spot was captured from the enemy. It is interesting to note that this German force averaged about nineteen miles a day during marches. In this one campaign we can see not only the use of the three systems of replenishment, but also various combinations of the different systems. Vorbeck's force, which reached a maximum of 15,000 men, surrendered to the British, who used about 160,000 men, after four years of successful campaigning<sup>11</sup>. Even then Vorbeck only surrendered because Germany itself had done so, and not because he had been beaten. Thus by devising suitable systems of replenishment, and changing these systems rapidly to suit the current conditions, Vorbeck's force was able to maintain the mobility necessary for successful operations.

*Kokoda Trail.* On the Kokoda Trail, however, the Japanese lost to the Australians, although the Japanese were using a combination of the three systems of replenishment which was admirably suited to the conditions<sup>12</sup>. And one of the main reasons for the defeat of the Japanese was that they lacked the flexibility to change their system. The system in brief was: most of their requirements for fighting were carried with the force (self-containment); they relied on local gardens and Australian dumps for much of the materiel on which to live (local replenishment); and carriers brought forward from the coast the small quantities of extra materiel required (replenishment from bases). This system proved inadequate because of the failure to continue capturing Australian dumps, the rapid depletion of local gardens, the unexpected delays imposed by Australian forces, and bad management of the carrier system. When it was known that the system of replenishment was inadequate the Japanese tried to obtain food by sending out foraging parties; these were successful. Air replenishment would have been an answer to the Japanese problem, as was proved when it was used successfully by the Australians opposing them. Air replenishment, however,

<sup>11</sup>Ernan Gardner, *German East*, p. 194, para 1.

<sup>12</sup>Raymond Paul, *Retreat from Kokoda*, p. 90 and 288.

was not used, although sufficient aircraft were available and the Japanese had had previous experience of the value of this system; in China in 1937 they replenished whole divisions by air<sup>13</sup>. In effect, the Japanese imperilled their advance on the Kokoda Trail because they did not change their system of replenishment from the existing combination to one of replenishment direct from bases using air transport.

A successful system of replenishment therefore is one which uses to best advantage the characteristics of the three basic systems; and which can be rapidly varied to meet essential requirements should conditions change.

### **Existing System of Replenishment**

The existing system of replenishment is one in which most materiel is replenished from bases; some materiel is, however, replenished locally but seldom in the combat zone and an endeavour has been made to give to the combat element some security against disruption to the lines of communication. This has been done by putting stocks of materiel, sufficient for self-containment over a short period only, on road vehicles integral to the force. Reserves are normally held at every level of command back to base, although this is not obligatory. The present system requires that seven to ten days stocks, including reserves, be held within the division. This system was designed initially for warfare in developed countries with terrain easily traversed by surface vehicles. All means of transport available are utilized to replenish materiel, although air transport is the major movement agency, especially in the combat zone. Some co-ordination of movement is achieved by headquarters and a variety of agencies which have 'grown up like Topsy'; the lack of one authority, has, however, prevented efficient co-ordination.

All of the following have at one time or another, some responsibility in the chain of replenishment

- (a) The Government Departments of Defence, Supply and the Treasury.
- (b) The three Armed Services: Navy, Army and Air.
- (c) All branches of the staff including the Branch of the Secretary, Department of the Army.
- (d) Staffs of all formations and units.
- (e) Most Corps; these include armour (e.g. tanks), engineers, signals, service, medical, dental, ordnance, and even survey (for maps).

In almost every case the reasons for this present division of responsibility no longer apply; and often tend to complicate the system unnecessarily.

<sup>13</sup>Shaw, *Supply in Modern War*, p. 244, para 2.

In summary the existing system of replenishment is a combination of the three basic systems. Insufficient stress is placed on the use of local replenishment, at all levels. Self-containment is only obtained by a reduction in mobility; this reduction is caused by the use of road vehicles with limited cross-country performance to carry materiel with the force. Movement of materiel to the force can be by any or all means of transport and lacks efficient co-ordination. Responsibility for providing materiel is so fragmented between different corps as to make standardization and economy difficult to obtain. In addition neither the provision of materiel nor movement is really centrally controlled except at unit level. This system is in effect an amended version of systems current when 'warfare in the rear' had not reached its present importance; and unfortunately it has become inflexible by the addition of many makeshift staffs superimposed to obtain at least some co-ordination between the multitude of agencies responsible for the provision and movement of materiel.

The system accepted abrogates in one way or another all the principles of replenishment:

- (a) *Foresight.* One basic fault in the system is the division of responsibility. This is known but as yet no conclusive action has been taken to make the necessary changes in responsibility. This shows a lack of foresight in the planning for any further war.
- (b) *Simplicity.* A user of materiel does not want to and should not have to waste a lot of time deciding where to send his request for an item. Staffs should not have to spend many months learning who is responsible for what item, and then who is responsible for moving it.
- (c) *Economy.* Extra cost is always involved in maintaining dual systems. When the system is divided between numerous Corps then it becomes costlier still. Constructing and/or maintaining road, rail and inland water routes just in case air transport cannot be used for a short time may give some flexibility, but it is also extremely costly. It may even be much cheaper to buy more aeroplanes, build more airfields, or just dump in forward areas and accept the loss if dumps must be left. In essence the present system is uneconomic. Besides, no real check has been made of the full cost of alternate systems (e.g., all air transport and dumps) compared to the enormous cost of alternate routes (e.g., road). In any case, if war in a theatre is expected to last only a short time then the cost of the former will certainly be less<sup>14</sup>.

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<sup>14</sup>Gardner, *German East*, p. 194.

- (d) *Co-operation.* Co-operation is vital, but the present system of replenishment uses co-operation to replace the tried and proven system of centralized command and control. If a commander wants to obtain action on replenishment he has to deal in turn with at least four, perhaps five, branches of his own staff as well as commanders of various services. He need only deal with two people if one was responsible for movement and one for provision of all materiel. When a joint army/air force task is to be undertaken the proven maxim is that one army commander works with only one air force commander. The same should apply to the basic divisions within an army: e.g., operations and all movement or operations and all replenishment. In fact the existing system of replenishment demands too much co-operation from too many people for too long.
- (e) *Flexibility.* Available manpower and labour-saving machines are allotted to units of the many different corps operating the replenishment system. Because of rivalries that develop, and the lack of close centralized control, great difficulty is experienced in concentrating the necessary resources of men and machines on those tasks with the highest priority. This is one type of inflexibility. Another and perhaps more apparent type of inflexibility is that forced upon the combat elements. They are dependent to a large degree on road vehicles to carry their self-contained stock of materiel for immediate replenishment. Thus their reduced mobility brought about by the use of road vehicles causes further inflexibility.
- (f) *Security.* The use of surface lines of communication is insecure unless an enormous effort is expended in protecting them. This is an established fact of war in South-East Asia and needs no further elaboration. Airfields, although large, are much easier to defend than a long surface route. But even then defence is complicated because of the many units of different corps which have to be co-ordinated into the defence arrangements. At least two separate commanders are normally appointed in an area occupied by units responsible for replenishment—one or more for replenishment and one for defence. All this does is to create friction, and the correct balance of effort is seldom achieved between the requirements for security and replenishment. One commander with, if necessary, an adviser on defence would solve the problem.

### **Possible Improvements to the Existing System**

The combat elements of most forces from industrialized countries have become accustomed to using road vehicles to carry with the force both their requirements for immediate replenishment and their forward reserves. Men of the combat element still carry some of the requirements; and in some cases materiel required is dumped in forward areas.

Although there are some occasions when road vehicles can be used without reducing mobility, they will more often than not reduce the mobility of a force; to regain that mobility a force can either avoid taking road vehicles with it, or use vehicles which are not restricted to roads. The latter (e.g., cross-country vehicles and aircraft) are costly and are not yet as readily available as road vehicles. At present, therefore, aircraft and cross-country vehicles should be used only for ferrying materiel and not as mobile store-houses. A reduction in the transport capacity integral to a force means that dumping should be used. But both the load of the soldier and dumping could be minimized if less materiel is required forward for reserves and immediate replenishment. This minimization could be assisted by the deletion of fuel and spare parts, if vehicles were no longer used to carry reserves and immediate replenishment.

Can the soldier carry more? Men, particularly combat troops, have been used throughout military history to carry some of their own requirements of immediate replenishment. In recent times they have been overloaded to the detriment of both mobility and combat. General Fuller once stated that 'the soldier cannot be a fighter and a pack animal at one and the same time. The idea is wrong at the start. Yet it is always being repeated'.<sup>15</sup> Facts we do know, and which are so often overlooked are these: first, the soldier on the march, where he is thinking only of putting one foot before another, should carry one-third of his body weight; that is, not in excess of forty-five pounds. Second, the load carried should be much less (about thirty-three pounds) where a soldier's life depends upon quick physical and mental reaction<sup>16</sup>. Thus the soldier cannot be used to carry more until technical improvements can substantially reduce the weight of existing materiel.

Use of Dumps. 'Only the materiel moved and used contributes to success in war. That which remains stored is a gift to the enemy'.<sup>17</sup> The key word in the above is *used*. Therefore what must be strived for is to move forward only that materiel which will be used immediately. Some of this may be dumped temporarily

<sup>15</sup>S. L. A. Marshall, *The Soldier's Load and the Mobility of a Nation*, p. 10.

