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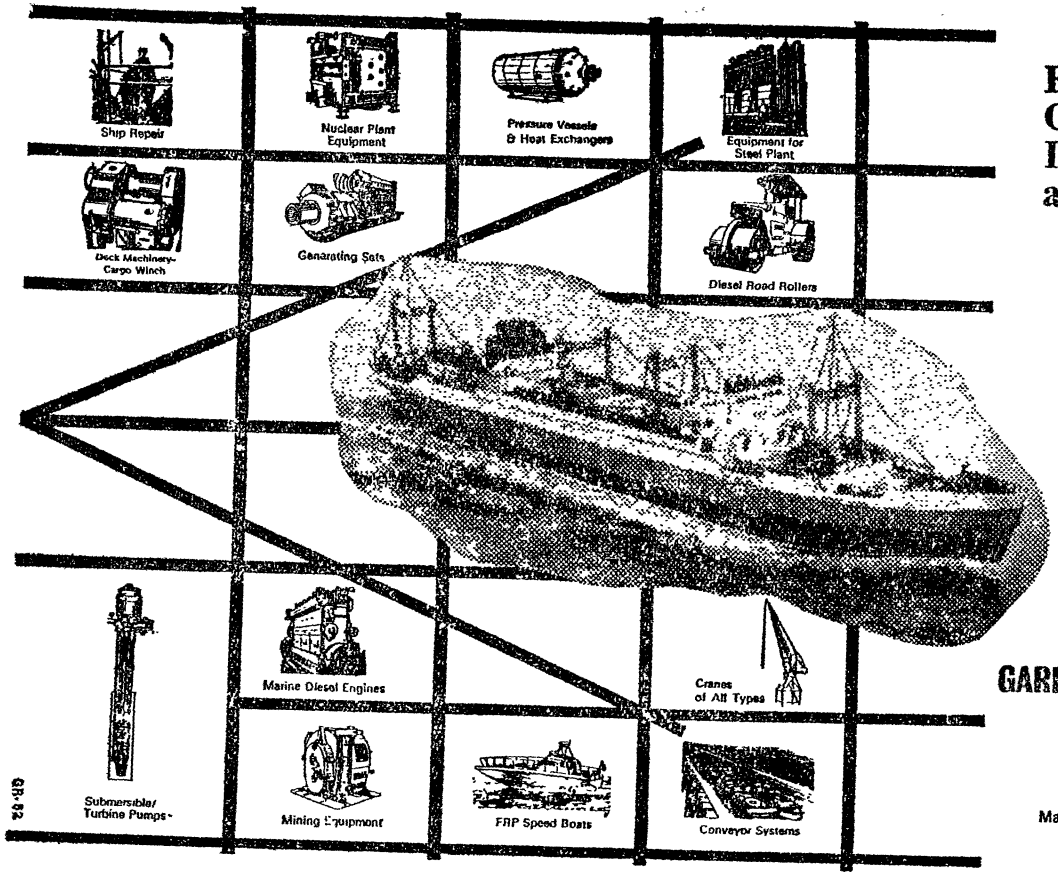

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The Pakistani Defensive

RAVI RIKHYE

IN December 1971 Pakistan with 12 divisions (including two armoured) and 5 independent brigades (including three armoured) successfully held off 13 Indian divisions (including one armoured) plus various formations totalling 11 brigades (including three armoured plus an ad hoc force equal to a fourth). Today Pakistan can deploy 18 divisions (including two armoured) plus around 9 independent brigades (including six armoured). Assuming two armoured brigades roughly equal a division, in terms of divisional-equivalents the 1971 ratio was about 14/17 against Pakistan, today the ratio is 22/26*. (We assume that overstrength formations in Kashmir are roughly equal on both sides. No account of possible Pakistani divisional raisings in 1974-76).

Considering the rough parity of forces in the west in 1971, and considering India's basically defensive intentions, the lack of meaningful gains against Pakistan was only to be expected. Doubtless India could have achieved more by way of territory : for example, if Indian 12 Divisions could have avoided aborting its attack, and if the tank brigades under I Corps had been better coordinated. But even if many objectives were not met, there was no difference to the strategic outcome of the war, which is all that counted.

Seeing as the margin of superiority for India has remained more or less the same, about three or four divisional-equivalents, can we assume that the balance between India's offensive power and Pakistan's defensive power remain unchanged ? In my opinion, despite the superficial figures, Pakistan's defensive power has been enhanced considerably more than India's offensive power. In the next war Pakistan will be able to absorb an all-out Indian attack, turn it back, and in its turn launch an offensive into India. This is a very major change since 1971, when all Pakistan could do in the event of an Indian first strike was to halt India's thrusts at points well inside Pakistan, and in its turn launch limited offensives in thinly-held Indian areas to gain some countervailing ground. In 1971 (and in 1965) if Pakistan wished to secure major gains against India, it had no option but to strike first, whereas today it can make such gains in the counterattack.

The Pakistani offensive capability will be dealt with in a subsequent article ; here I will concentrate on how its defensive capability has increased faster than India's offensive capability.

* This estimate includes raisings in the period 1971-76, and is for Divisions and Independent Brigades in Northern, Western and Southern Commands with one division from Central Command.

To understand the true nature of Pakistan's defence, it is necessary to briefly refer back to its short-coming of 1971 :

1. There was no unity of command at the highest level ;

2. Senior officers were politicised and were divided amongst themselves on how to handle the civil war ;

3. A major civil war had raged for almost 9 months, severely affecting morale and training programs in the west ;

4. Bengalis and Bengali-sympathisers in west Pakistan were a constant threat to operational forces and handed over immense amounts of information to India ;

5. World opinion was against Pakistan, its major treaty allies had made clear their decision not to militarily intervene ; and

6. Pakistani forces were burdened with large numbers of new recruits, two divisions not even a year old, and immense equipment shortages. Much of the equipment in service was obsolete—particularly in the armoured forces, the air defence units, and the air strike forces.

None of these severe disabilities pertain today. Moreover, there appears to be a defensive agreement with Iran. If we assume that the Soviets will restrain China from militarily intervening in a future Indo-Pakistan war, we can also assume that United States will equally prevent the Soviets from so intervening for us, which leaves a pretty clear field to Iran. There is probably little reason to assume that Iran will militarily assist Pakistan in military adventures against India, but it will be a rash planner who discounts Iranian intervention should Pakistan at any stage begin losing to India.

Currently it is fashionable to produce long analyses proving how Iran is not yet a military power to be reckoned with, mainly because its forces are only now becoming familiar with some very complex equipment. I don't think we in India properly appreciate that the Shah began planning for Iran's military expansion as far back as 1966. The bulk of his fighter pilots are quite competently trained, as are his air cavalry and paratroop forces. Others may disagree, but even today I see no reason to assume Iranian intervention forces will fail in their duty : and certainly 5 years from now inadequate experience will not be problem for the Iranian armed forces as a whole. Nor do I see any reason to assume that US technicians will fail to continue maintaining Iranian equipment in the event of intervention.

Because of Iran, Pakistan's defensive capability can be said to have increased to the extent it is probably not feasible for India to consider strategically decisive options against Pakistan. For example, it is now unrealistic to think of separating part of Pakistan from the main body, or of putting Pakistani forces out of action for 5 to 10 years. Thus, India is restrained in a way we were not in 1971.

Let us further consider increases in Pakistan's defensive capability under three categories : mobile reserves, tank/anti-tank forces, and air-defence/strike aircraft forces. In all three cases it will be seen that the capability increase for the defence has been greater proportionate to India's capability increase for the offence.

Mobile reserves. At the start of the December 1971 operations, Pakistan had in mobile reserve its 6 Armoured Division plus brigades of its 8 and 17 Infantry Division and 8 Armoured Brigade (all in Sialkot sector) ; 3 Armoured Brigade in Lahore sector ; and 1 Armoured, 7 Infantry and 33 Infantry Divisions (Multan sector). The 33 Division appears to have been short of one brigade detached for duty against Indian formation, so that on the whole there were 2 armoured divisions plus two armoured brigades, and some 7 infantry brigades from 4 divisions. By the end of operations 8 Armoured brigade had been committed, as well as a brigade of 33 Division, so that 2 armoured divisions and armoured brigade, and 6 Infantry brigades were left,

Even this overstates the true situation, because all Sialkot reserves were held ready for commitment to Shakergarh. Had the war continued another three days, between Kasur and Kashmir, Pakistan would have had a single armoured brigade and possibly one infantry brigade as reserves. Similarly, its 1 Armoured Division and probably the remainder of 33 Infantry Division were held in reserve against an attack by Indian Armoured Division, so that the only real reserve for the front from Kasur to Karachi was 7 Division. Most formations were, thus, really tactical reserves ; only an armoured brigade plus 11/3rd infantry divisions were in strategic reserve. Even then the armoured brigade was tied to defending IV Corps from Lahore.

Today the situation has dramatically changed. Assume for illustrative purposes that the 1971 strategic plan was employed with present day forces on both sides. India may use (Kashmir, 2 divisions ; Jammu, 2 divisions ; Pathankot Corridor, 3 divisions ; Amritsar sector, 3 divisions ; Southern Command, 2 divisions : strike force, one armoured division) with the following additions. Southern Cammand—one extra division ; Ganganagar sector—two divisions ; strike force—one armoured division ; general reserve (to be used to exploit success on various sectors or to counter attack Pakistan)—4 divisions. To counter such a development, of its two armoured and 16 infantry divisions Pakistan might require the following :

— Kashmir : 1 division
— Sialkot : 3 divisions
— Lahore : 2 divisions
— Multan : 2 divisions
— Sind : 2 divisions

To this total of 10 divisions must be added the two armoured divisions which will be required to counter India's armoured formations. This leaves six divisions in strategic reserve, plus about three armoured brigades. None of these forces require commital against any particular threat, because the line-up of forces is quite adequate to counter India's attacks, In an Indian attack assuming that India commits its general reserves, Pakistan as the defender will not require to reinforce threatened sectors on a one-to-one basis. So Pakistan will still have about three infantry divisions left over when all Indian forces are committed. This is a material improvement over the situation in 1971.

The improvement is not just in terms of three divisions for a strategic reserve where only one was available in 1971, but in the defensive strength assigned to various vulnerable sectors particularly Sind in 1971, Pakistan forces in Sind started with one division and a brigade against two Indian divisions and a brigade (4 brigades to 7), which was inadequate considering the vast areas to be covered and considering India held the initiative. Under the new scenario 6 brigades are available. This might not seem like much of an improvement, nonetheless, in 1971 India could launch a three-axis attack and Pakistan could adequately defend only two. India can still mount a three-axes attack, but now Pakistan can defend all three-axes, plus call on a brigade or two from Multan, and yet have the strategic reserve to draw on.

The apparent anomaly of Pakistan having three divisions left over for strategic reserve while deploying three divisions less than India occurs because at several points Pakistan either has better communications than India or defends interior lines. In Kashmir, India must deploy two divisions whereas Pakistan's overstrength 12 Division can protect its side of the border ; in Jammu and the Pathankot Corridor India requires five divisions for the defence whereas Pakistan requires only three ; around Kasur Pakistan can use one division to defend whereas India must deploy two ; in Sind Pakistan can defend with two divisions whereas (if Pakistan uses two divisions here) India must deploy three. A purely defensive posture on Pakistan's side requires 10 infantry divisions in the line, on India's side 15 are so required ; if Pakistan is defending the 3-1 advantage required for the attacker works in Pakistan's favour by permitting it to deploy fewer troops from the general reserve than India.

It hardly needs noting, then, with 3 infantry divisions and some armoured brigades in strategic reserve, Pakistan has ample forces to check Indian offensives, despite India's increases in offensive power. In 1971 India could have pushed through major attacks in three sectors ; Sialkot, Multan, and Sind, and Pakistan had only one division available

to adequately reinforce one sector. Today India can push attacks against the same sectors, but Pakistan has divisional reserves for each.

Tank/Anti-tank forces. In 1971, India was clearly superior to Pakistan in armoured forces.