<sup>16</sup>Marshall, p. 13.

<sup>17</sup>Marshall, p. 56.

while the first part of it is used; and dumping may be necessary when there is a likelihood that movement forward of materiel will be interrupted. In any case, with materiel dumped on the ground, there is less to lose than with materiel stored on vehicles which, because of terrain, are no more mobile than dumped materiel.

'If we are ever to have a wholly mobile army—mobile afoot as well as when motorized on the road—the fighting soldier should be expected to carry only the minimum of weapons and supplies which will give him personal protection and enable him to advance against the enemy in the immediate situation. He should not be loaded for tomorrow or the day after. He should not be given an axe in case he may have to break down a door.'<sup>18</sup> The above principle stated for the soldier should also be rigidly applied to the whole combat element. It has become the custom with most people to believe that the reserves held within units (say the three days rations) are not reserves at all; indeed it is commonly expressed that of the materiel held within the division only that held by service units can be called reserves. This idea is a fallacy which will have serious consequences for any force operating in South-East Asia, particularly when using air replenishment. Unused materiel held within a unit is a reserve. If it is not taken into account, then over-insurance will result, causing waste and reduced mobility. In fact these unit reserves would, when using air replenishment, enable reserves held in formations to be reduced; and thus could allow a reduction to be made in the many materiel-holding service troops within a division.

In summary, mobility will be increased and the amount of replenishment reduced if road vehicles are not used by the combat elements of a force to carry the materiel required for limited self-containment. The soldier should not be used to carry extra materiel to offset that previously carried by road vehicles. Dumps should be used as little as possible but in preference to storage on vehicles. The amount of immediate replenishment and reserves held by a combat force should be reduced. This reduction should be made after ascertaining the minimum requirements for the immediate situation, and these must take into account the reserves held within all units, remembering that the delays inherent in air transport are not as great as those of surface transport. It is important to remember that during the first Chindit Expedition into Burma 'each man when fully equipped carried about fifty pounds, which increased to sixty-six pounds when it included the unexpended portions of seven

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<sup>18</sup>Marshall, p. 29.

days rations'. Experience showed that the loads carried could be greatly reduced since, as far as 'replenishment was concerned, implicit trust could be placed in the Royal Air Force to deliver it as required at any time and almost anywhere, as long as there are adequate numbers of aircraft.'<sup>19</sup>

### **Local Replenishment for the Combat Element**

As local replenishment can reduce the amount of materiel moved forward, its importance should be stressed to all ranks. In addition, where items are obtainable locally then reserves of these can either be minimized or deleted, depending on the amount available in the area in which the force is located.

Captured enemy materiel is a source which has great potential. In some cases it may even be worthwhile to concentrate on capturing enemy materiel. This would have two major benefits: first, with the use of this enemy materiel, a reduction in our movement commitment and, second, the denial to the enemy of items which he requires, and of which he will in most cases be in greater need than us. Because ammunition is always such a large percentage of the materiel required to be moved, particular attention should be given to training our soldiers in the use of enemy weapons and ammunition.

'Western' armies are taught to make full use of such local items as construction materiel, water and fresh food, but at times this teaching is misconstrued or not followed. Materiel-holding units demand dunnage from outside the area simply because the local timber will not last for years. If the local product is suitable to use for the likely period required, then it must be used and thus save transport. On the other hand, however, if items are not available locally this must be made clear; for example, too often one hears the general statement that soldiers can live on what is available in the jungle if they know how to find it. Bernard Fergusson, a member of the Chindit Expedition into Burma, wrote revealingly on this subject.

- (a) *Hunting*. 'Hunting proved almost impossible. I once sent out a hunting party, and they returned with nothing but a minute tortoise, which doesn't go very far among three hundred famished men'.<sup>20</sup>
- (b) *Local Purchase*. 'Local purchase depends upon many chances. It takes time and is a source of danger if there are enemy about; to feed a whole column you need a deal of rice—probably more, even for one meal, than a village can supply at short notice; and there is little hope of finding adequate supplies of anything other than

<sup>19</sup>S. W. Kirby, *The War Against Japan*, Vol II, p. 501.

<sup>20</sup>Bernard Fergusson, *The Wild Green Earth*, p. 186.

rice'.<sup>21</sup> It must not be forgotten that any purchases made should be paid for promptly. The amount of materiel purchased should be such that it does not leave the villagers short; if this occurs, hostility with its attendant evils will result.

- (c) *Living off the Country.* 'There is a school of thought in the training world which used to contend that it was possible to live off the country in a narrower sense than this. Much time has been wasted in teaching the doctrine that a man who knows what is what in the jungle can subsist on edible roots. It is conceivably possible in certain jungles at certain seasons; everybody knows of delicious plants which one can recognize and eat, but to live on such chances alone is a full-time job. It is nonsense to suggest and wicked to teach that troops can cover their daily distance, carry out their job and fight the enemy on what they can find in the jungle'.<sup>22</sup>
- (d) *Fattening Troops before Operations.* 'The lesson must be accepted that troops preparing for a long physical ordeal must be fattened for it'.<sup>23</sup> This method of reducing the requirement for rations is included here under local replenishment, although it could just as easily have been included earlier under self-containment.

*Obtaining Materiel from Allies.* More attention should be given to pointing out the advantages of making reciprocal arrangements between allies for items temporarily in short supply. This avenue of replenishment should be a standard arrangement between sub-units and units, as well as between formations. For example, where one battalian is short of ammunition but its neighbour because of less activity, is not, then a redistribution should be standard procedure. This arrangement should be enforced not only within a national force but also between units of forces from different nations.

*Summary.* Because of its importance in reducing the 'tail' of a force, more emphasis should be given to local replenishment. In particular the following should be emphasized: first, early planning (for example, on area studies and administrative Intelligence) to gain accurate information about the resources available locally from the countryside, and from both hostile and friendly forces; second, how and for what period the maximum economical use can be made of these resources; third, thorough and accurate training to ensure that all ranks understand the availability and use of local resources as well as the

21 Fergusson, p. 187.

22 Fergusson p. 188.

23 Fergusson, p. 193.

need for economy with them; fourth, the need for an equitable allotment of local materiel to the local population, and the value of prompt payment for any materiel purchased; fifth, the importance of ensuring that men brought into a combat area are previously 'fatted'.

### ***Replenishment of the Combat Element from Bases***

A new look is necessary at the present teaching that all means of movement should be used. Perhaps it will prove more economical to concentrate on air movement, and at most one alternative (e.g., road). If other secure means exist then use should be made of them; however, they should be considered a bonus. But it must always be remembered that air transport has enough flexibility in itself to make unnecessary the use of other modes of transport to gain flexibility. Besides, the extra cost of road vehicles, road construction, maintenance and defence is difficult to justify, merely to obtain alternative means. Control of all movement must be made the responsibility of one authority as soon as possible. Any delay only increases the unjustifiable cost and confusion inherent in the present system. The formation of the Royal Corps of Transport in the British Army as a result of the McLeod Report, is a step which Australia could well emulate.

*Responsibility for Replenishment.* All that needs be said is that the sooner one organization is responsible for all replenishment the better. A move has already been made in this direction by the British Army which transferred the responsibility for provision of food and fuel, etc, from the Service to the Ordnance Corps.

*Defence of Installations, etc.* This is so important that a commander for defence (with staff) should be integral to each part in the system of replenishment. This commander should have the dual responsibility of supporting the combat element administratively and also of defending the administrative installations, etc. If the commander does not have this dual responsibility, the correct balance is unlikely to be obtained between the requirement for defence and the need to replenish the combat element. The commander with this dual responsibility should command an organization which combines the best features of the new organizations brought about in the British Army by the McLeod Report, and those incorporated both in the Division Support Command of the United States Army and in the Service Battalion in the Canadian Army.

### ***Conclusion***

For a system of replenishment to be suitable for an Australian force in South-East Asia, flexibility is the prime

requirement. But, to ensure that a correct balance is obtained between power, mobility and range, the system chosen must use the best characteristics of the three basic systems of replenishment. Thus:

- (a) Self-containment of the combat element should be reduced to a minimum because it is uneconomical and reduces mobility. The main points of interest here are that:
- (i) It is essential to decrease the number of road vehicles and increase the number of air or cross-country vehicles.
  - (ii) The soldier should if possible carry less, but certainly not more than he does at present.
  - (iii) Dumps should be used in preference to road vehicles for storage of materiel. If materiel requires moving then it should be ferried by aircraft or cross-country vehicle.
  - (iv) Stocks should be reduced in keeping with the lesser time it now takes air transport to deliver materiel. It would appear that the seven to ten days holding now required for a division is based on the time taken for movement by road after interruption to the system of replenishment.
- (b) Because it can be economical and can increase mobility and range, local replenishment should be used much more than it is, particularly for items readily available in a force area. Accurate administrative Intelligence and area studies will be of great assistance here. The major areas for improvement are:
- (i) The need to ensure that we collect enemy materiel (including weapons and ammunition) and that we train our troops in its use.
  - (ii) That maximum use is made of any local resource available.
  - (iii) The introduction now of a system to exchange materiel in short supply between units of all allied nations.
- (c) As it is the only reliable system available, replenishment from bases should remain the major means of replenishment. Here, however, there is a possibility that major changes may bring significant benefits:
- (i) Reliance on air transport as the only sure means of movement of materiel will relieve a force of the maintenance of multiple means of movement (road, water and pipeline as well as air).

(ii) The efficiency of the replenishment system could be improved by dividing anew the responsibilities for supply and movement. This new division of responsibilities should be more in keeping with modern techniques and the small size of the Australian Army.

(iii) Amalgamation of the various materiel supply and transport staffs and units under one commander would greatly assist the commander of a combat element in his function of command, as well as increase the overall efficiency of the replenishment system. If necessary, this amalgamation could be part of a wider merger, including all administrative staffs and units.

Replenishment deals in many drab and awkward facts which must be faced and a solution found, for it forms the very foundation of tactics and strategy. It is usually ignored. Unless the replenishment system is put on a sound footing, there is little likelihood of arriving at that vital balance between power, mobility and range that is so necessary to win wars in South-East Asia. □

#### **'THE CONDUCT OF COUNTER-INSURGENCY WARFARE'**

Due to an editorial oversight it was not acknowledged that p. 11 of Lieutenant-Colonel Garland's article on 'The Conduct of Counter-Insurgency Warfare, published in the AAJ of January 1966, was based on Otto Hellbrunn's article 'Guerillas in Pitched Battle', published in the Royal United Service Institution Journal of May 1965.

# **Search and Clear Operations**

*Lieutenant-Colonel R. S. Garland, MC,  
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## **The Aim of Search and Clear Operations**

WHAT is a 'Search and Clear operation'? Is it an advance, attack or a pursuit operation—or a bit of each? The US equivalent term is 'Search and Destroy' and as such has received wide press coverage in Australia.

What is the more vital element of the term—Search or Clear? The two terms are inter-related but the Clear requirement contains the key to a successful operation. Pamphlet 11, Section 53, recognizes the requirement for a trap concept, as it states: 'The aim of a Search and Clear operation is to search an area thoroughly and to make sure that no enemy either remain undetected or are allowed to escape.' Consequently there is a need for two plans: the Search Plan and the Trap Concept.

I submit that the Trap Concept must govern the Search Plan. If a search operation is launched without a specific trap concept in mind, the enemy will be free to move to another and quieter area until the operation is completed. He can then return to the contested area at a later date. To cover his withdrawal he can set booby traps and fight delaying actions against our advancing elements so that we incur casualties without any real tactical gain.

I therefore argue that the Trap Concept must be decided upon before the Search Plan is thought out in detail.

The aim of a Search and Clear operation should normally be to locate and destroy a guerilla force. Considerations such as destruction of food dumps and suchlike are important, but of less significance. In any case the degree to which a 'scorched earth' policy can be implemented is normally governed by political considerations aimed at winning the support of the local population.

The object of the search and clear operation should be to kill as many guerillas as possible and not merely to swan around Viet Cong Territory with no trap concept in mind. Massive search and clear operations launched with a view to 'showing

the flag' and which do not include a trap concept are pointless and wasteful in military effort.

The commander of a search and clear operation must first solve three related problems before he can prepare his outline plan.

- (a) What is his guerilla target and what are their likely dispositions?
- (b) How can he best trap and destroy this enemy with the forces at his disposal?
- (c) How can he launch his search operation with a view to achieving (b) above?

### ***What and Where is the Target?***

A battalion should normally be allotted a target: e.g., a guerilla battalion and an area in which to conduct operations, normally the area of influence and support enjoyed by the 'target'.

The concept of one battalion with one target and one operational area has been validated in many counter-insurgency wars. The American concept in Vietnam of allocating to each battalion a local Tactical Area of Operational responsibility (TAOR) does not go far enough out. Each battalion should have a specific target and an extensive operational area which is directly related to the known operations of the selected target; this area should not be confined to the local security requirement of the operational base.

If a battalion has one target and one operational area then the battle for the domination of this area can commence. By constant patrolling the battalion will rapidly build up local knowledge of the enemy, his habits, his contacts and his tactics. If the CO can learn to attune his thinking to that of his guerilla opponent then he should be able to predict the likely movements, actions and reactions of his enemy under any battlefield situation. This is Stage 1 of learning how to set a trap!

The main military problem in a counter-guerilla war, which is in effect a fluid infantry patrol war, is that of target acquisition. It is quite useless to throw a major operation into jungle terrain without either first locating the target or alternatively planning an effective trap for the enemy forces which may or may not be in the area.

The first action which is necessary to build up a reliable system of target acquisition must be the implementation and full exploitation of all means of gathering battlefield Intelligence. Most Intelligence gathered from local sources is stale be-

fore it reaches the battalion Intelligence officer. However, maps should be kept which show all such 'stale' Intelligence so that a picture of the general pattern of guerilla activities is built up. The most reliable source of battlefield Intelligence comes from ground evidence reported by patrols. Such evidence gathered over a period will depict on a map many of the habits and weaknesses of the guerilla. It must also be stressed that much valuable ground evidence will be missed if our infantry patrols are not training in tracking! I will not discuss all the means which are available to locate Viet Cong dispositions, such as air reconnaissance, air photos, patrol reports, tracking teams, information from agents, and so forth. Suffice to say that the commander normally has sufficient information at his disposal to make intelligent appreciations as to the likely dispositions of the Viet Cong and the evasive actions they are likely to take to avoid encirclement.

Before the commander considers his trap concept, he must endeavour to estimate the known and likely Viet Cong dispositions and put them on the map. This may sometimes call for a great deal of inspired guesswork. However, effective reconnaissance patrolling by SAS-type units should be able to reduce the guesswork content and contribute to the setting up of targets for destruction by our forces.

In the allocation of targets to battalions for search and clear operations, the following points should be borne in mind:

- (a) Pressure must be brought against the guerilla targets and maintained. This can only be achieved over a lengthy period by constant patrol and ambush activities.
- (b) The above long-term pressure must be applied simultaneously against all guerilla forces in the theatre. This principle supports the one battalion-one area concept. It also restricts the Viet Cong capacity either to concentrate against any one battalion or to escape to quiet areas.
- (c) When an opportunity is presented for the destruction of a particular guerilla force, all available forces should be concentrated for the kill, irrespective of battalion boundaries.
- (d) Large operations launched into Viet Cong territory, such as the Ben Cat-Iron Triangle operations in September 1965, do not achieve significant tactical results unless they are based on reliable information and incorporate a trap concept.

To sum up so far, the battalion commander must first be allotted a target. He must then settle down to a familiarization

patrol programme to get to know his enemy and his operational area before he launches any major search and clear operations.

The aim of the subsequent search and clear operations must be to destroy the guerilla forces. The capture of ground or the clearance of an area of jungle are only of importance if they contribute to a master plan which provides for the destruction of the enemy. As the guerilla is an elusive target and he fights on a concept which provides that no base is worth defending, tactical concepts must be based on techniques for:

- (a) The location of enemy camps and supply dumps.
- (b) Destruction of the located base by ground and/or air operations. These operations will not be successful unless tactical surprise can be achieved either by stealth or by speed.

This system of allotting operational areas to battalions is not inflexible. Quick concentration of our own forces can be achieved by lifting and redeploying those forces by helicopter or APCs and boundaries can be shifted or clearance given for movement by one force into the territory of another, in pursuit of its target.

Enemy locations, particularly in the vicinity of the controlled area will be constantly changing. It is essential that any information obtained be acted upon immediately and effectively. Mobile forces, capable of being committed to battle with the least possible delay must be available to support patrol operations.

Before leaving the subject of target selection, I must quote the wise observation of a Vietnamese colonel during my tour in Vietnam last November:

The important target (he said) is the village guerilla. He is the contact man for the regular units and he provides their intelligence and local logistic support.

This is very true and if we plan to eliminate the village guerillas the hard core regular units must eventually lose their mobility!

### **Setting the Trap**

As the results of patrols (and other Intelligence agencies) information can be collated and the pattern of enemy activity will be gradually discerned. Trap concepts can then be brought into play.

It should be remembered that our own forces when searching in Viet Cong country will be lightly equipped, possibly without artillery support and in not more than battalion strength. In their own areas guerillas are capable of concentrating very

rapidly and in great strength against intruders. There is no question, therefore, of our troops taking up conventional defensive positions. They must depend for protection on their mobility, the secrecy of their movements, and the speed of their action; in short they must become guerillas themselves.