Today the situation is very different. The expansion on both sides has made it difficult for an outsider to keep track of the new raisings, but we know that Pakistan is now keeping parity with Indian regiments in terms of numbers, and that they are all medium regiments. If we use an approximate figure of 30 regiments on Pak side, this increase is more significant in the case of a Pakistani offensive, as the tank is better used for attack than for defence, nonetheless, assuming our standard pattern of tank force organisation and deployment, there is going to be just about a zero chance of using the Indian tank forces as armoured spearheads clearing the way for our infantry. Pakistan can counter an Indian attack of—say—28 regiments with 14 regiments, and still have that many left over for counterattacking successful breaches in its defence positions. This also means that even should the infantry clear the way for our tanks (a slow process), the armoured forces will not be able to break out. And when our bridgeheads can be counterattacked with equal forces in armour, there is not much reason to assume our infantry is going to have significant success in establishing, leave alone holding and expanding, such bridgeheads.

Added to this increase is the addition of the TOW anti-tank missile to Pakistan's defence. There appears to be little realisation of what this weapon can do to a tank attack. It is not just another ATGM, but a deadly "smart" missile : as long as the operator sticks with its flight, he has 9 chances out of 10 of hitting his target. If a platoon of 4 TOW launchers successfully ambushes a tank regiment, it can inflict 50 percent casualties within minutes. Further, should a tank brigade successfully breakout, three Super Frelon helicopters (such as Pakistan is acquiring) or 4-5 Mi-8s (such as it already has) can emplace a TOW company along its expected flank of advance. We may expect that the company will be wiped out, but before it is, at a sacrifice of 60-70 men it can render ineffective the tank brigade.

It is not my point to say that TOW is some sort of magic weapon : obviously it is not. But for the first time "smart" weapons are now deployed against us, and the results are likely to be very different from those achieved by recoilless rifles and a few antique Cobra-type ATGMs. TOW can be countered by mechanised infantry on foot, by attack helicopters working with aerial scouts and airmobile infantry and by artillery sweeps. But where is this mechanised infantry and where are the attack helicopters ? A tank regiment is lucky if it can count on 8 APCs and 100 men ; a tank brigade lucky if it is spared half-a-dozen

Alouette 3 reconnaissance sorties. TOW is a powerful additive to the Pakistan anti-tank defence, and will inhibit our tank movement in a way never encountered before.

Air Defence/Strike capability. A major advantage India had in 1971 was air superiority over the front and—by our standards—lavish fire support from the IAF. Air action may not have disabled the Pakistan 1 Armoured Division—but none can deny that in sectors like Chaamb air power contributed materially to the outcome of the battle and that some degree of inhibition was enforced on Pakistani tank formations. This advantage is no longer ours.

Even though the IAF has added MiG-21s for ground attack as fast as Su-7 and Hunters have been phased out, it is probably reasonable to assume that the IAF's ground attack capability has been degraded since 1971. However, we can now concentrate at least 2/3rds of our air strength against Pakistan whereas in 1971 at least 10 squadrons had to be diverted to the east, so that in terms of available tonnage against Pakistan we are probably as well off as in 1971 and superior in terms of attack and air defence sorties flown.

Yet Pakistan has tripled the number of air defence regiments available to it—we may expect 15 regiments in the next war, has added 9 batteries of the Cortale low-level SAM, and is almost certain to introduce around 6 batteries of the Hawk medium-level SAM. Whereas it had only around 45 Mach 2 fighters available in 1971 (almost half being obsolete F-104As) backed up by around 70-90 MiG-19s and about 100 totally obsolete F-86s, by 1967 it will operate 100 Mirages (own plus some borrowing from its friendly countries), plus 110 A-7 Corsair IIs, and is known to have a requirement for 100 F-5Es which may or may not be partially filled by 40-50 ex-Iranian F-5As. Moreover, by 1981 it will have an integrated air defence system covering the country. Overall, by 1981, its air defence and attack capability will have increased by well over three times (depending on what weapons are introduced while our attack capability will have increased about 1½ times (assuming 50 Jaguars).

Let us look at some of the weapons a moment. The Hawk is not like Soviet SAMs. For instance, 14 batteries are considered adequate to protect Jordan against the Israeli Air Force, whereas something like 60 batteries of Soviet SAMs would be required for the same job. Six Hawk batteries are not, therefore, to be compared to six SAM-2 or even six SAM-6 batteries. Hawk always was a potent weapon, capable even in its earlier versions of accuracies adequate to kill battlefield artillery missiles. Now it exists in vastly improved versions. Crotale is accurate enough that a battery of six launchers are considered adequate to protect an airfield against an attacking squadron ; two batteries are probably enough to cover an armoured division operating in a concentrated area.

We already know about multiple flak, having taken heavy toll of our Su-7 squadrons against Pakistani quad-23mm fire in 1971. Except this time there will be three times as many guns.

The Mirage 3/5 is no MiG-21. A MiG-21 can protect targets within a 300-mile radius, it can make one firing pass with its missiles, and it cannot loiter. The Mirage 3/5 can protect twice as much radius, can make two firing passes, can loiter, and can employ an omni-directional air-to-air missile of 11-mile range (22-mile in extended range with the Super Matra 530). Moreover, it can take the Magic Matra 550 dogfight missiles, and—as they say in air forces that employ such missiles—you don't know what air-to-air missile combat is till you come up against dogfight AAMs.

Then we come to the F-5E. This plane is so agile it is used by US Air Force aggressor fighter squadrons to teach even F-15 Eagle pilots how to fight. The Eagle, incidentally, can climb at supersonic speed sitting on its tail, which shows the F-5E has to be very nimble indeed. Of course, it is not in the same class as the F-15, but it has better turning performance and unlike the latter, it is not range limited. The F-5E handles, I suspect, very much like the Gnat would if it could hit Mach 1.6, and that is a very formidable opponent.

The A-7 in its E version carries 15,000-lbs of ordnance over ground-attack ranges and can deliver that ordnance with an accuracy 3.5 times that of the F-4 Phantom II. It is one of the safest and most survivable planes ever used by the US Navy—attack carrier squadrons operating with the A-7B/E ever Indochina would achieve their objectives with consistently fewer losses than other types. We can safely leave to the imagination what 50 A-7 strikes would do to an attacking infantry brigade.

In short, the air picture in 1981 is likely to be very different from 1971. There will be 300 modern fighters against less than 50, 15 flak regiments against 5, an air defence ground environment against no coordination worth the name in 1971 and several missile batteries against none. A few Jaguars or Su-19 Fencers is not going to change the balance back in our favour.

In 1947 both India and Pakistan fought each other with World War II weapons. By joining the western alliances, Pakistan pushed ahead one generation in its equipment : it now had post-Korean War type weapons. At the same time India largely had 1940s weapons. This told against us in 1965. Because its allies failed it after 1965, Pakistan failed to replace its 1950s equipment with more modern material, but India spent the 1960s absorbing large amounts of modern weapons. So we used the 105mm Vijayanta against Pakistani N-47 Pattons, MiG-21s against Pakistani MiG-19s and F-86 Sabres, 130 mm guns against old

155 mm guns. This told against Pakistan in 1971. Now our forces are unlikely to complete their next reequipment cycle till the end of the 1980-81. This will once again put them ahead of us : we will use 1960s weapons against 1970s weapons. But the next war will not be a repeat of 1965, because at that time though Pakistan had better weapons, they were employed in numbers too small to affect India's vast numerical superiority. In the next war Pakistani forces will not be much smaller than ours, and they will be better equipped. That will give them an advantage in the defence that Pakistan has not enjoyed since 1960.

Indian Ocean or Madagascar Sea* ?

STEPHEN P. COHEN

DURING a recent interview with James Reston, Henry Kissinger noted that there were three categories of research or investigation in international politics. At the most abstract level one encountered the supreme scientific and academic generalists, often utilizing quantitative techniques. At the working level there was the desk officer, slogging his way through the day-by-day flow of fact and information. Somewhere in between, however, there should be a middle-range analyst who attempts to tie reality to theory, drawing away from the immediate and pressing issues of today, but not so far that conclusions were irrelevant to the policy maker. Kissinger called upon the academic community to make their research somewhat more relevant to the policy-maker, just as, while Secretary of State, he encouraged more sophisticated reflection and analysis within the policy-process itself.

At least when applied to the political and strategic issues growing out of recent developments in the Indian Ocean region, this injunction makes some sense. The day-to-day details of Indian Ocean politics are beyond access to most of us. Who really knows the precise status of the negotiations for continued U. S. access to port facilities in Bahrain ? Or to the number and location of SSBN cruises in the Indian Ocean, let alone their targets ? Or, for example, the real need of the U.S. Navy for facilities at Diego Garcia ? Or the degree of military cooperation between the U.S.S.R. and, say, Somalia ?

Moving from the unknown to the absurd, of what relevance is the knowledge that, say, over the next ten years, we can state with scientific accuracy, that at a .6 level of confidence 20% of the littoral states will undergo some major internal political change involving their military

*This article is based upon a presentation to the 1974 Midwest Conference on Asian Studies (Lawrence, Kansas, U.S.A.). It represents one of a number of different American perspectives which have emerged during the debate on Indian Ocean policy since 1973.

The author is Associate Professor of Political Science, Univ. of Illinois, Urbana, USA. He has served as a consultant to the U.S. Arms Control and Disarmament Agency, the State Department, and the Commission on the Organization of the Government for the Conduct of Foreign Policy (1975), and is the author of *The Indian Army* and numerous articles and monographs on American policy towards South Asia.

establishments? Clearly, the range of feasible analysis correlates fairly closely with that which Kissinger claims to be the useful range of analysis —although his record of giving weight (or even listening to) the informed U.S. scholarly community concerning South Asian affairs was not very promising. Nevertheless, the effort would seem to be worthwhile.

Our primary concern is with the littoral states, but not equally with all of them and not to the exclusion of certain non-littoral (but non-superpower) states. We will, in sequential order, examine the political and structural characteristics of these states as a group, their divergent interests and divergent capabilities, the likely impact upon them of an expanded superpower military presence (both in the Indian Ocean and on Diego Garcia), and finally, the likely alternative strategic alignments among littoral states and penetrating superpowers.

Littoral States : Fantasies and Facts

There is no common littoral interest, although there are strong parallels between the interests of many littoral states. There is no common littoral policy, although there are parallels and similarities between littoral state policies. Further, it is highly improbable that the future will see any change, that there will be a convergence of interests or policies which today seem to run in close parallel, but never touching.

To the extent that the littoral states can be said to have foreign policies, they are primarily if not overwhelmingly concerned with regional balances of power. This is especially true on the Asian side of the Red Sea, in South Asia and the Persian Gulf. And, of course, these sub-systems are not oriented around "littoral" issues, but would exist if there was no Indian Ocean. Here the Ocean only serves the function of separating subsystems, it does not even provide the means for the integration of various regional conflicts. Probably the most brilliant utilization of the sea has been by the smuggling community; their success over the years also indicates how feeble the naval forces of a number of littoral countries really are.

One reason the littoral states as a group have been reluctant to develop adventurous foreign policies even within the context of the region itself—has been their obsession with the maintenance of state integrity. From the largest to the smallest, each has it own special weakness; quite often this weakness is directly related to ethnic, linguistic, or cultural patterns which tie together domestic and foreign policy. In a few cases the problem is economic in nature : stark deficiency, as in Bangladesh and certain regions of India bewildering and embarassing sufficiency, as in the case of some of the Arab states.

This domestic weakness has a number of foreign policy implications. The most important is that it gives rise to fear of foreign interference and

support for dissident groups. In fact, many of the littoral states engage in such mutual meddling with their neighbours, often in alliance with their neighbour's neighbour, in classic *Kautilyan* symmetry. Therefore, such fear is usually justified, even where it gave birth to self-fulfilling prophesies.

Naturally, the counterpart to fear of foreign intervention—at whatever level—is the strategy of inviting or luring foreign support. Here, the littoral states have usually turned to the *safest* power : the one farthest away, which has more often than not been the U.S.A. The fear of the U.S.A. in Pakistan, Saudi Arabia or a number of other states is less than fear of a neighbour. However, as William Barnds has argued, the instability of a number of littoral states means that for an external power backing one side may yield only shortrange gains and will certainly lead to the alienation of other regional powers, so the great powers have been generally reluctant to engage in NATO-like commitments. This may yet change as the stakes are perceived to have been greatly increased (in the Persian Gulf) and a Soviet presence continues to expand, offering for the first time a plausible alternative to U.S. patronage.