TRAP PLAN A  
HAMMER AND ANVIL TRAP

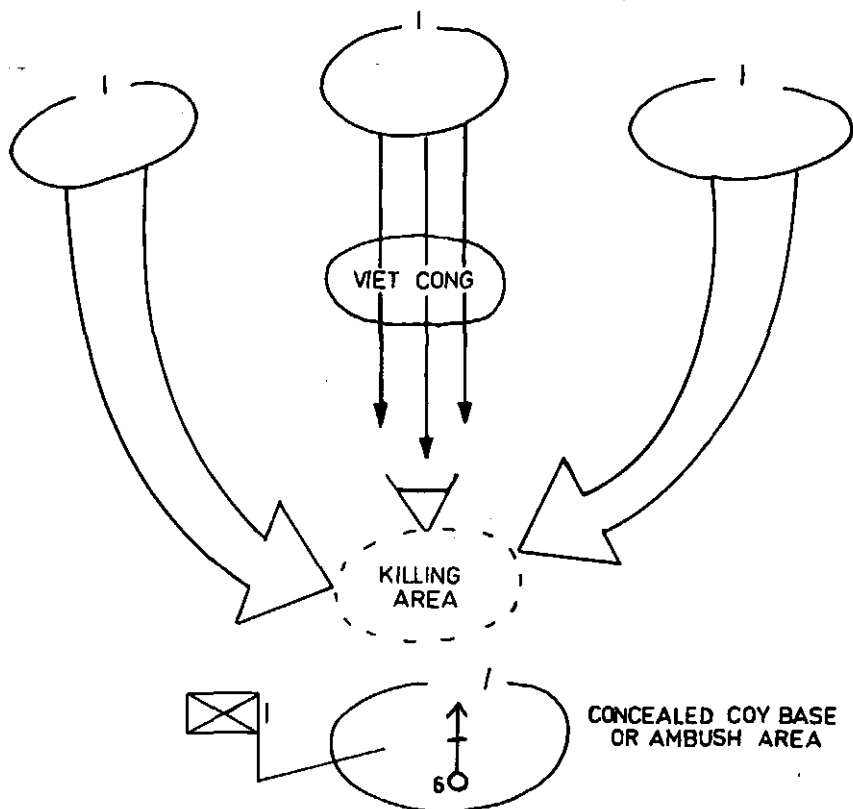


Figure 1

If a guerilla force is located, any plan to engage it must take into account its ability to disperse very rapidly and in one form or another we must mount an immediate encirclement attack. If caught, guerilla reaction may be violent and aim at punching a route out through the cordon, and a mobile reserve to deal with this may be required. Otherwise they may attempt to disperse and escape, leaving a rear party behind to continue the

battle and distract the attacker. A small guerilla element may also deliberately provoke an engagement and make an obvious retreat to lead us away from the main guerilla force.

TRAP PLAN B  
NATURAL OBSTACLE TRAP

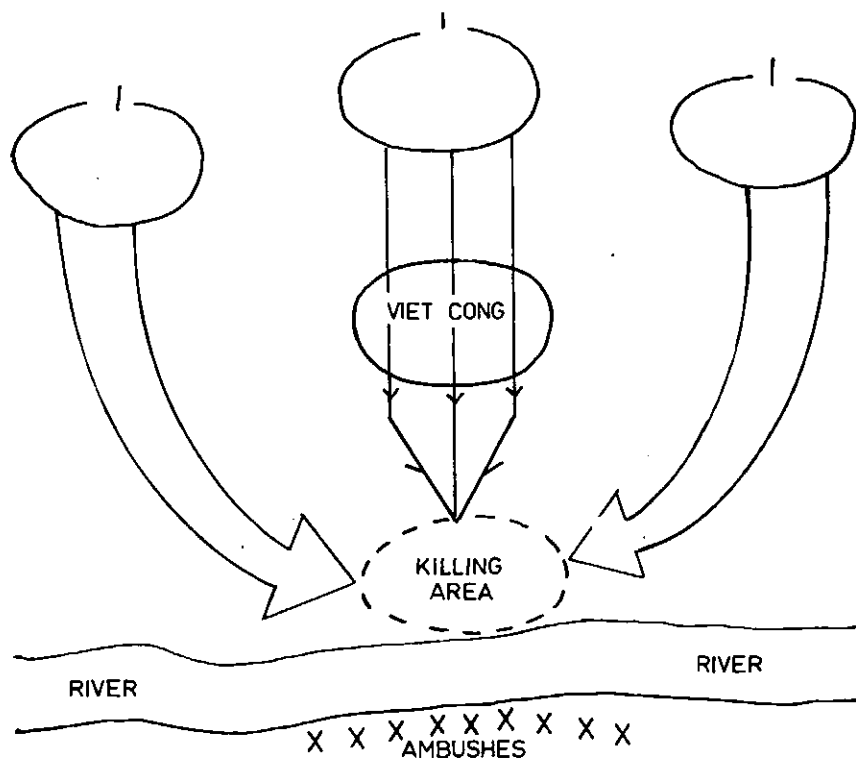


Figure 2

After a careful assessment of the known habits of his guerilla target, the commander must make a detailed map appreciation before he decides on the trap concept upon which he will base his search and clear operation.

Three possible battalion trap concepts are illustrated in Figs 1, 2 and 3. The same principles apply to trap concepts conducted at higher or lower levels of command.

It is no easy matter to encircle a Viet Cong force as it can only be achieved by manoeuvre based on stealth or speed. Most

counter-guerilla experience would indicate that encirclement by stealth has seldom been successful. However, most failures can be attributed to faulty planning and loss of security. Although the closing of the trap by speed, such as helicopter or APC movement, would seem to provide a reliable answer, local factors, including terrain limitations, may not permit rapid envelopment.

TRAP PLAN C  
FISHING NET TRAP

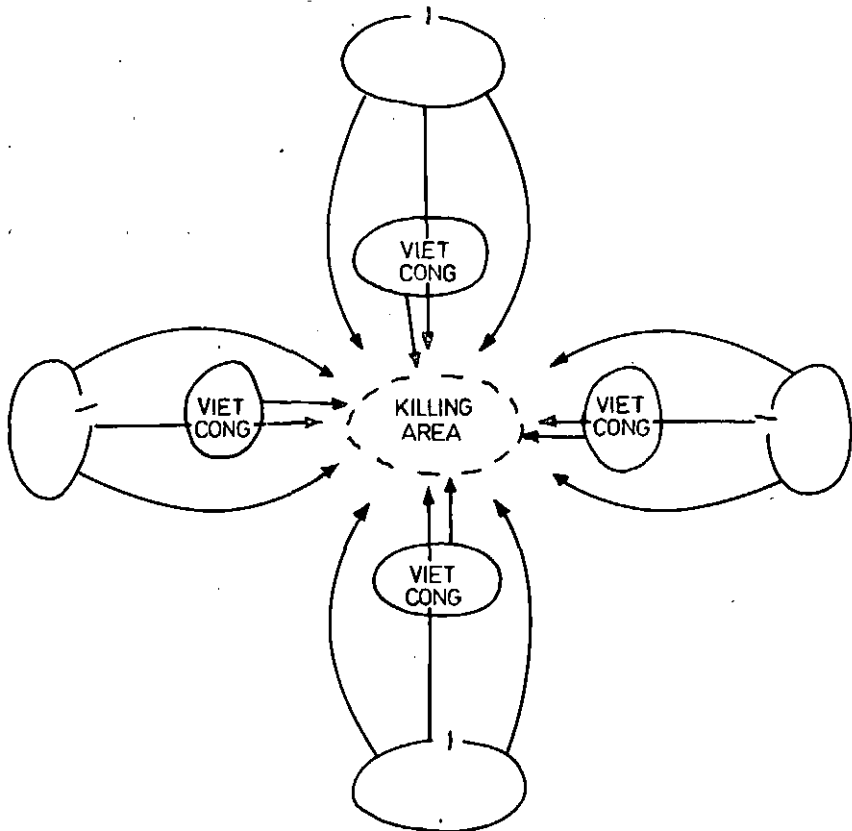


Figure 3

The most important principle in setting a trap for a search and clear operation is to infiltrate forces astride likely escape routes before launching the main search operation. Such forces

may represent the anvil of the trap or be employed in search operations also so that the noose can be further tightened round the Viet Cong target. Consequently the blocking force of the trap may either be static or mobile according to the requirements of the plan.

Guerilla forces show a somewhat unsporting reluctance to be canalized into an obvious trap. They will take evasive action to avoid encirclement as soon as our intentions become obvious. Some favourite guerilla tricks are to circle behind the searching troops, or hide up on inter-unit boundaries or to move into areas that have already been cleared.

Such guerilla counter-measures can be defeated by:

- (a) Simultaneous search across the whole front of the advance. This implies a large number of small reconnaissance patrols as against a small number of large fighting patrols.
- (b) Once the search has begun, a rapid rate of advance should be maintained so that the quarry can be flushed and the trap closed.
- (c) If the area to be searched is a large area, and this is normally the case, the blocking force can assist to tighten the noose by searching inwards.
- (d) The fishing net search and trap concept is shown in Figures 3, 5 and 6. Most guerilla tactics can best be countered by a simultaneous search converging from the perimeter of the area, as against a linear search in which the flanks and rear of the area are left open for Viet Cong evasive action. When a search is conducted on the fishing net principle, the more the enemy endeavours to evade our searching troops, the more likely he is to be caught in the net, provided it is skilfully and quickly closed around the Viet Cong.

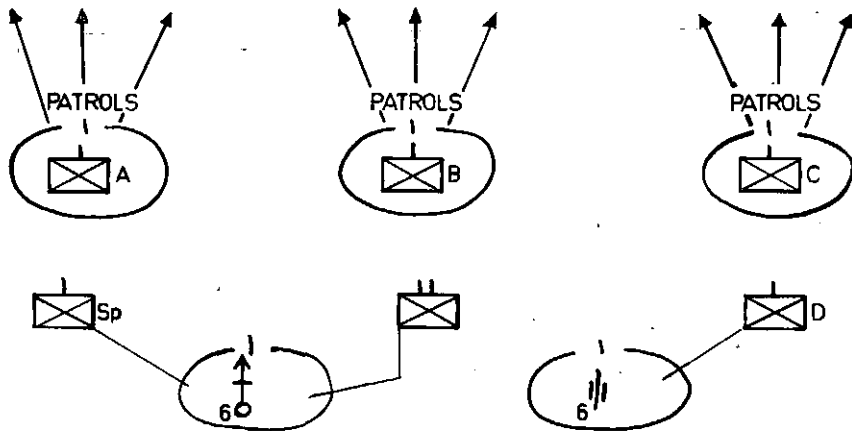
The ability of a commander to form a trap in a fluid search and clear operation is governed by the standard of training of his troops in basic infantry subjects such as fieldcraft, jungle navigation, fire discipline, physical mobility and radio communications. During training for counter-guerilla operations the conduct of searches and traps based on Fishing Net concepts should be practised in rugged jungle terrain until the battalion reaches a high standard of mobility and flexibility in fluid operations.

Troops must be trained to patrol up to and along their inter-unit boundaries without fear of being shot up by their flanking units. Such patrolling requires of the troops involved high standards both of target recognition and fire discipline.

**The Search**

Perhaps the meaning of a search operation would be clearer if we called it the 'Hunt'. A search and clear operation is a man hunt, except that the quarry, the Viet Cong, has the ability to strike back if we offer him suitable targets.

SEARCH PLAN P  
MOBILE FIRE PLATFORM CONCEPT



*Figure 4*

Figure 4 shows a search plan based on company patrol bases. This plan was used by 1 RAR during the Ben Cat and Iron Triangle operations in Vietnam. It has certain advantages in an operation in Viet Cong territory where our Intelligence may be very bad. The companies patrol in strength from company bases which are in range of either the battalion mortars or field battery.

The main advantages of this plan relate to the defensive qualities of the layout. As such it is more defensive than offensive.

Only three effective company patrol bases are employed. The remaining rifle company must protect the guns; the support company is deployed with battalion headquarters. Assuming fighting patrols of half platoon strength about 15 men, each company base can only provide three patrols at any one time and secure the base also. Consequently the battalion can only provide nine patrols across the battalion frontage of search. In enclosed country such a low density of search is both inadequate and dangerous.

Ideally, the search plan must aim at locating the enemy base without comprising security. We will be better able to achieve this if:

- (a) Our infantry are taught tracking to a stage where they can recognize recent enemy tracks in the jungle even though these tracks have been obliterated or concealed by enemy actions. (The collation of this ground evidence will quickly establish likely Viet Cong dispositions and intentions.)
- (b) Tracking teams, including tracking dogs, are on call so that located tracks leading to or from a guerilla base can be successfully followed. This will enable us to converge on the suspected area with a view to surrounding and destroying the camp as soon as it is found.

With a tracking capacity we can follow up the guerillas after every engagement and so turn even an enemy ambush to our advantage.

The battalion plan to search an area must be aimed at dominating the desired area. This can be achieved by either flooding the area with our patrols or by systematic searching backed up by offensive operations based on patrol information. The systematic construction of helicopter landing zones will also assist in the domination of an area.

The bulk of operational experience indicates that when an area is flooded with troops, the guerillas move to another area until the operation has expended itself. The size of the operational area and the terrain difficulties encountered in South-East Asia will seldom permit an area to be effectively cordoned and searched on the flood principle.

I favour a battalion search plan which is based on systematic searching but which retains the capacity to concentrate against located targets. This Fishing Net concept is shown in Figure 5.

Before finalizing his plan for the conduct of a search and clear operation the battalion commander must consider:

- (a) Measures to ensure the security of the battalion defended area.
- (b) Cover plan to conceal movement out of the defended area.
- (c) Location of likely enemy bases and the known pattern of enemy operations, including sources of supply and likely reactions to our operations.
- (d) Supply arrangements for the operation related to the requirement for tactical surprise.

- (e) Communication plan, which must ensure coverage of the operational area.
- (f) Distribution and movements of local population and the resultant effects on our operations.

SEARCH PLAN Q  
FISHING NET CONCEPT

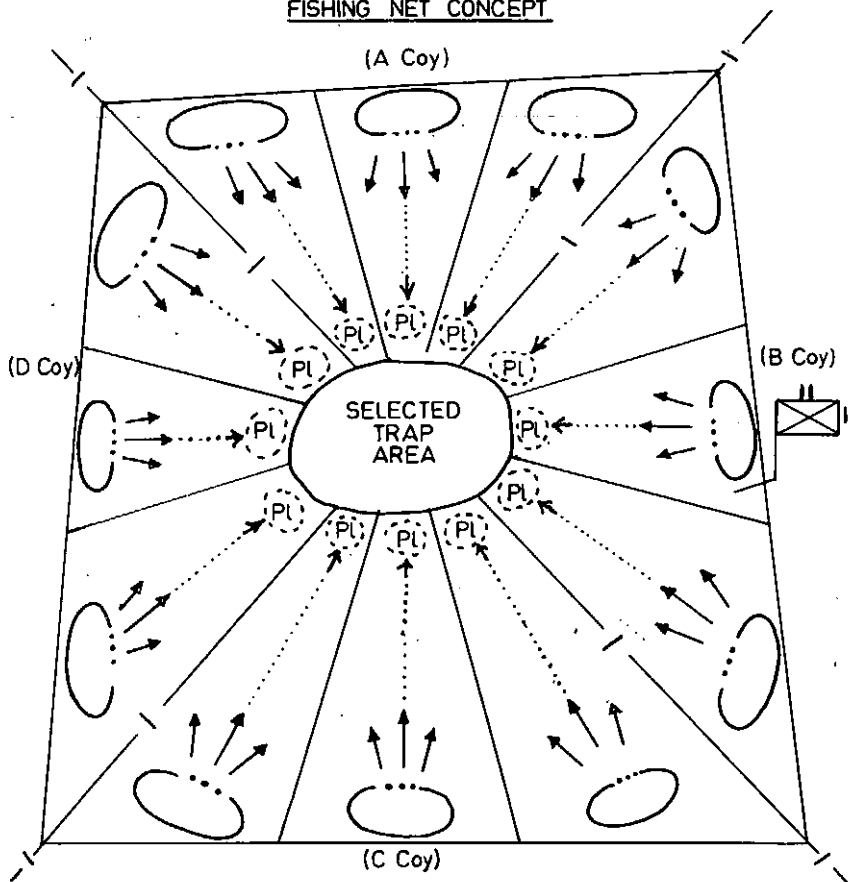


Figure 5

The battalion commander must decide whether the likely target will require a battalion operation. If he decides on a battalion operation the companies and platoons will move and search in conformity to a battalion plan. The initial selection of an area for a search and clear operation is interesting. It need not always be the area which contains the most enemy.

An easy victory has a big influence on the local population and on the morale of our troops.

Irrespective of the level, unless the exact location of a guerilla base is known, the following concept is recommended:

- (a) The area to be searched must be narrowed down as far as possible based on known information. A detailed appreciation of the enemy and a terrain study should assist in reducing the size of the area to be searched.
- (b) The most likely area for the guerilla main bases must be treated as the centre of the area to be searched.
- (c) Searching troops should converge from the perimeter of the area and search systematically towards the centre.
- (d) The allocation of areas, boundaries and timings must be so planned that all searching troops converge on the most likely area at the same time.
- (e) All headquarters down to platoon headquarters must maintain radio communications on a continuous or schedule basis so that the plan can be changed as required. Battalion and company command posts must occupy good radio sites.

Great care should be given to the selection of boundaries. They must follow natural features and must be inclusive to a nominated force. If boundaries become known they can become an area of security for the enemy.

Great skill is required to move the search forces into the operational area without prejudicing surprise. Probably no other form of warfare has demanded such a high professional standard of tactical ability. The deception plan must be coordinated at the appropriate planning level and executed at all levels with extreme patience and care. Long approach marches by night will often be called for.

During search and clear operations in Vietnam far too many of our battle casualties have been inflicted by Viet Cong booby traps. Although these booby traps have often been well concealed and skilfully employed, a well-trained infantryman should spot a high percentage of them. Training in tracking will also increase the skill of scouts in spotting booby traps. Mine dogs should also prove useful in this role.

We know from bitter experience in New Guinea and Korea that mines and booby traps are two-edged weapons. No doubt the Viet Cong have had their share of accidents and now site their booby traps very carefully. I doubt that they would lay booby traps until the direction of our advance has been disclosed. I also doubt whether they would lay booby traps on

their exits. Our aim should therefore be to approach a Viet Cong position from an unsuspected direction, which will probably be their selected withdrawal route, and we should strive to drive the Viet Cong back into their booby traps and our ambushes.

If we wish to come from an unexpected direction we will normally have to employ infiltration tactics and do a lot of walking over rugged jungle terrain. This requirement emphasizes the vital importance of the mobility of the infantryman on his flat feet. Fortunately the Australian Army has forged ahead with light-weight jungle equipment and light-weight rations. This has assisted our infantryman to achieve mobility. He can carry seven days Australian combat rations on his back in order to manoeuvre around the guerilla and achieve tactical surprise.

### **Company Search Concepts**

The next important issues are the size of the patrol base and the size of the reconnaissance patrols. A strong enemy threat should not always force us to establish company patrol bases and send out large fighting patrols. This line of thinking will negate the aim of patrolling. If we wish to locate and trap the Viet Cong we need information which can be acted upon by our full force and an opportunity for a big trap should not be thrown away by reckless patrol action. Therefore we should send out small reconnaissance patrols to acquire information secretly. This will facilitate the development of a battalion or task force trap.