Only a very few littoral states have the means to follow even a semi-independent strategy. Chief among these are Iran and India, two states in transition from dependence and weakness to an unprecedented assertion of self-security, if not self-reliance. They both have been able to manage cordial if not close relations with the super-powers, they have a mutual interest in regional stability, their economies could be complementary, and they have no conflicting territorial interests.

One of the striking characteristics of Indian Ocean politics is the disparity between interests and capabilities among littoral and non-littoral states. As we have indicated, some littorals have virtually no interest in what happens in the Indian Ocean itself : the fate of Bangladesh, Pakistan, and the East African states hardly rests upon oceanic developments. Even if the Indian Ocean were important for these states, they could do nothing—except, perhaps, turn over their ports to interested outside powers. Some non-littorals have a profound interest in Indian Ocean developments, but also have no capacity to project themselves into the region. Chief among these states is Japan, which receives some 80% of its oil from the Persian Gulf region. But at the very most Japan has been able to enter into a number of developmental projects with various oil producing states, alter its position on the Arab/Israeli dispute, and become even more dependent upon America to protect her interests in the region in case of a major conflict.

As for the interests and capabilities of the two super-powers, it should be noted here that both are in a state of transition. As the Gulf region becomes more crucial, and as the echoes of the Arab/Israeli dispute carry down to the further reaches of the Red Sea, they will probably be inclined to expand their capabilities to meet new sets of contingencies. This will

have an inevitable impact upon the regional powers which are not directly involved in these disputes—especially India. India is in the peculiar position of having little in the way of direct interests in the Indian Ocean itself until some other power(s) develops its own presence. For the Indians (and many other states) the Indian Ocean itself is strategically meaningless, an empty space with no inherent economic or strategic value. However, it becomes important as it is filled by others. The regular presence of American, Soviet, Chinese (and perhaps some day Iranian) ships in the Indian Ocean constitute a threat to India to the extent that one or more of these states retain or develop ties with Pakistan. To deal with Pakistan by itself, India needs only a token navy, to deal with Pakistan's allies or friends may be beyond her own capabilities. The difficulty, for India, is that other powers are expanding their presence in the Indian Ocean for non-South Asian reasons. Even Diego Garcia is not "aimed" or directed against India, although it will necessarily complicate Indian strategic calculations.

Super-power Expansionism and the Littoral States

If we assume for the moment that the two super-powers will continue to exapand their forces in the Indian Ocean, what will the impact be upon the littoral states?

A number of them simply do not care one way or the other. Pakistan and Bangladesh are probably unconcerned. The former no longer expects any substantive assistance from the U.S.A., should it again have a war with India, the latter is beyond caring. Different considerations apply to Sri Lanka and the weaker Persian Gulf states. They do not desire a near-by American or Soviet presence, but such a presence—especially an American—might be useful in certain contingencies. These would be situations of extreme domestic disorder, revolt, or insurrection; a friendly outside power might be welcomed under such circumstances, as were the Americans in Sri Lanka in 1971.

Various forms of military deployment on the part of the two super-powers will have a differential impact upon the littoral states. A regularization of American SSBN patrols in the Indian Ocean will probably mean an increase in Soviet surface vessels as well as an expansion of the Soviet attack submarine fleet. None of this would have much of an impact upon littoral states, except to the extent that the presence of nuclear weapons was made a political issue, or surface vessels had some political application.

However, an increase in vessels with direct interventionist capabilities (STOL carriers, floating marine detachments, aircraft carriers) would lead to littoral recalculations of local balances of power. Two such balances are most likely to be affected by such an increase in Soviet and/or

American interventionist capabilities: the Persian Gulf region and the Arab/Israeli situation. In the case of the Persian Gulf, American (or Soviet) forces might he used to secure a shaky regime or confer legitimacy upon a successful insurrectionary movement, with oil as the ultimate prize. However, such intervention will necessarily be complicated by an activist Iranian policy, and it is hard to imagine American involvement until Iranian resources were exhausted. In the case of the Arab/Israeli dispute the Indian Ocean approach is a flanking maneuver, with the stake being access to Israel through the Bab el Mandeb. Here, superpower interests revolve around the protection of client state security.

A third form of super-power deployment in the Indian Ocean would be conventional surface forces orientated towards protection (or interdiction) of shipping on the high seas. Although some such as Edwin C. Reischauer have dismissed this possibility as anachronistic in the modern era, it is not difficult to construct scenarios which terrify the major consumers of Persian Gulf oil. Japan has practically no capability for seaborne defence beyond the home islands. She is also vulnerable to Soviet pressure in her own waters. Were her shipping to be threatened by the Soviets or some state located enroute to Japan itself, there would be no effective Japanese solution except capitulation or further reliance upon American military forces. And it would not take a direct threat to keep the tankers in port: even the hint of danger is enough, failing the existence of a convoy or escort system. Thus, while the probability of shipping disruptions on high seas is low, the magnitude of the threat is enormous, and may alone justify such precautionary measures as the expansion of facilities at Diego Garcia.

Should India be upset at the prospect of an American/Soviet buildup in the Indian Ocean region? This buildup would elevate the importance of the region for both superpowers, and by extension, India's importance to them would increase. It may also be that India needs both superpowers in the region, one to balance the other. Unlike some of the smaller regional states, which try to balance a neighbour by invoking the support of an external power, India is not seriously threatened by any neighbouring state and if left alone with one superpower might find itself in an uncomfortable position. Further, the presence of superpowers in the region provides added justification for the development of India's military strength. Here there is a coincidence of interest between hawks in India and naval hawks in the U.S. as they each emphasize the importance of the Indian Ocean region, and the two groups seem to have begun feeding upon each other's propaganda. Undoubtedly India would prefer to be left alone as the dominant power in the Indian Ocean, but if this is not possible (and it does not seem likely that the major powers would agree to limit their presence in the region in the face of a littoral crisis) then she would

rather seek a balance among larger powers than be left to the mercy of a single one.

Pakistan finds itself in a peculiar position vis-a-vis great power expansionism in the Indian Ocean. While an American presence is not expected to be much of a boon for her, it is possible that it might lead to greater American entanglement in South Asian affairs. However, Pakistan's other patron state, China, has strongly opposed superpower expansion in the Indian Ocean, and she would be reluctant to take a public position in opposition to the Chinese. This example shows how limited and circumscribed the mutual interest of China and the U.S.A. are in this region; Pakistan meanwhile says little about the Indian Ocean, in an attempt to placate both of her larger allies.

An Indian Ocean Strategic Linkage?

Some Commentators, especially in India, have suggested the possibility of the development of political and military linkages between the most important littoral states and the two superpowers. One such "axis", as perceived in new Delhi, pits Pakistan, Iran, China and the U.S.A against India, Iraq, Bangladesh, and the Soviet Union. The key conflicts here are India vs. Pakistan, Iran vs. Iraq, and China vs. Russia. If such alignments were to firm up then one might be able to say that the Indian Ocean region was truly integrated, at least through interlocking hostilities and one could speak of a regional policy in terms of siding with one alliance system or the other.

Another strategic linkage might find the littorals on one side, gathered together for mutual security and forming a common front against marauding non-littorals. Iran has spoken of such an arrangement more frequently in recent months, and it is not impossible that even India will come to support such an alignment at least in principle.

However, we do not take either of the above sets of alignments seriously. In the case of an alliance between littorals and non-littorals, one does not find that degree of mutuality of interest which would permit arrangements or agreements beyond one or the sub-regions of the Ocean area. There are, and certainly will continue to be, understandings between the American and the Saudis and Iranians over Persian Gulf policy, but such understandings fade in importance when one examines American and Saudi policy vis-a-vis Israel, or American and Iranian policy vis-a-vis south Asia. Similarly, the Soviets and Indians act in concert vis-a-vis China, but India has only marginal influence over Soviet policy even in Pakistan, let alone Iran.

If some form of grand strategic cum political linkage between littorals and non-littorals seems unlikely, we would regard any major agreement among littorals as even more improbable. The conflict situations we have

described above certainly keep neighbours armed against each other. Of even greater importance is the perception of many littoral states that external powers represent a lesser threat than other littorals, a perception which will guarantee periodic invitations for intervention or support.

we conclude by returning to the title of this paper. The use of the phrase "Indian Ocean", implies a unified, integrated setting. Some have thought this to be "strategic", as in the recent U.S. Army bibliography on "South Asia and the strategic Indian Ocean". (DA Pam 550-15, 1973) A similar integrity is assumed is some littoral—especially Indian—commentary. Perhaps the Indians have a special proprietary vision because of the coincidence of names. In reality, we find no such strategic, economic, or political unity. It does not appear to grow out of superpower competition—which will probably remain fairly low level, and orientated towards each of the sub-systems of the region—and it certainly does not grow out of a sense of littoral camaraderie. It is perhaps better to speak of Persian Gulf policy, South Asian policy, Arab/Israeli policy, and discuss the interactions and exchanges between these conflict sub-systems than to refer to an overall Indian Ocean policy. What we have, in fact, is a Madagascar Sea and an Indian Ocean—and also a Persian Gulf, an Arabian Sea, and a Bay of Bengal.

The Egyptian Offensive Across the Suez—1973

MAJOR DK KANWAR

AT 1405 hours on 06 Oct 73, a barrage from 4000 guns and mortars heralded the most spectacular opposed river crossing operation since the Second World War—the Egyptian Offensive across the Suez. The technical difficulty of crossing the wide canal with its elaborate defensive system, the undisputed Israeli air superiority and their superior mobile formations all posed seemingly insurmountable problems. The Egyptian solution of launching and sustaining an offensive with predominantly defensive weapons is unique in the history of warfare. In less than half the time predicted by Israeli strategists, the Egyptians had put across the canal five infantry divisions and 500 tanks. The aim of this paper is to highlight the problems faced by the Egyptians in their offensive across the Suez canal and how these problems were solved, with special reference to combat engineering tasks.

THE CANAL DEFENCES

The schematic at Fig. 1 shows a cross-section of the canal defences on either side. The canal is about 160 Kms long and its width varies between 180-220 M. Tidal variation ranges from 60 Cms in the North to about two M in the South and current from half a knot in the North to three knots maximum at the Southern end.

Sand moraines (bunds) had been constructed by both the sides upto the waterline. The moraines rose to a height of 30-40 M on the Egyptian side and 15-20 M on the Israeli side. The higher embankment on the Egyptian side provided effective protection against ground fire and visual/radar surveillance. The moraines had very steep sides, with slopes of 600 and were covered liberally with concertine wire.

The moraine on the Israeli side had a string of fortifications or strong points, some 16 in number, popularly known as the Bar-Lev line. The strong points were sited to cover the most likely approaches on the Egyptian side and the more vulnerable areas on the Israeli side. Distance between one strong point and another, therefore varied from 700 M to 10 Kms. The strong points were fully self-contained half company/

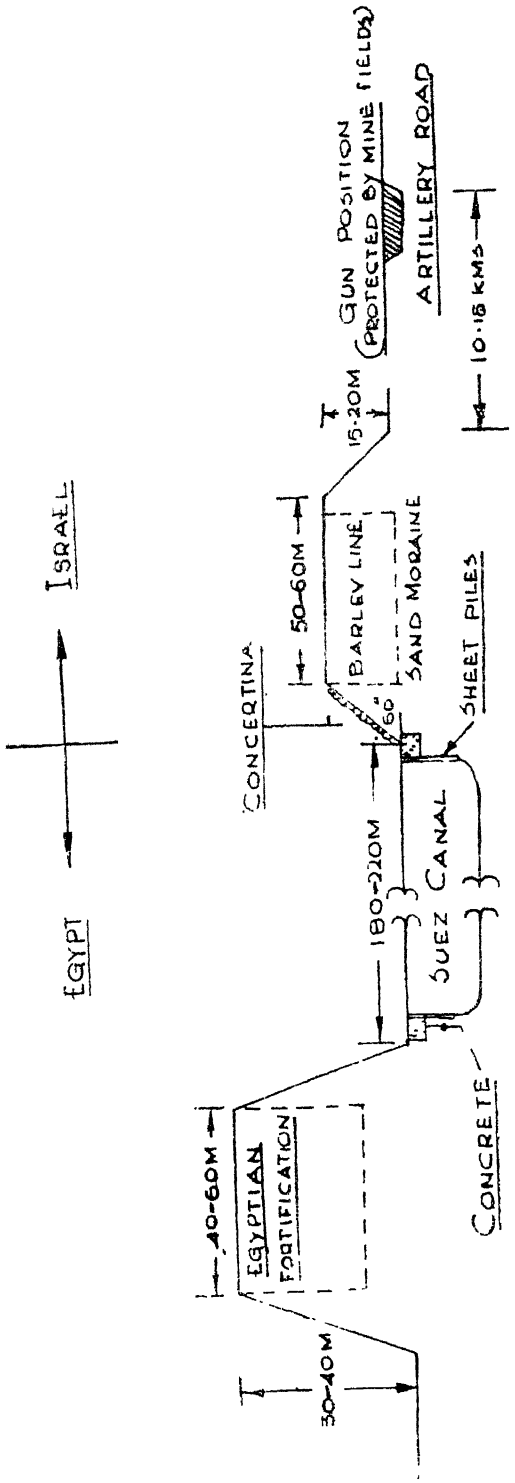


Fig. 1. Cross SIC of Suez Canal

platoon defended localities with infantry company support weapons and observation parties equipped with radar surveillance. The bunkers were constructed over different levels and were fully air-conditioned. Fig. 2 shows a cross-section of a typical communication trench.

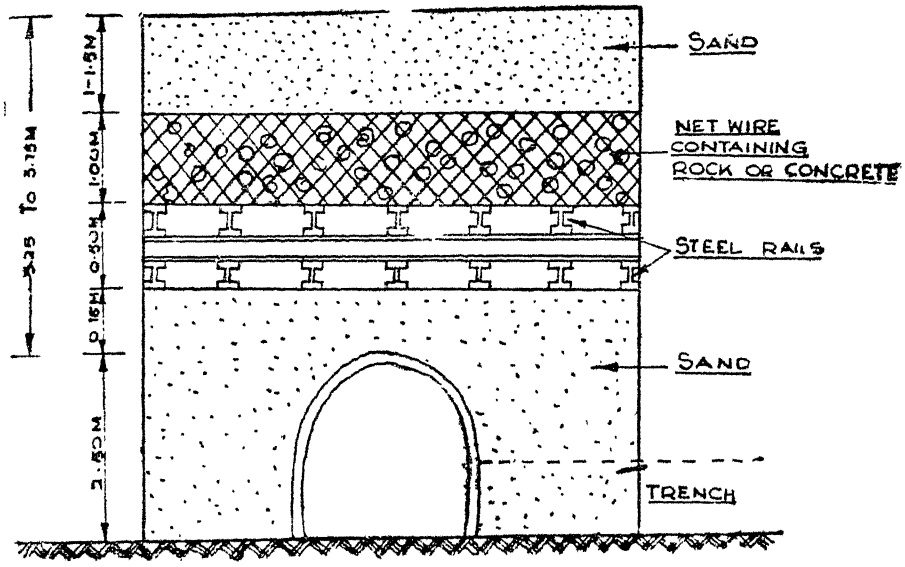


Fig. 2. Strong point over head protection.

Beneath the strong points a series of underground oilstorage tanks had been constructed with pipes interconnecting them and finally leading to wide nozzles down by the water's edge. Pumps were installed to spray the oil over the canal which was then to be ignited by thermite bombs. Each strong point could pump 200 tons of oil.

In between the strong points, hard-standings and ramps had been prepared to be used as firing positions for tanks. The artillery road (Ref Fig. 1) was used for move of heavy/medium artillery guns and the lateral road for move of supplies. The local mobile reserve consisted of one mechanized infantry brigade and two squadrons armour deployed at four or five places immediately behind the strong points. The sector reserves consisted of three armoured brigades of one mechanized infantry brigade and two regiments armour each, deployed in the Northern, Central and Southern Sectors.

The Bar-Lev Line was intended to provide surveillance and advance warning and impose caution. It was not intended to be a first line of defence. There were only 436 troops occupying the defences supported by 300 tanks and about 70 guns. When the offensive was launched only 20 tanks were deployed in the planned fire positions.

Fortifications on the Egyptian side were similar but more extensive. The moraine had gaps at intervals to provide access to the waterline. At places opposite the Bar-Lev strong points, 'U' shaped roads for tanks had been built leading to the top. All communications along the bank were through underground cables for security.

PLANNING AND PREPARATION

The Egyptian General Staff appreciated that Israel's defensive strategy was based on the following three elements :—

(a) Air superiority which would enable her to launch a crippling pre-emptive air strike based on accurate intelligence of enemy intentions.

(b) Reliance upon 'Secure Borders'. The Suez Canal and the fortifications of the 'Bar-Lev Line' were considered to have enough delay potential to enable Israeli reserve to be mobilised and rushed to the front.

(c) Superior armour could destroy any forces that did manage to cross the canal and the defensive line.

The Egyptian staff solution therefore sought to neutralise each of the three tenets of Israel's strategy in the following manner :—

(a) *Air Superiority.*

(i) *Missile Air Defence System.* Israel's undoubted air superiority was proposed to be countered by a very effective missile air defence system on the home bank for protection during the assault across the canal, and protection of bridges and ferries once these had become operational. For protection of the bridge head on the far bank a handily portable missile air defence system was proposed to be ferried across with the initial assault waves and deployed 8-10 kms ahead of the canal.

(ii) *Dispersal of Crossing Places.* The crossing was planned to be affected along the whole canal without any main thrust line so as to ensure that the Israeli air effort would be dispersed and not concentrated against one target. The schematic at Fig. 3 shows the five divisional crossing sites planned and the deployment of Israel's defence forces.

(iii) *Dummy Bridges.* As a further safe guard against air attacks, dummy bridges were planned to be constructed along side the actual assault bridges. These dummy bridges were actual equipment bridges capable of taking class 5 loads.

(b) *Israel's Superior Mobile Reserve.* The next and the most important problem was of establishing a sizable bridge head across the canal before the superior Israeli mobile reserve

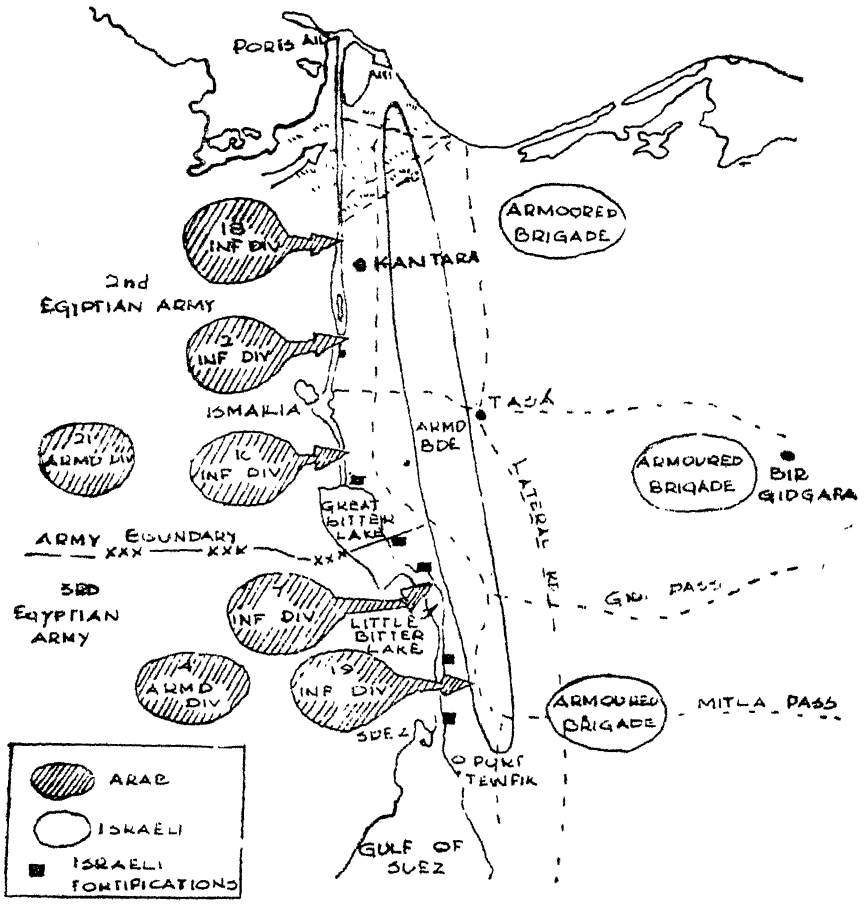


Fig. 3. The Egyptian assault across the canal 06 Oct. 73.

could be concentrated against it. This could only be ensured by :—

(i) *Deception Plan.* The success of the whole operation depended on the deception measures planned at the political, strategic and tactical level. Under cover of constructing defence works on the West Bank camouflage positions and shelters for weapons, vehicles and ammunition were built and stockpiled during night. Bridging equipment was brought up in the last few days, placed in pits near the canal and covered over. Concrete hard-standings were made for guns and tanks. The large scale move of troops and equipment just resembled the usual annual exercise and did not alarm the Israelis at all, nor for that matter did the Egyptian troops know that the exercise was any different from the usual ones. In a lecture delivered at the RUSI (Royal United Service

Institution, London) on 06 Nov 74, Gen Herzog KBE, former Chief of Intelligence service of Israel's defence forces, conceded "I ought to mention, in fairness to Israeli intelligence that the Egyptian deception plan was successful not only as far as we were concerned but also with worldwide intelligence. Furthermore it succeeded in deluding the Egyptian army. 95% of the Egyptian officers taken prisoner by Israel, knew for the first time that this exercise would turn into war only on the morning of 06 Oct 73. We have the story of one divisional commander who was told the night before. He called for his brigade commanders next morning to tell them. The deception plan was eminently successful, extremely well conceived and very-well carried out."

(ii) *Canal Crossing.* Israel needed upto 48 hrs to effectively deploy its mobile reserve in strength near the canal. Ways and means had to be found, therefore, to cross the complete assault force of five divisions and armour within 24 hrs to give them enough time to regain balance and deploy to meet the Israeli reserve.

(aa) *The High Moraines (Bunds).* The high moraines (bunds) on either side posed the first major problem. 60 gaps of 20 ft width each (30 on either side of the canal) had to be created involving earthwork of more than 90,000 cu.yds.

Guns, dozers, and explosives were tried unsuccessfully. Finally the use of pressure jets to wash away the sand provided the answer. The hard upper crust was to be first blasted with previously prepared charges and then powerful jets of water from the canal were to be forced in by portable turbine driven pumps of 1000 gpm each.

(ab) *Bridging the Canal.* Posed the next major problem. Conventional bridges were slow, unwieldy and cumbersome. The Russians offered a most modern solution—the PMP—to be used for the first time in combat. The PMP is a revolutionary design in bridges, incorporating the use of pontoons which served the triple purpose of piers, girders and decking. To make bridges all that was required was to join the pontoons together on water. Pontoons were launched into water by vehicles which drove right up to the waterline, thereby almost completely eliminating manual handling at all stages. Pontoons were to be joined on the home bank and the whole bridges swung across by powerful tug boats. As a surviving Israeli reported "It grew out of the water like an extended arm." The same equipment with tug-boats was to be used as ferries.

(*iii*) *Selection of H-Hour.* The H-hour was so selected (1420 hrs) that the day light hours available would be just sufficient for bridging operations to be completed, but insufficient for the Israeli mobile armoured brigades, held as sector reserve

to deploy effectively for a counter attack. The Egyptian armour would thus have the whole night to cross the canal and deploy to meet the inevitable counter-attack next morning.

The techniques of infantry assault across the canal and the new methods of bridging and reducing bank heights were rehearsed again and again at suitable places on the Nile till perfection. As the Engineer-in-Chief remarked later "My troops rehearsed the crossing 300 times".

THE ASSAULT

At 1405 hours, 06 Oct 73, the offensive across the Suez was launched on a five divisional front. Under cover of a tremendous artillery barrage, surface to surface missiles and anti-aircraft missiles, the Egyptian Army Sappers crossed the canal in assault boats and proceeded to create gaps in the concertina wire by Bangalore torpedoes. The oil nozzles and pipes had been blocked/cut the previous night by engineer commandos and were rendered totally ineffective.