A company patrol base is noisy, difficult to move and difficult to hide. It will soon be located by the guerillas and will invite attack. To defend a company patrol base adequately will seriously deplete the available patrol capacity. Patrols radiating from a company base will advertise the presence of the company and will restrict the range and frontages of patrols.

A larger area of jungle can be searched and dominated by patrolling from platoon bases as against patrolling from a company base. The platoon base is a flexible unit and it can move with the search. If the enemy attempts to concentrate against a platoon, he can in turn be surrounded by the remaining platoons of the operation. I have shown a company search plan based on the fishing net concept in Figure 6.

All jungle experience both conventional and counter-guerilla confirms that the ideal size for a recce patrol is 3-4 men. This principle still should apply to a reconnaissance patrol in counter-guerilla operations. During the search, each patrol is a reconnaissance patrol. It must move quietly and obtain battle information without being seen. Large reconnaissance patrols

of fighting patrol strength will advertise their presence and compromise the operation. Also, the larger the size of each patrol, the fewer will be the patrols available, the smaller will be the size of the area dominated and the operation will take a proportionately longer time to complete.

SEARCH PLAN Q (Contd)  
SHOWING A COY SEARCH PLAN

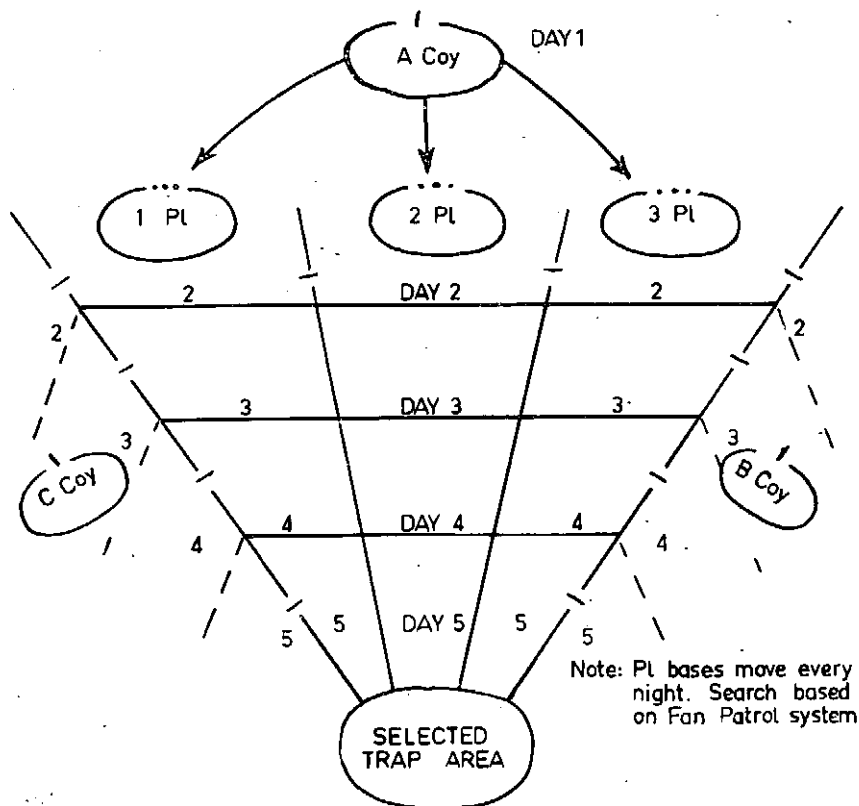


Figure 6

A jungle search can be related to casting a net. The net must be cast over the suspected area and skilfully drawn in until all exits have been blocked. This is a sneaky operation and the well-trained guerilla will endeavour to either outwit or outrun us as soon as our operation is compromised. The deployment of large numbers of small reconnaissance patrols moving from

platoon patrol bases in accordance with a converging plan will ensure for us the best tactical advantages irrespective of any course the enemy may take if our operation is compromised. If we can then maintain contact and keep him on the move for extended periods he will outstrip his administrative resources and collapse. If he stays to fight he will be encircled. The guerilla must have a breathing space after every engagement to resupply himself and plan his next move. For this reason the maintenance of contact with the guerilla force is a vital principle in the conduct of counter-guerilla operations.

The battalion plan must aim at closing with the guerilla and being one jump ahead of him when he moves. Company and platoon dispositions must be arranged accordingly. When pressure is brought on the guerilla, the pressure must be maintained by extended operations, with rotation of platoons, when necessary, from the operational base.

### ***Springing the Trap***

The plan for the search should ensure that when a guerilla base is located by patrolling the battalion is favourably deployed for rapid encirclement of the area. (Voice aircraft could assist in both recalling reconnaissance patrols by a codeword and deceiving the enemy by phoney broadcasts.)

Orders for the establishment of a cordon must be issued by radio. (A company frontage in a cordon should not exceed 1,000 yards.) This manoeuvre calls for a high standard of map reading and jungle navigation. It is a difficult operation in jungle and it should be practised in training for counter-guerilla operations. (If the enemy has heavily booby trapped an area, this area should be used to our own advantage in the selection of killing areas.) The assault force should not move close to the enemy position until all companies in the cordon have reported that they are in position and have linked up with their flanking companies.

The assault force will then execute a silent attack on the enemy position and break into their base on a narrow front. The enemy will often disperse and be caught in the cordon. If the enemy stays to fight, the cordon can be tightened. Tracking teams should be employed to flush out Viet Cong who have gone to ground.

The use of air bombing must always be borne in mind, provided the target area can be accurately indicated to the air force. If an air strike is planned, the cordon must be arranged outside the danger area and close in on conclusion of the strike. Likely exits must always be ambushed.

Where possible, artillery should support such operations from the defended area. If the jungle war of hide and seek develops into a fixed battle, the decision to fly in artillery support should not be made lightly. We should only fight such a battle when we are certain of being victorious. The enemy wishes to entice our vulnerable elements into the jungle so that he can employ his guerilla techniques to advantage. The jungle war must be conducted in such a way that we retain mobility and never become road-bound, except in the controlled area.

The attack on a guerilla base is a conventional attack with a difference. The difference is created by the cordon and the safety distances involved. This will often preclude the use of artillery support which will both compromise surprise and endanger the cordon. It may also drive the Viet Cong into their tunnels, which is not what we want. Our aim in springing the trap must be to catch the Viet Cong out of their tunnels and flush them into the ambushes set by the cordon!

Tunnel searching is a subject which requires particular study and specialized equipment, such as tear gas, pumping machines, dogs, satchel charges, infra-red equipment, etc.

### ***Lessons Learnt in Vietnam***

Some brief notes compiled by Major P. G. Sharp of the Infantry Centre, who served with 1 RAR in Vietnam, are subtended. The points mentioned apply to operations conducted during the period May-November 1965.

'The aim never seemed to be clearly stated: e.g., a typical brigade mission was: "X Brigade conducts search and destroy operation during the period . . . ."

'Most operations were on a large scale (usually brigade size) and areas allotted were too large for successful search in the time allowed. Blocking forces were often not used at all. Where they were used, successful blocks were well-nigh impossible owing to the large area required to be blocked by inadequate forces, and large gaps were left in the blocking position.

'The use of helicopters for troop insertion, together with long fire preparation of LZs made surprise impossible. Clandestine movement of some portion of the force into the selected area was not attempted. It was evident in most operations that the Viet Cong were aware of at least the outline plan. This was attributed to the fact that all operations had to be cleared with various headquarters. Intensive air reconnaissance was flown over the area of operations on the two days prior to commencement. This again detracted from the security of the plan.

'Search and destroy operations failed to enlarge the area of government influence. There was no attempt to follow up successful operations by local government action. In fact it was known that the Viet Cong immediately re-occupied the area in which operations were conducted.

'Positive results of search and destroy have been: capture or destruction of Viet Cong material, destruction of Viet Cong installations, and destruction or capture of Viet Cong troops.

'Viet Cong reaction to search and destroy operations have generally been to evacuate the area of main force units, and leave small groups of mobile forces in the area to act as snipers and observers. Main force units have also set up strong ambushes, several of which have been most successful against current method of search employed by U.S. infantry.

'Recent reports of successful search and destroy operations by U.S. forces indicate that the importance of correctly positioned blocking forces is being realized.

'Intelligence on which planning was based was usually out of date. No attempts were apparently made to obtain up-to-date information by use of long-range patrols, etc. Quite often no reserve was held at brigade level during brigade-sized operations. On several occasions when good use could have been made of a mobile reserve for quick reaction against Viet Cong forces, such a reserve was not immediately available.

'Flexibility of fire support was a feature of all operations, and despite the terrain and lack of road communications, artillery was always positioned on time to give the support required.

'Air photographs of the area of operations were in extremely short supply, and at times not available at all. Some attempts were made to obtain photographs of LZs by use of a hand-held camera. These photographs were of limited use only.

'Movement of the 105-mm pack howitzer inside the M113 was used on occasions, and proved most successful.