At 1420 hours infantry assault groups paddled across the canal in collapsible assault boats. The assaulting infantry was organized into an assault group and a covering group for each strong point with the mission to eliminate small arms fire within a zone of 1½Kms from the canal by 1620 hours to enable bridging operations to commence. The covering group was armed with light support weapons and hand portable anti-tank and anti-air craft missiles (Fig. 4). Their immediate task was to establish positions behind the strong points to provide fire support to the assault groups attacking the strong point and to prevent the Israeli tanks from moving into their prepared fire positions. They laid hasty mine fields along the approaches and their anti tank defence was so effective that only 20 Israeli tanks managed to reach their firing positions on the moraines. After the 1½Kms zone was neutralised, the covering groups moved forward carrying their missiles in hand carts to establish defences against the mobile Israeli reserve and Israeli air craft for 12-24 hours till own armour had crossed over.

No attempt was made to ferry across any tanks in the initial stages of the assault and the complete anti-tank defence was based on RCL, Rocket Launchers and Missiles. At 1620 hours bridging operations commenced on the home bank simultaneously with operations to reduce the far bank. To cater for changing water level, the concrete lining and sheet piles were blown away by explosives.

By 2000 hours the first bridge was through and by 2300 hours the engineers had reduced the moraines at 60 places, established 10 bridges and set up 50 ferries.

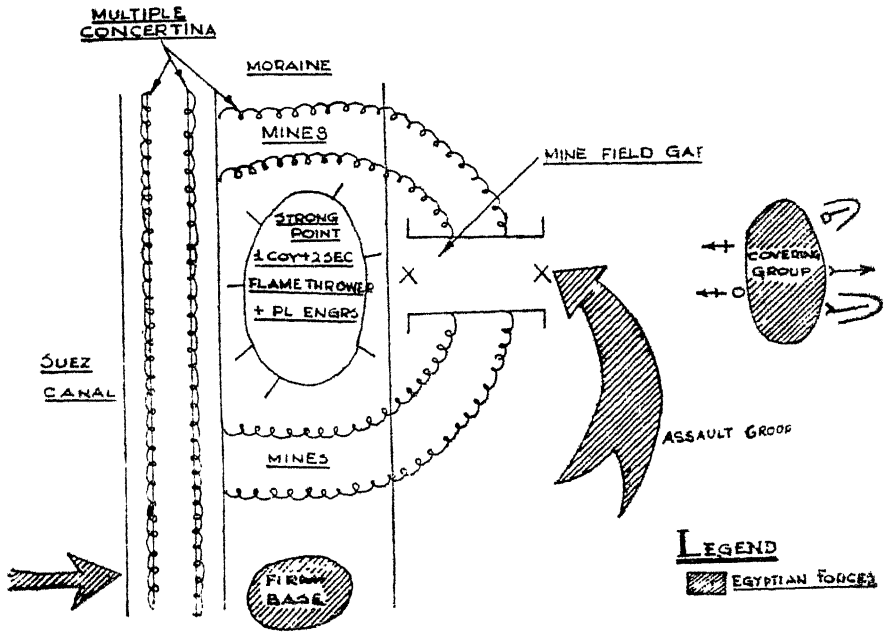


Fig. 4. ASLT Technique—strong point.

Across the Bar- Lev Line hasty mine fields laid by Israeli helicopters were cleared with the help of 'Ploughs' mounted on T-54. As the tanks ploughed through the mine fields, they dropped trails of a phosphorescent fluid to mark their path clearly at night. Minefields around the strong points were cleared manually and with the help of Bangalore torpedoes.

Throughout Sunday and Monday, Israeli Air Force concentrated on destruction of pontoon bridges over the canal. These attacks were only marginally successful, as the Egyptian Chief of Staff, Gen. Shazli, later explained, "The enemy air attacks were severe and sustained. They did hit some pontoons. But bridges were made from linked sections and were easily replaceable. Repairing a bridge usually took from half an hour to an hour. We also moved our bridges from one location to another, to confuse pilots who were working from reconnaissance information. And we put up heavy smoke screens to make aiming more difficult for them, while dense anti-air craft fire added to these difficulties". Even the medium and heavy guns based along the artillery road were ineffective as their forward Observation posts based on the moraine were speedily eliminated.

Crossing of the second Army was on schedule. The third Army, however, got struck for a while as the hosed sand turned into mudbogging the tanks and making anchoring of pontoons difficult.

Within 24 hours of the H-hour, 500 tanks and five divisions with their entire complement of heavy weapons had been crossed over.

LESSONS LEARNT

The ease and speed with which the Egyptian forces crossed the Suez Canal and the Bar-Lev Defences highlights the following lessons in relation to defences based on linear obstacles :—

(a) Irrespective of how elaborately a defensive obstacle system is prepared, its delay potential ultimately depends upon the fire cover that the defender is able to provide. In the absence of an effective fire cover, the obstacle system has no delay potential and merely lulls the defender into a false sense of security.

(b) In limited mid-intensity warfare, the speed with which offensive operations can be launched through defensive obstacle systems would be of paramount importance. In such operations engineer support assumes vital significance. It follows therefore, that it would be strategically correct for armies with limited means to modernise assault engineer equipment even at the cost of other arms. A smaller force put across a defensive system with great speed and surprise is more suited to achieve limited objectives than a larger force put across slowly.

Air Defence Weapon System for India

COLONEL B B GUPTA

INTRODUCTION

DEVELOPMENT of defensive and offensive air weapons is a continuous process, thereby necessitating periodical review of our air defence weapon system. The speed, radius of action, manoeuvrability and weapon delivery capabilities of the modern aircraft has reached formidable limits. Modern fighter bombers fly at supersonic speed carrying a variety of weapons which they can deliver with great precision and weight. These aircrafts adopt low and very low level attack tactics. They hardly give any warning of their approach. Thus, low and very low air attacks appear to be a decisive factor of war. If attacking aircrafts are not destroyed or effective air defence not provided the results can be disastrous.

Aircraft like MIRAGE has an all weather capability and speed in the region of Mach 2. At the face of it, this is quite awe inspiring. But it must be realised that no aircraft, attacking ground targets, can fully utilise these capabilities owing to limitations imposed by low flying, difficulty in navigation and target acquisition and characteristics of existing means of weapon delivery.

At such low heights, aircraft cannot achieve full speed because of excessive strain on the wings, high fuel consumption, limited human reaction in navigation and target acquisition and weapon delivery. Consequently, aircraft generally fly slower and normally at heights upto 300 ft. The speed of even mirage class of aircraft would be subsonic, whereas at higher altitudes upto 10,000 ft the speed may be in the transonic range.

Air defence weapons possessed by India today just cater for our immediate needs. Most of them are of the first generation and seem to have outlived their utility in the present context. They are cumbersome which restrict their mobility and effectiveness considerably.

Considering the speed of modern aircraft and the technique of weapon delivery system, there appears to be a definite requirement for

timely detection, acquisition, data computation and passing of the processed data to the guns in the shortest possible time. It must also be realised that no country in the world can have enough air defence weapons to provide effective air defence for all possible VAs/VPs. The available air defence resources have to be deployed and switched over as per the progress of the battle/war in various zones. This switching over/re-adjustment should be such as to keep the air defence weapons non-effective for shortest possible time. This necessitates having a self contained fire unit, fire control radar and the power supply unit forming integral part of the gun. The degree of mobility required and the type of VA/VP to be defended can determine its traction. Further, the air defence weapons have to cater for, not only the mobile-operations, but also for the static VAs/VPs (strategic and tactical), mobile forces and forward infantry divisions. These air defence weapons have further to be so integrated that they overlap and are also capable of functioning in conjunction with other services.

To carry out a review of air defence requirements and suggest the air defence weapon system suitable for Indian conditions upto 2000 AD.

POLICY

The policy regarding air defence weapon system may be based on the following considerations :—

(a) Our potential enemy.

(b) The terrain and the climate we are likely to fight.

(c) Economic resources of the country.

(d) Indigenous development/manufacturing capabilities of weapons,

(e) Likely integration of air defence weapon system with other services like Indian Air Force and Navy—primarily Air Force.

Our Potential Enemy

The world of today seems to be divided into distinct power blocks with the neutrals holding the balance. India is non-aligned. It is unlikely that any of these two power blocks or the neutrals will wage a war against us.

Our immediate neighbours are China, Pakistan, Bangla Desh, Nepal, Bhutan and Burma. Due to ideological differences and as per our experience of last thirty years, our main adversaries are well-known. They are equipped with the latest modern aircrafts like Mirages and are likely to keep the same pace in future also both in aircrafts and training. Similarly the possibility of their acquiring the best and the latest weapons available with their allies has also to be kept in view and our air defence system so organised as to counter this threat.

The Terrain and the Climate We are Likely to Fight

The type of terrain and the nature of climate in which our forces are likely to fight varies from deserts of Rajasthan, thick jungles and paddy fields of Assam and Bengal, flat plains of Punjab to mountains of Himalayas.

The temperature varies from 30° F to 110° F. The army may thus have to fight in different types of terrains and climate.

Economic Resources of the Country

India is an economically backward country with limited capabilities of carrying out any major reorganization/re-epuipping of the air defence weapon system from within the resources. A sound technical and industrial base is in the offing and with the present pace of development and consolidation it may take another 20 years for us to stand on our own.

Indigenous Development/Manufacturing Capabilities of Weapons

Presently indigenous resources and manufacturing capabilities are limited. Our Research and Development Organisations are still in their infancy. Practical and technical know-how is yet to be developed and mastered. With the development of industrial base, the requirements of defence would also be met to some extent. Keeping in view our economic conditions we may have to give preference to the indigenously available/ likely to be available equipment.

Likely Integration of Air Defence Weapon System with Other Services Like Indian Air Force and Navy—Primarily Air Force

The air defence weapons of the army cannot be discussed in its entirety without linking them with the overall national air defence plan. This necessitates close coordination and integration with Indian Air Force and the Navy. As per present role, the army's air defence weapons have to cater for a limited given height. The early warning system and the identification/dissemination of own and enemy aircraft information needs detailed coordination and yet the system be flexible to cater for individual service needs.

EMPLOYMENT AND REQUIREMENT OF AIR DEFENCE WEAPONS

Air Defence weapons are required to provide low level air defence. They are likely to consist of guns, missiles and rockets. The system must be immune to ECM. The employment and requirement of these weapons will depend upon the type of VA/VP to be defended, and also the cost effectiveness, as guns are cheaper than missiles.

TYPES of VAs/VPs

(a) *Static VAs/VPs*

(i) Strategic VAs/VPs. Like airfields, industrial complexes, dams in the rear etc. etc.

(ii) Tactical VAs/VPs. Like bridges, defiles maintenance administrative areas, SUs etc. etc.

(b) *Mobile VAs/VPs*

(i) Armoured columns.

(ii) Infantry divisions.

(iii) Gun areas.

COORDINATION OF VARIOUS TYPES OF AIR DEFENCE WEAPONS

The various types of weapons used i.e. guns, missiles, rockets, should be such as be capable of being deployed singly or jointly. Further, this integration should be such as to cater for all types of attacks with changing situations and minimum dislocation of the already deployed weapons.

COST EFFECTIVENESS

In a country like ours, this is a major consideration which may involve sacrificing of some of the best available systems in the world. Further, in the ultimate analysis, it is also to be kept in view that guns are cheaper than missiles. Also the air defence weapons selected should, as far as possible, conform to the existing manufacturing capabilities developed in the country/likely to be developed to ensure economic production.

THREAT

The existing and the future air threat is from aircrafts with all weather capabilities, speeds in the region of Mach 2 and above, and sophisticated weapon delivery techniques. These characteristics may not, however, be fully exploited due to limitations imposed by low flying, navigation, target acquisition and the weapon delivery systems. The modes of approach and attack is also dependent on the type of weapons it carries and the degree of penetration required in the enemy territory.

The modern aircrafts will approach the target at low and very low levels. Bombs, rockets, guns and air to ground missiles are likely to be the main weapon carried by them for times to come. Stand off attacks using bombs or missiles will be encountered in the future. Existing air defence guns cannot provide effective air defence against this type of attacks.

The technique of using retarder bombs seems to be to employ it in saturation attacks simultaneously at maximum airfields to ensure neutralization of air interception by own aircrafts.

The speed of the aircraft during approach and attacks may vary from 600 to 1000 Km. per hour. Area targets may be attacked both during day and night, whereas small and targets requiring precision attacks will necessitate fair weather, good visibility and near approach.

FUNCTIONS OF AIR DEFENCE SYSTEM

Four major functions of air defence system are—

(a) Eearly detection of all approaching aircrafts ;

(b) identification of these aircrafts, using electronic or visual means ;

(c) interception and destruction of hostile aircrafts ;

(d) control of air defence weapons.

SUGGESTED EQUIPMENT

While suggesting the equipment some of the important operational considerations that have been kept in view are—

(a) *Limited Reaction Time.* Due to supersonic speed of the aircraft and the difficulties that may be encountered in their early detection.

(b) *Volume of fire.* To be intense to cater for short time of engagement.

(c) *Gaps/dead zones.* Covering the gaps/dead zones of the various air defence Weapons.

STATIC VAs/VPs

(a) *Medium Calibre guns (30-40 mm).* Twin barrel gun with high rate of fire (say 600 rpm per barrel) having its own fire control equipment and generator mounted on a single chassis. If possible the search and acquisition radar may be combined. Since there is not likely to be much difference in kill probability rate of 30, 35 and 40 mm guns, it is recommended that we should have the gun designed on 40 mm calibre bases as the technical know-how and manufacturing facilities for the same are available indigenously.

(b) *Missiles.* Guided missiles be deployed to provide depth to the VA/VP and also engage enemy aircrafts which are not likely to actually fly over the target area. Aircrafts flying high and resorting to precision bombing/stand off techniques can also be engaged by the missiles.

(c) *Radar.* As the missiles have to be integrated with the guns, it is essential that they are fed from a common search and acquisition radar (s). Furthur, for missiles as the tracking and firing may have to be controlled automatically from the radar, the

design considerations of the radar for the missile units may be little different. As far as possible, maximum standardization in their characteristics and production may be achieved.

ARMOURED DIVISION/MOBILE FORCES

The equipment allotted for their protection should be as mobile, if not more, as the armour columns are. Suggested equipment are:-

(a) *Small Calibre guns (20-25 mm).* Small calibre multi barrel guns (four to six barrels) with high rate of fire (say 1000-1500 rds per minute per barrel) are suggested. It should have its own search and fire control equipment and generator. All the components should be mounted on a self propelled single chassis on tracks. Though ideal calibre for multi barrel weapon system would have been 20 mm, 23 mm calibre guns.

(b) *Missile.* Since the battle is fluid only mobile and light weapons are suitable. Shoulder fired missiles with 2000 m range are recommended.

INFANTRY DIVISION

(a) *Small Calibre guns (20-25 mm).* Small calibre multi barrel guns (two to four barrels) with high rate of fire are recommended. The weapon system should have search and fire control equipment, gun system and generator mounted on a single chassis on wheels. 23 mm multi barrel guns which are currently available will meet our requirement.

(b) *Missiles.* Shoulder fired missiles of up to 2000 m range are recommended to be deployed in conjunction with multi barrel guns.

MISCELLANEOUS VAs/VPs

Any of the weapon systems mentioned above will be suitable for all other types of VAs/VPs discussed earlier

QUALITATIVE REQUIREMENTS OF AIR DEFENCE WEAPONS

BASIC REQUIREMENT

The following essential basic requirements must be considered:—

(a) *Operational Characteristics*

(i) *Radar*

(aa) Search and acquisition
(bb) Optical sighting system
(cc) MTI
(dd) Auto tracking
(ee) IFF facilities
(ff) TV system for display
(gg) Target simulator incorporated for training purposes
(hh) Be immune to ECM
(jj) MV measurement facilities

(kk) Regeneration
(ll) Power supply

(ii) *Guns/missiles*

(aa) Rate of fire
(bb) Volume of fire
(cc) Kill probability
(dd) Modes of operation
(ee) MV/speed of missile
(ff) Power supply

(b) *Physical characteristics*

(i) Mobility
(ii) Cross country capability
(iii) Levelling
(iv) Compact and robust
(v) Easy to camouflage

(c) *Operation and maintenance*

(i) Into/out of action
(ii) Operational readiness
(iii) Defects
(iv) Air-conditioning
(v) Communication
(vi) Training
(vii) Maintenance and replacement
(viii) Endurance
(ix) Operators required to man

(d) *Ammunition*

(i) Availability
(ii) Manufacturing facilities
(iii) Cost factor
(iv) Easy to handle
(v) Safety aspects
(vi) All weather proof
(vii) Primer
(viii) Fuze
(ix) Cartidge case
(x) Suitable propellent

QUALITATIVE REQUIREMENTS

Radar

(a) *For Scan (Local Warning)*

(i) Scanning ranges —200 Kms
(ii) Height —15 m to 1500 m
(iii) IFF —Facilities incorporated
(iv) Provide MTI facilities
(v) Be immune to ECM

(vi) *Modes of display*

(aa) TV display ;

(bb) 'P' scope ; and

(cc) Digital read out of target range and azimuth with respect to fire control equipment.

(vii) Maximum error —Range $\pm$ 2 Kms
Azimuth $\pm$ 36 miles

(viii) No of frequency —Three to six programmes suggested

(ix) Stamina —Minimum 96 hours.

(x) Power supply —Forming integral part of set (for training separate generator may be used).

(xi) Capabilities to feed data to selected four to six fire control equipments simultaneously and automatically.

(xii) Communications facilities with fire control radars.

(xiii) Sub clutter visibility —25-40 db.

(b) *For tracking (fire control equipment)*

(i) Search and acquisition range —70 to 100 Kms on single scan basis

(ii) Auto tracking range —50 to 70 Kms

(iii) Target speed data —200 to 600 m per sec

(iv) Capabilities to receive data from local warning radar automatically and continuously.

(v) Frequency —super high 'X' band.

(vi) Be immune to ECM

(vii) Optical sighting system to cater for visual engagement

(viii) Modes of display —'P' and 'A' scopes and TV.

(ix) Height —15 m to 1500 m

(x) Computer—

(aa) Computing range 300 m to 20 Kms.

(bb) Rates of change—As per parent radar.

(xi) *Regeneration.* The computer must provide facilities for regenerating future position of the old target for 15 secs, after the target has been lost on the radar or visually due to any

reasons on the assumption that the target has maintained its course, speed and height constantly, at the same time radar is following a fresh target.

Guns	*Calibre*	
	30-40 mm	*20-25 mm*
(a) MV	1200 to 1400 m per sec	1500 to 1700 m per sec
(b) No of barrels	2	4 to 6
(c) Rate of fire	600 rds per barrel	1000-1500 rounds per barrel per minute
(d) *Max effective range*		
(i) with radar	5000 m	3500 m
(ii) without radar	3500 m	2500 m
(e) Sustained fire	100 rounds	400 rounds
(f) Max effective height	1500 m	1500 m
(g) Max horizontal range	15,000 m	10,000 m
(h) Method of lay	RPC LPC Hand	RPC LPC Hand
(j) Sighting system	Electrically operated graticules	Electrically operated graticules
(k) *Infra Red Devices*		
(i) Drivers	100 m	100 m
(ii) Gunner	200 m	200 m
(l) Power supply	Integral	Integral
(m) Mode of firing	Hand Foot pedal Commander/ remote	Hand Foot pedal Commander/ remote
(n) *Ammunition*		
(i) Type	He with max kill probability	He with max kill probability
(ii) Self destruction element	10-15 sec or 10,000 to 15,000 m	10,000 to 15,000 m or 10-12 sec.
(iii) Carriage	Filled in charger in boxes	Belted packed in boxes

(o)	Method of feed	Charger	Belt fed
(p)	No of rounds in a charger	6 to 8	Not applicable
(q)	*Availability of ammunition*		
	(i) 40 to 50 rounds in hopper		Ready use
	(ii) 120 rounds in ammunition rack for reloading.		
(r)	Crew	To be minimum and capable of doing multi-purpose duties	
(s)	Firing	(i) Stationary	Stationary
		(ii) On move	On move
(t)	Method of firing	Single/in pair	Single/in pair or all barrels together
(u)	Operating temperature	—40° C to+65°C	—40° C to+65°C

MISSILES

(a)	*Short Range Missiles*	
	(i) *Range*	
	(aa) Minimum	—1000 m
	(bb) Maximum	—5000 m
	(ii) Cruising Velocity	—800 m per sec.
	(iii) Capability	—all weather
	(iv) War head	—Blast type
	(v) War head weight	—to be worked out separately
	(vi) *Kill probability*	
	(aa) Against manoeuvring targets	—70%
	(bb) Against non-manoeuvring targets	—90%
	(vii) *Power supply*	
	(aa) Launcher	—generator
	(bb) Within missile	—Dry battery
	(viii) Fuze	—I.R. Graze, contact, VT and self destruction
	(ix) Reloading	—Automatic

(x) *Guidance*

(aa) IR tracking

(bb) Radio command guidance

(xi) *Height*

(aa) Maximum	—1500 m
(bb) Minimum	—15 m

(xii) Air portability

Shoulder Fired Missile

They should be able to cover up the gaps/dead zones and also be able to be operated with one man for low and very low flying targets with speed of upto 500 m per sec.

Integration of Various Types of Army Air Defence Weapons

While suggesting the futuristic air defence weapon systems it has been endeavoured to ensure that various weapons complement/supplement one another as well as can be deployed independently.

Mix up of Air Defence Weapons in One National Integrated System

It is likely that the air force may also have some small calibre guns. It is for consideration whether these guns should be permanently taken away from them and handed over to one Service with their well defined role and task.

The radars required for early and local warning should be such as to meet each others requirement.

ORGANISATIONAL CHANGES

With the type of equipment suggested, the likely roles for which the same will be deployed and considering our requirements for allocating adequate air defence resources to various VAs/VPs, a thorough review of our organisational set up will become paramount. The same is not being discussed in this article as it is outside its purview and which should form a subject for study and analysis by itself.

CONCLUSION

Modern and future warfare envisages use of low flying, high speed aircrafts. The aircraft tactics and weapon deliveries system are undergoing a radical change. The weapon delivery system, like stand off techni-, allows the aircraft to deliver a weapon on a desired target without

actually flying over the target area. This technique is likely to be developed further even for precision attacks.

In India we have very meagre research and development facilities and our economic resources act as a restraint for extensive research/acquisition of sophisticated weapon system.

Keeping in view our potential adversaries it is felt that the existing calibre guns with increased rate and volume of fire will meet the requirement for various types of VAs/VPs. In order to cater for short reaction time and less time of engagement, existing guns modified to multi-barrels with their own search and tracking fire control units and power supply will be able to meet the changing situation of 2000 AD. In order to cater for the changed air attack tactics and weapon delivery techniques, the guns will have to be supplemented by short and very short range all weather missiles.

Some Thoughts on Improvement of Career Prospects of an Average Army Officer

LIEUTENANT COLONEL KM BHIMAIYA, GARHWAL RIFLES

"POOR Major X has fallen by the wayside. It is a pity that he has not made the grade for promotion. Real bad luck especially when he was the recipient of the Sword of Honour at the Indian Military Academy and was subsequently Instructor at the Weapons Wing". Most of us are used to this monotonous and yet inevitable tenor of conversation whenever Army officers meet each other formally and informally. A deeper analysis of the causes for the tragic failure of Major X would have revealed that the causative factor was not so much the bad luck as the lack of purposeful career planning. The aim of this paper is to discuss the factors affecting the career prospects of an average Army officer and suggest ways and means of improving the same. Career implies advancement in a particular vocation. However, as advancement is conditioned by many shifting factors like job security and satisfaction, service conditions and rehabilitation schemes, it cannot be investigated in isolation.

The scope of this essay is limited upto and including the rank of Lieutenant Colonel, as a good majority of the average officers are likely to secure this rank.

Improvement of career prospects is only the means and not the end by itself, as such, all career improvement techniques should necessarily and concurrently contribute towards the enhancement of the efficiency standards of the organisation. This inflexible and basic premise predominates the subsequent analysis of career prospects.

CURRENT SOCIO-ECONOMIC FACTORS RELATING TO CAREER

There will be no dearth of volunteers for the officers cadre so long as the present unemployment situation continues. However, the socio-economic changes, the harsh realities of the service conditions and the inadequate compensation by way of matching emoluments have restricted the bulk of intake to lower and middle strata of society. Some argue that

the lower strata of society cannot furnish the desired leadership in the Army; this has, however, not been substantiated by historical facts, these cross-sections have had limited opportunities of adjusting themselves to varying social environments as also of acquiring the desired level of general knowledge. These gaps accentuate the need for a well thought-out career planning.