'During the conduct of search and destroy operations the following points were of note:

- (a) Areas cleared were almost invariably reoccupied immediately by Viet Cong mobile or local troops.
- (b) Extensive use made of booby traps and mines to slow our movement and inflict casualties.
- (c) Tunnel systems required use of special engineer/assault pioneer groups "on call" to carry out destruction.
- (d) Dogs were of great value in tunnel location and clearance work.
- (e) Many areas that were suitable as LZs had been prepared for defence by the Viet Cong.

- (f) Clear delineation of areas of responsibility was very difficult, with the result that inter-unit boundaries were often not searched because the units were afraid of friendly clashes occurring.
- (g) The use of helicopters for daily re-supply, while at times being the only possible method, gave the Viet Cong a clear indication of our whereabouts. Where movements of troops and re-supply were done by ground means it was found that the Viet Cong became most confused as to our location and intentions.'

### **Conclusion**

The above notes warrant a great deal of thought. It should be remembered, however, that the search and clear operations which were conducted during the period covered by Major Sharp were planned within the framework of the current military and political conditions of the time. Suffice to say that the existing military situation was far from encouraging and the political platform very fragile. It is to the credit of the Allied forces that offensive operations were launched at this stage in Vietnam. There can be little doubt that Allied intervention and military operations stemmed the tide of Viet Cong victories and take-overs. Ben Cat was 'early days' for 1 RAR and the battalion has since gained a great deal of operational experience. It is evident that this experience will make a solid impact on our thinking about counter-guerilla operations.

In this paper I have attempted to prove that a search and clear operation is an offensive operation aimed at locating and destroying a guerilla force. As such it is a fluid combination of advance, attack and pursuit operations. For a successful operation, the commander must first conceive his trap concept and then search in such a fashion that the Viet Cong are caught in selected killing areas.

We cannot win a counter-guerilla war unless we launch search and clear operations aimed at the methodical destruction of the guerilla army and its supporting administrative framework.

The early operations launched in Vietnam should not be used blindly as a pattern for future search and clear operations. We should examine these plans and their results critically so that we can develop effective techniques to trap and destroy Viet Cong targets. If we are prepared to pay the full admission price to go to a search and clear operations, we may as well select some good positions to watch the end of the show, get some good close up shots and hang around until the final curtain drops on the Viet Cong Jungle Ballet! □

# **SPIW**

## **Weapon of the Future?**

*Sergeant J. Shannon,  
Royal Australian Infantry*

ONE of the most consistent rumours in the weapons industry since 1963 has been the existence of the SPIW (Special Purpose Individual Weapon). Interest was first aroused when it became known that the U.S. Army Infantry Board was testing four prototypes of an experimental dart rifle at Fort Benning, Georgia. Detailed below is a summary of the available information on this weapon.

The U.S. Army defined a requirement for a radical new weapon. The design study dictated that it had to be a light and dependable rifle that fired darts instead of bullets. The specifications issued to the major weapons manufacturers required them to build a rifle that would fire .06 calibre darts from a .223 calibre barrel. The weapon submitted was to have a fire-control mechanism that operated on single shot, in bursts of three, and on full automatic from a 60-round magazine. Finally, the rifle had to be capable of firing the existing M-9 grenade from a three-round launcher which was to be located below the rifle barrel.

By February 1964, four companies had delivered test prototypes: Aircraft Armament Industries; Winchester; Harrington and Richardson; and the Springfield Armoury. By March, men had been supplied by the 197th Infantry to fire the weapons and the Infantry Board began its prototype-test programme.

The darts or 'flechettes' fired by the rifles were about the size of a finishing nail, and were encased in a plastic 'sabot'. This 'sabot' carried the dart down the rifling of the barrel, but disintegrated as it left the muzzle. The darts had been aerodynamically designed and, after the two-stage separation, continued in free-flight to their target. In order to minimize weight, the shell cases were machined from very thin brass. The developed complete cartridge was light, strong and compact.

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*Sergeant Shannon was called up for National Service in 1959, serving as a recruit with 13 NS Bn and as a gunner with 21 Locating Regt. He volunteered for the CMF in October 1960, and since 1961 has been engaged largely in Intelligence duties with 3 and 4 Royal NSW Regts. He is at present a platoon sergeant and company recruiting officer with A Coy 4 RNSWR. He is a cost accountant by profession.*

With the exception of one entry which was operated by the recoil of the primer, all of the prototypes used blow-back actions. The result of this combination of cartridge and action was a rate of fire of almost 2,500 rounds per minute, and it was soon discovered that it was impossible to fire less than a full magazine in a single burst. The technicians from the various companies altered their sample rifles in order to reduce the rate to approximately 800 rounds per minute.

Each test rifle was equipped with a 'counter' or small disc in the firing mechanism which controlled the rate of fire. When the selector was set on 'three-round burst' for example, the counter ensured that precisely three rounds were fired. The counter device was one of the most dependable parts of the rifle.

Aircraft Armament Industries produced the model which was most popular with the test personnel. This particular rifle resembled a light .22 rifle with a vertical fore-grip similar to the Thompson Model 1928. The stock was made of wood, and possessed the solid feel traditionally demanded in action by the infantryman. The magazine was a plastic drum which held 60 rounds in a spring-loaded spiral. The grenade-launcher was detachable, and was cocked by an external lever.

Harrington and Richardson did not justify the expectations of the test personnel, and their prototype was unable to complete the qualification trial because of malfunctions. The prototype utilized the Dardick idea of 'trounds' instead of rounds. These shells are cast with a triangular case, and each H and R 'tround' held three darts which were fired from separate barrels. The barrel mechanism was adjustable to give a controlled shot-pattern. The rifle used a pistol-type cylinder to feed the 'trounds' into the chamber. A three-round cylinder was fitted to the highly accurate grenade launcher.

The Winchester model proved to be extremely unpopular during the test. It had a fibreglass stock and fragile magazine. Although it was the lightest of the four entries, most test personnel agreed that it was not strong enough for combat use.

The Springfield rifle was cautiously received because of its 'toy gun' appearance, but proved to be an excellent weapon. The stock contained a 60-round magazine which actually comprised two 30-round magazines. The front half of the magazine was emptied first, then the rear half. The spent cases were ejected from the rear of the stock through a convertible ejection port opposite the firer's cheek. A second trigger operated the grenade launcher.

When the tests were over it was concluded that, experimentally at least, the dart was a deadly new concept in warfare. Upon striking any object, the dart yaws out of its trajectory and inflicts an explosive wound.

Nothing has been heard about the SPIW for almost a year, and it is now doubtful that the U.S. Army will order even limited numbers of the dart rifle. Apparently there are too many problems which would have to be solved before the SPIW could be considered a practical reality. The thin shell cases consistently bent when they were ejected, and reloading was therefore uneconomically difficult. When the sabot disintegrates, it creates a fine dust of fibreglass particles which blow back into the firer's eyes. All of the test models were light and short, and in consequence a bayonet would have been a useless accessory.

The U.S. Army has adopted the attitude, based on World War II studies, that men in combat rarely aim their rifle, and it was therefore decided to explore the 3-round burst as a means of increasing the probability of a hit. This burst concept proved itself during the test, and it is not unlikely that existing rifles will be modified to fire on a controlled-automatic basis. The SPIW itself seems destined to become yet another interesting museum piece, but surely the counter device and the 3-round burst merit further development. □

#### AAJ MONTHLY AWARDS

The Board of Review has awarded the \$10 prize for the best original article published in the May issue of the journal to Captain D. J. Atkinson, Royal Artillery, for his contribution 'Close Support Fire in Non-Nuclear War'.

The Board considered that two of the articles published in the June issue were of equal merit and that the \$10 prize should be shared by the authors concerned. The articles were:

'The Spider and the Fly' by Captain F. Fazekas.

'Professionalism' by Lieutenant-Colonel W. J. Finlayson.

# **Radar in a Tropical Combat Zone**

*Captain M. J. Ryan*

*Royal Australian Infantry*

A RECENT article in the Australian Army Journal\* dealt lucidly with the ways in which infra-red and other image intensifying devices will aid the modern army in the effective application of its firepower, under conditions where conventional target acquisition methods are not sufficiently reliable. Another electronic aid to tactical operations is radar, and a combination of infra-red sensors and radar transmitters seems potentially able to compensate for the deficiencies of human sight and hearing.

The two current or proposed radar devices incorporated in the infantry division are well-known — these being the KPQ-1 radar unit in use with the Divisional Locating Battery, and the manpack tactical surveillance radar slated for use in the infantry battalions' surveillance platoons. The KPQ-1 is a specialized unit with which the majority of officers will have little contact, and can be omitted from consideration here, other than noting that current developments in the field of micro-circuitry will inevitably enable a reduction of the system's size, weight and noise output.

The proposed infantry surveillance platoon radar units, which are apparently undergoing a detailed evaluation process before a decision is made as to their adoption and tactical employment, will almost certainly be of American manufacture. A great deal of development time and money have been devoted in the United States to the production of surveillance radars, both as private ventures by electronics manufacturers and under the military-sponsored design contracts which have produced such units as the AN/PPS-5 and AN/PPS-6, both of which indicate targets by visual screen readout and audible doppler tone.