CONDITIONS OF SERVICE

SALARY/PENSION

The benefits of the recent pay raise have largely been offset by the spiralling prices. The glaring anomalies between the conditions of civil services and the service officers have already been amply high-lighted in the Pay Commission recommendations. Suffice it to say that it is absurd to equate the emoluments of an Army Commander who safeguards the security of one-third of the nation with those of an oil executive or a General Manager of a Public Sector Undertaking.

INCENTIVE ORIENTED SCHEMES

The existing system guarantees the substantive rank of Major to almost all the officers and time scale rank of Lieutenant Colonel to most of them. This system is commendable as far as job security and career prospects of poor to average calibre are concerned. But it suffers from lack of incentive, stagnation, disenchantment and frustration. In a nutshell, this implies that the low average officer would, often have, blocked the promotion of an average officer at the level of Major's appointments. The cumulative effects thus erode the organisational efficiency. An incentive conducive to efficiency can be introduced by designating the Major's rank as "selection category." The full implementation of this measure may have to wait till the stabilization of the officer situation. This scheme should provide for the compulsory retirement of officers who fail to make the grade after 15 years of service which then would become the initial engagement period. There should be a parallel organisation to rehabilitate officers so retired. The suggested rehabilitation schemes have been dealt with separately.

The above measure may sound draconian. But it provides inventive, conducive to efficiency and would be appealing to officers who would rather like to see the fruits of their labour in cash and promotion. Appeals to heritage, patriotism, traditions and calculated but well timed eulogies of politicians would continue to lose their relevance and credibility.

CAREER PLANNING

Existing System

This covers the following aspects only:

(a) Timely reversion to regimental duty in order to enable the officers to earn the required command reports.

(b) Selection and detailing of officers to basic/career courses.

It goes without saying that the planning should cover the wider spectrum of officers career. Some of the gaps that could be covered are discussed in the succeeding paragraphs.

Stages of Career

The perspective planning should commence prior to the date of commissioning and continue till an officer attains the rank of Lieutenant Colonel.

Allotment of Arms/Services

At the time of commissioning the allotment should be made in relation to the individual aptitude which should be determined not by the individual, caprice of the assessing officers but by studious evaluation by a team of experts known for their objectivity. As a further safeguard there should be a further screening after 3-4 years of service by which individual predilections would crystallise. It is not essential that inepti-tude patterns should be corrected at this stage. Lateral movements in relation to aptitudes are best accomplished during the formative period of one's career.

Post Commission Training and Basic Courses

The post commission training is organised at unit level and the extent to which officers benefit from this largely depend upon the pro-fessional environment obtaining in the unit and the interest taken by the unit Commander. Proper organization of post commission and pre-course training go a long way in enriching the professional knowledge of the officers and hence their self-confidence. It makes the officers healthily conscious of their career and provides them with the motivation so neces-sary for their advancement.

Balanced Regimental Staff/Extra Regimental Employment Tenures

As this requirement is affected by many uncontrollable factors this is most difficult of accomplishment. An officer who has gained staff/ instructional experience during the first 6-7 years of service, generally,

has a more rounded personality and better scope of subsequent employability than an officer who has been stagnating on picquets or at Regimental Centre. In this area, the career Planning Cell at the Military Secretary's Branch can render yeoman's service by enabling maximum number of officers to have such balanced tenures. Some of the uncontrollable factors affecting this are as under :—

(a) Unforeseen changes in the establishments.

(b) Wastages, mainly unanticipated due to a variety of reasons.

(c) Postings on compassionate grounds.

(d) Overriding requirements of ensuring balanced peace and field tenure to officers; most of the staff/Extra Regimental Employment appointments are available in field or hard peace areas.

(e) Inability of officers to meet the qualitative requirements prescribed for the various instructional appointments.

Purely on mathematical basis, the situation could be partially remedied, if the officers accept the first 6-7 years of service in field areas as an accomplished fact. This can further be legitimized by raising the marriagable age to 28. However, the same answer may not be valid for Grade II appointments; at this stage officers require more stability to look after their families and children's education.

Facilities to Qualify in the Promotion Examination and the Entrance Examination for the Defence Services Staff College

Promotion examinations are important milestones in an officer's career; however, the nomination for Defence Services Staff College constitutes a major break through. One of the major causes for frustration and subsequent lack of interest displayed by officers stem from the unequal opportunities afforded by varying service conditions for the preparation of promotion examination in general and the Defence Services Staff College examination in particular. While leave rules cannot provide for these contingencies local administrative orders subject to exigencies of service could guarantee timely leave for preparation to all potential candidates. This is important particularly in view of the weightage given to the Staff College qualification.

Postings

These can be dealt with under two headings : routine postings and those to appointments carrying prescribed qualitative requirements. Routine postings particularly those on compassionate grounds generate considerable dissatisfaction. Some no doubt arise from the ignorance of norms followed by the Military Secretary's Branch; the norms, however,

need major rationalization. These are discussed as under :—

(*a*) *Balancing of Attractive and Unattractive Postings.* This is a complex process involving the delicate reconciliation of conflicting factors like suitability, requirement for balanced peace/field tenures, qualitative requirements and so on. Besides, the value criteria for various stations and appointments also differ considerably from officers to officers. A partial answer to the problem would be to incorporate a paragraph in the Annual Confidential Report from where the individual officer could indicate his preference of appointments/stations subject to the exigencies of service. As many officers as possible should be accommodated within their indicated choice. No doubt, this would entail increased spadework at the Military Secretary's Branch. The game is, however, worth the candle as it would optimize job satisfaction so essential for efficiency.

(b) *Posting on Compassionate Grounds.* The present procedure for applying for posting on compassionate grounds is too cumbersome. Many genuine cases at times, get rejected at various lavels resulting thereby in the erosion of officer's confidence in the system. In view of its effects on officer's performance in general and career in particular a special cell at the Military Secretary's Branch should be charged with the responsibilities of expeditiously and sympathetically processing such applications. The latter should be sent direct to the Military Secretary's Branch under the provisions of Defence Service Regulations and not be allowed to painfully trickle through staff channels. Certain vacancies in attractive stations can be kept unfilled or earmarked in advance ; these can be placed at the disposal of the compassionate posting cell.

(c) *Appointments Carrying Qualitative Requirements.* These refer to certain selective Instructional/staff appointments. Of the various qualitative requirements, prescribed grading on courses is the most important one. Assessment on courses of instruction is based on severely restricted areas of personal qualities and demonstrated performance. Besides, no objective assessment of the officers' potential can be attempted within the duration of the course. In most of the cases due to the irrational weightage given to courses, officers can well afford to rest assured on their past performance. On the other hand, an officer who earns an average grading on courses but has subsequently enriched his knowledge, and tempered his experience with commendable performance on command assignments stands permanently debarred from filling an instructional assignment because of his average performance perhaps a decade ago. This anomaly renders officers unhealthily and unduly course oriented and many of them get away by not returning matching performance in command assignments. By the same token, there is a crying need to improve the career prospects of non staff college graduates. At present the staff college qualification or the lack of it can brighten or seal the career of a vast majority of officers. Hence, there is a need to

rationalize the qualitative requirements of selective appointments in order to make them more broad based and prevent them from being the prerogatives of 'Course Gladiators'. This recommendation does not even remotely insinuate that sub-standard officers should be assigned to instructional/selected staff appointments. It is most important to disseminate the rationalized/revised qualitative requirements thoroughly so that it provides an average officer with the necessary incentive to work for it.

Some Anomalies in the Promotion System

The present system is governed solely by the annual confidential reports. The damage that can be caused by a subjective annual confidential report has been discussed separately. Suffice it to say that due to the superlative weightage attached to the annual confidential reports 'obtaining of good chits' has become as specialised a technique as that of securing good course reports. A good report often conceals professional ineptitude; as such, it should be confirmed by professional examinations. Professional knowledge generates confidence. Though a commander may have a team of experts, personal experience and knowledge of a subject places one in a better position to make the final judgement that leads to a better decision. If the annual confidential reports are evaluated in the light of periodical promotion examinations an officer with high average professional knowledge, but mediocre reports will not suffer. In fact, the current system of nominating officers for the Army Staff Course at the Defence Services Staff College is a step in the right direction. The same system with necessary changes should be extended to all selection promotions.

Imbalances in the Promotion Patterns of Certain Arms/Services

Officers of certain arms/services though passed fit for promotion have a long wait before they pick up their ranks whereas officers of some arms pick up the rank with 15-16 years of service. There are many uncontrollable reasons for this disparity. To remove this imbalance, more vacancies in specialized jobs like data processing, Research and Development organization and (deputation to) public sector undertaking should be found. The situation can also be redressed by the upgradation of certain appointments and adopting the two-tier system of grading staff appointments.

Communication of Reasons for Non-selection to Affected Officers

This would spare the officers a great deal of anxiety and suspense and indicate them areas requiring improvement. An average and keen officer of average intelligence, who is keen on self improvement would benefit from such a system.

Annual Confidential Reports

This is one of the most controversial issues of an officer's career. So long as there are flaws and angularities in human nature, annual confidential reports can seldom be cent per cent objective. In the interest of the service and the individual it is necessary to rationally evaluate them so as to reduce subjectivity and personal prejudices. Some suggested methods are discussed below :—

(a) *Realistic Evaluation of the Annual Confidential Reports at the Military Secretary's Branch.* While assessing the suitability of officers for various appointments there is a tendency to overreact to common weaknesses like lack of tact, short temper and so on ; consequently those reporting officers who are aware of the implications of a seemingly harmless word like 'could be more cheerful', tend to play safe and totally exclude mention of any weakness in a mistaken sense of loyalty. This discourages the officer from overcoming his deficiency and in practice equates indifferent and conscientious officers. The evaluators in Military Secretary's Branch would do well to remember the famous dictum of Lord Tennyson "He is all fault who has no fault at all."

(b) *Ratio Index.* Some reporting officers tend to be liberal in their assessment whereas the others rather strict. In order to remove such an imbalance, it is necessary to establish a computerized index of the assessing officers.

(c) *Certain Anomalies in Assessment.* It is not intended to discuss major aberrations resulting from ulterior and non-professional considerations. Presuming that the necessary conditions obtain, some of the anomalies which affect the career of an average Army officer are as under :—

(i) *Exaggeration of Common Failures.* Some shortcomings mostly based on snap judgements are blown out of proportion and mentioned in the annual confidential reports. Such a tendency makes officers overcautious and curbs aggressiveness and initiative.

(ii) *Incorrect Interpretation of Indicators of Efficiency.* An officer may be earnestly endeavouring to improve discipline by firm handling and exemplary punishment ; yet, an inspecting/assessing officer may comment on the high rate of disciplinary cases in the unit. Quite often, individual and isolated job performances (even though non-professional like organization of social functions) are wrongly identified with the accepted hallmarks of efficiency. Consequently, the so-called high grade officers have little long term techniques/planning for improving upon the efficiency. They find it extremely expedient and "practicable" to live from crisis to crisis ; look after peacetime critical areas, tread the safe path ; earn the bare minimum of command reports ; and, again gravitate into

attractive staff appointments. On the other hand, an average officer (presumably a non-staff college graduate) has to toil his way through an exacting command tenure of more than four years with little prospects of an attractive staff appointment as a prelude to further promotion.

TRAINING

PROFESSIONAL

Leadership Qualities. The need for steady and graduated professional training cannot be overemphasized. The man-management problems are bound to be more and more complex in years to come. In future organisations Army and Civilian Officers have to be welded together as cohesive teams. As the future intake is going to comprise mainly of civilians (joining a citizen Army) future officers particularly at the young officer's level should have some knowledge of the workings of civilian mind. This could be accomplished by cross-attaching young officers to some industrial work for about 6-12 months. They would then learn the art of personal leadership without the aid of Army discipline.

Correspondence Courses. The facilities for officer's self-education are woefully lacking. While certain subjects like tactics do not lend themselves to postal training, because of their practical/outdoor nature, there are numerous other subjects like Administration Law, Industrial Management, Business Administration and so on, are eminently suited for correspondence courses. All universities should afford facilities to Army Officers to enrol themselves as candidates for correspondence courses. The same opportunities should be afforded in technical disciplines so that lateral movements, if necessary, are possible early in their career. This would ensure job satisfaction and enhance efficiency.