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*Captain Ryan is Manager of the Military and Special Products Division of Cannon Electric (Australia) Pty. Ltd.*

*He underwent National Service training from December 1955 to January 1956, joined the Melbourne University Regiment in March 1956 and was appointed lieutenant in October 1958. He was promoted captain in March 1962 and has held various postings, as a company commander in the MUR and on HQ 3 Div. He was seconded to the United States 4 Armd Div in 1963, serving with 2 Armd Rifle Bn, 160th Infantry.*

Tactical employment of the surveillance radar at battalion level can reasonably be expected to fall under one or both of two major areas at any one time:

- (a) A security function, as a medium-range surveillance device for defended areas;
- (b) an aggressive function, as a short to medium-range early warning device for patrols and listening posts.

This is, of course, a wide generalization, and almost certainly understates the capabilities and possible employments of such units. However, it will serve to define the area for reference.

Although sweeping claims are made for the definition and selectivity of these units — e.g., in regard to their ability to differentiate between armed and unarmed men, men crawling and men walking, jeeps and trucks, and even men and women! — it is at least likely that the average infantry soldier can expect a more confused and difficult operating environment than is applicable to laboratory experiments and controlled field tests. So while individual units undoubtedly are able to live up to manufacturers' claims, it is almost certain that an operator working at the likely training level of an average infantry replacement private will have difficulty in realizing the full potential of the surveillance radar under even normal field usage conditions. In close country the screening effect of foliage is considerable, and even in open country, background clutter and false echoes can cause slow-moving objects to be missed by the radar pulse sweep. To filter out background clutter requires an often unacceptable increase in the size, weight and sophistication of the radar unit.

This may well mean that to be fully effective the operator must be able to scan his working area well in advance of his critical usage period, which in effect will be the hours of darkness, and familiarize himself with the echoes of all the reflective objects — trees, houses, rocks, etc. — within range, in the same manner as a sentry relying on purely visual observation will make himself a range-card, and a mental list of potentially-deceptive objects. The effectiveness of the manpack radar in a mobile role — e.g., accompanying a sweep patrol — is open to question.

While the surveillance radar will assist us in countering the night operations so beloved of the irregular soldier, and in restoring a favourable balance between available firepower and difficulties of target acquisition, to be fully effective it will almost certainly need to be supplemented by infra-red and ultrasonic

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\*'Night Vision Aids', *AAJ*, Feb 1966.

sensors, image intensifiers, acoustical telescopes, sniperscopes and similar electronic devices.

Another radar-orientated instrument which is almost certain to find a wide variety of tactical uses is the radar transponder. The transponder can loosely be defined as a boosting device, capable of receiving a weak or distant radar pulse, and re-transmitting a clear echo at a power/sound output equal to that of the original radar signal. In other words, a distant target without a transponder can return a weak, blurred image or no image at all; a transponder-equipped target will respond to a radar pulse with a clear, sharp radar 'blip', either audio or visual or both.

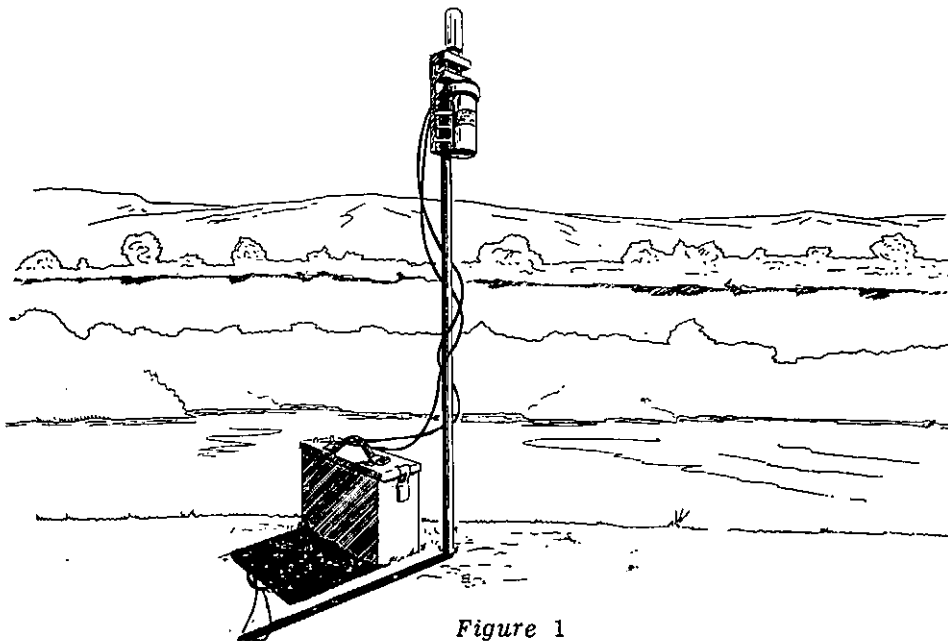


Figure 1

The most common use of transponders is as general-purpose tracking devices for target drones, missiles, satellites, helicopters and both low and high performance aircraft. However, in mid 1964 the American Motorola Corporation developed an answer to a U.S. Air Force posed problem — how to mark drop zones at night, in adverse weather, or when the surrounding terrain was lacking in readily-identifiable landmarks. Solutions then current included low-frequency radio homing beacons (which lacked the necessary range), high intensity flares and

smoke (which comprised the security of the drop zone), fluorescent panels and reflectors (which were often bulky and always required direct line of sight contact) and tinfoil chaff or 'window' (which blanked out every radar device in the area). By combining a standard transponder, a circulator to give proper isolation for single antenna operation, and a horizontally polarized antenna, Motorola produced an entirely new ground locator beacon sub-system, capable of guiding any radar-equipped aircraft (such as the C-130 Hercules) onto a pinpoint dropzone at a 200 mile range. (Figure 1.) It was only a logical step to the incorporation of the instrumentation into a finned, dart-shaped drop-pod, suitable for air delivery onto the target point (Figure 2) at sub or supersonic speeds.

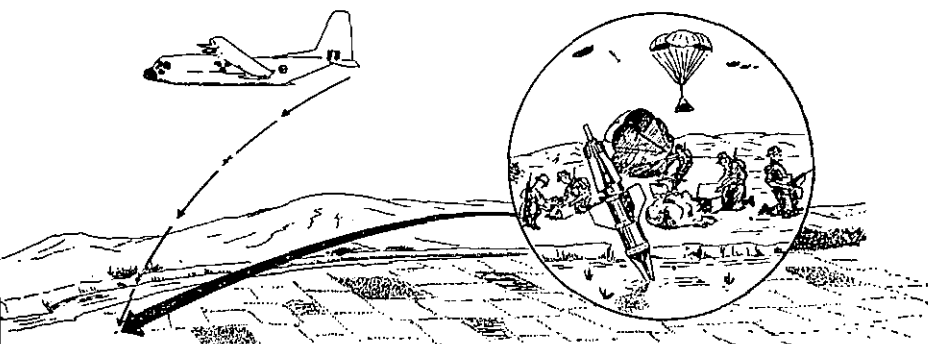


Figure 2

This means that reconnaissance aircraft can now mark DZs or targets as they are located, in such a way as to enable pinpoint identification by transport or strike aircraft an hour, a day or a week later, and that deep-ranging patrols can receive supply drops even in rain forest without compromising their own security by visual displays. (Figure 3.)

Designed for missile and aerospace use, the present generation of transponders is, in general, capable of meeting far more severe environmental stresses than normal military use could impose, and comes in a variety of shapes and sizes. The Motorola range includes examples weighing 3.2 lbs, and measuring 3.3" x 2.8" x 3.9". Use of integrated circuitry techniques will inevitably produce transponders which clip to a belt, or drop into a shirt pocket.

Use of transponders at unit level would then enable battalions, independent of weather and terrain, to

(a) mark bomb lines for attacking aircraft;

- (b) indicate targets for pinpoint air strikes;
- (c) track and identify patrols by use of organic surveillance radars.

Transponders are also being fitted to tactical strike aircraft, to assist ground-control teams to locate, track and vector the fast, low-flying ground attack jets onto the target with greater accuracy and increased security for forward ground elements.

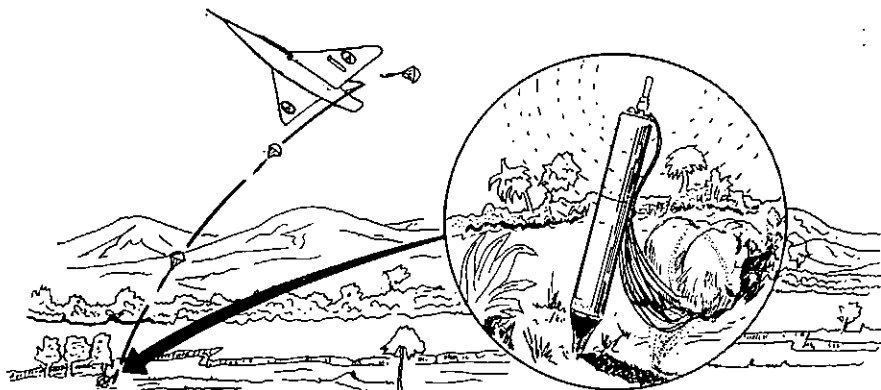


Figure 3

Under the impetus of combat operations in Vietnam, the development of radar aids for the ground forces is being progressively accelerated. The tropical combat zone's environment and resultant tactical problems have imposed the severest requirements on the ingenuity of the electronics research scientists of the West, but the challenge is being met, and our ability to 'hold back the night' strengthened. □