REHABILITATION

One of the anxieties that constantly plague an average officer is retirement which comes inevitably at an early age. Officers should be allowed to plan a second career, while being in the first; otherwise they will be either too late to obtain the necessary qualifications and to exploit on opening when it presents itself. To this extent there is a crying need to streamline the Rehabilitation Cell at the Ministry of Defence. Two distinct but inter-related organisations should be inherent; vocational evaluation and liaison. The former should progressively determine the most suitable vocation and the later in close liaison with the civil organisation locate suitable jobs.

The qualifications for civilian jobs at present are formidable. These should be intelligently modified for Army officers. There is a

large number of managerial jobs which require no special technical expertise. The crux of the problem lies in the translation of some of the functional military tasks into civilian terminology. An average Army officer understands the importance of team work, is mature, responsible, dependable, motivated and well disciplined. These qualities should qualify him for any managerial job and given the necessary incentive, he would not take long in mastering the technical aspects. Technical expertise without the basic qualities of management are not of much use. The converse, however, is not true.

RECOMMENDATIONS

Improvement of career prospects are only the means to an end; the later being the enhancement of efficiency standards of units and organisations.

Incentive oriented schemes like accelerated promotions and compulsory retirement after initial engagement period should be pushed through to promote healthy competition.

Change of arms/service during the first 3-4 years of service should be permitted to correct any demonstrated ineptitude.

To help rotate maximum officers in staff/Extra Regimental Employment and Regimental appointments, initially young officers may have to do long spells of field tenures. To this extent there is a case for raising the 'married establishment' age to 27 years. But during the service range of 11-14 years officers require stability in their appointments so as to look after their families, children's education and so on.

A special cell at Army Headquarters should be established to expeditiously deal with the applications for posting on compassionate grounds. The qualitative requirements for various appointments should be rationalized so as to permit average officers to hold attractive appointments.

The frequency of promotion examinations should be increased as a confirmatory measure in the evaluation of the annual confidential reports. The promotion should then be based on the combined evaluation of annual confidential reports, and performance in the promotion examination.

The present imbalance in the promotion structure of arms/service should be removed be allotting more Extra Regimental Employment and deputation vacancies to the arms/services where promotion blocks are anticipated.

The reasons for non-selection for promotion to a higher rank should be communicated to the affected officers so that they can improve upon their previous performance.

In order to improve objectivity of annual confidential reports the following steps should be taken :-

(a) Ratio index should be computerised.

(b) Annual confidential reports should be more realistically evaluated at the Military Secretary Branch.

(c) Indicators of efficiency should be recognised and evaluated in a more pragmatic manner by the inspecting/initiating officers.

Training in leadership should aim at developing leaders who can exert favourable influence on Army and civilian personnel without the aid of disciplinary measures.

Army officers should be allowed to plan their second carrier while being in the first one; to this end, a streamlined rehabilitation cell comprising of vocational evaluation and job finders should be set up at the Ministry of Defence.

Attack on Prepared Defences in Skirmish Order

LIEUTENANT COLONEL N K MAYNE

"Surprise can be said to have been achieved when one side has been able to achieve a paralysis of the enemy commander's mind, resulting in inaction or uncoordinated action. Surprise can be considered to be lost when the enemy commander starts issuing coherent and coordinated orders."

INTRODUCTION

IN a battle, both the defender and attacker try to surprise each other by doing the unexpected, but unfortunately the environment is such that actions can mostly be forecast atleast in an approximate manner. At best it is a chancy business because an alert enemy might still not be surprised despite one's best efforts.

In this paper we will concentrate on how an attacker can force the defender to lose control over the battle: in short how to nullify the defender's plan of battle, confuse his commanders and thus achieve surprise.

From the attacker's point of view, any defender's plans can be upset if some or preferably all of the following can be achieved :

(a) Enemy's Early Warning system, even though operative, should give late and inaccurate information.

(b) The section, platoon and company commanders should not be able to assess the strength of the attacker till as late as possible. Thus passage of information upwards should become, late and preferably inaccurate.

(c) His fire control should be upset, so that he has to expend more ammunition than what he has planned, both for artillery and small arms and further, if he can be forced to permit individual judgement of when and how much to fire by riflemen, LMG and MMG numbers, so much the better and the sooner it happens, the better.

(d) Destroy his planned mutual support plan by forcing everyone to look after himself.

(e) Nullify or reduce the effect of the high volume of fire and that of the belts of fire produced by automatic weapons by not presenting a suitable target.

(f) Nullify or reduce the effect of artillery and mortar fire by not presenting a suitable target at any time.

(g) Not permitting him to know the exact situation at any one time with any accuracy for him to launch his reserves at the right place and at the right time. If he launches them at the wrong time and/or wrong place, it suits the attacker.

(h) By reducing the reaction time for any particular situation by keeping the situation fluid.

PRESENT ATTACK PLANS

Present Form of Attack

The present form of attack is a derivative of the close order drill formations which were used upto the nineteenth century. The present form emerged as a protection against the MMG's murderous enfilade fire on a close order formation. The new formation was in open order with men about 5 yards apart and about 10 to 25 yards between ranks. The composition of the armies then, forced this open, almost review order, formation on the high command because the armies were mobilised from the territorials, militia and conscripts and consisted of quickly trained soldiers who required this kind of easily controlled, simple arrangements. This formation is eminently suited to a quickly mobilised conscript army. At the same time, whenever, the attacks got halted due to persistent enemy fire, individual acts of bravery were and still are required to silence this opposition as an emergency measure using fire and movement. During the battle such actions are usually taken by the veterans and seasoned soldiers. The attack in general was and is only supported by area neutralisation fire provided by the artillery.

Comments from Battlefield Studies on Present Form of Attack

Let us now see what battlefield studies have to say about the reasons for troops attacking in the present formation not getting up once they go to the ground. The study says, "When an advancing infantry line suddenly encounters enemy fire and the men go to ground under circumstances where they cannot see one another, the moral disintegration of that line is for the moment complete. All organisational unity vanishes temporarily. What has been a force becomes a scattering of individuals. This is inevitably the case. Men going forward in line are in sight of one another. They therefore have a sense of unity. But when they come unexpectedly in check and go to ground, they no longer have knowledge of the position of the men on their left and right. While erect, they feel the presence of the others. When they go down, this feeling is lost. The platoon leader

is certain only of his own location. Before the company or platoon or section can again become a going concern, capable of working its will on the enemy, it must reintegrate, and before it can reintegrate, communication must be restored between the fractions. This does not necessarily mean word communication. It may be only the communication which comes of seeing that others are present, though before this can well happen, there must be some precipitating act. It may be done through one bold individual standing erect and saying to a few others; 'Follow me, We're going on'. If a few arise and follow, the entire line is apt to get in motion. On the other hand, if this same individual advances alone but says nothing, it is unlikely that he will have any followers. Yet it should be observed that reintegration rarely takes place in this manner. The restoration of unity and of impluse to attack is, therefore, subject to the inertia and the trial and error methods of small unit leaders, who while remaining down, try to resume contact with their scattered fractions, or else fail even in that simple duty. In fact, the majority of small unit leaders do not take any steps towards restoring control, from which alone can come unity of action. Some try to contact their men by voice or by relay of voice. During an action, while the men are prone, the voice will rarely carry more than twentyfive feet; this means that unless there is relay and all hands understand what is being attempted, the voice method is ineffective. Others look for higher ground immediately ahead which is still under cover, then crawl up it so that their own men will see them. Still others wait for a tank to come along, then use it for cover as they walk across the front. Once halted, even if there has been no damage, the line never moves as strongly or as willingly again. After three or four such fruitless delays, men become morally spent rather than physically rested. All impetus is lost and the attack might better be called off for the day." "Within the small unit the loss or lack of control", the study says, "was almost invariably traceable to the failure of close up communications. In most cases this failure was not caused by anything the enemy had done but by the neglect of common-sense measures by our own soldiers, which were well within their means". Therefore, it is obviously imperative that we do not let this situation occur.

Battlefield studies also show that we must not base our policies on exaggerated notions of a man's capacity to endure and to sacrifice on behalf of ideals alone. In battle one may draw a small circle around a soldier, including within it only those whom he can see or those he believes will influence his immediate fortunes. These alone will determine whether he rallies or fails, advances or falls back.

If the moral disintegration occurs due to lack of knowledge about the comrades and lack of communication between them, a method needs to be evolved which ensures that everyone knows what the other is doing

at any one time under all circumstances and that communication and contact are retained within the smallest sub unit i.e. a section, as disintegration or integration has to start from here.

Relationship Between Fire and Move Tactics and Initiative

After the introduction of the breach loading rifles, we have always propagated the use of fire and movement by the infantry but it has been practised only in small scale patrol actions or small sub unit actions at best at section level only. Fire and movement requires a high degree of individual initiative. One of the lessons from the Second World War is that "As more and more impact has gone into the hitting power of weapons, necessitating ever widening deployments of troops, the quality of initiative in the individual has become the best praised of military virtues. Prevailing battle conditions increase the problems of unit coherence in combat. The only offset for this difficulty is to train for a higher degree of individual courage, comprehension, and most vital, self starting character of the individual soldier. However, it is good to remember that the thinking soldier—the man who is trained to be a self-starter cannot mature in an environment considering automatic action as the ideal. Discipline, long and assiduously applied, inculcates such a degree of automatic response that the majority will do as told—but only when told to do so." Our training still might try to teach all men to think clearly and teach them methods so that majority do resolve in an emergency to act correctly without orders. Unfortunately these two methods of training are mutually exclusive. You can have one, not both. Let us take some examples : For the sake of apparent discipline, we insist that men should fall in their sub units and then march on to a central parade ground. Do we not trust a man to reach the parade ground in time ? This does result in a man parading at least half an hour before the time. Similarly we require our men to go to the bazar also in squads. A man is involved in an accident or contacts malaria or VD or infectious hepatities but his CO is responsible : yet the man is fit to vote in a government but not fit to look after himself ! The question is, are we training our men, to be self-dependent, self-starters with initiative or are we ignoring their adulthood ?

In addition to individual initiative, fire and movement requires precision shooting by a sub unit or a group. The present formation of attack, however, caters for general movement supported by area neutralisation fire and we can include small arms fire from the hip in this category. We are authorised precision shooting supporting weapons (LMG) yet we make no use of it at all as a deliberate and planned measure.

PREDICTABILITY FACTOR OF THE PRESENT FORM OF ATTACK

The following predictable actions have to be taken by the attacker and the predictability factor is the biggest weakness of the present form of attack :—

(a) Assemble in an area for a deliberate marrying up with supporting elements in a suitable area which can usually be predicted by the enemy;

(b) Form up in the open order formation for attack, again in a suitable area which can be predicted with fair accuracy ;

(c) Move to the defences in a set formation requiring suitable ground to use this formation and this helps in predicting strength and direction of attack ;

(d) Centralised control over movement at a set pace ;

(e) The whole activity is closely coordinated without any initiative at lower levels, till the attack bogs down. Now it depends on only section commanders, or at best platoon commanders to exert their influence if they use their own initiative. Surely, this is an ad hoc arrangement and we cannot and should not base our plans on it.

(f) Even though the commander produces an overall superiority of 3 or 4 to 1 over the defender, the troops actually attacking any specific defence work are just equal to, if not less than, the defenders. This is so, as the distance between the attacking men is 5 yards and 15 to 20 yards in depth and thus only two men can tackle any defence work at any one time about 3 yards in width which might have 2 to 4 men inside.

The defender's plans are all based on this predictable pattern as follows :—

(a) DFs are selected to be fired on likely assembly areas and FUPs, where troops will have to halt for certain actions for a specific time and all that is required, is, timely information of this activity ;

(b) Assault, standing up in this set formation is most vulnerable to flanking automatic fire ;

(c) More troops are deployed and more obstacles are laid on likely approaches which permit troops to move in this formation.

(d) Less attention is paid to approaches which do not permit such a formation to move.

(e) Counter attack plan is based on the predictable position of the enemy after his attack in the enemy's reorganisation stage.

(f) The entire plan is based on fairly accurate and timely assessment of strength as the attacker is in the open and can almost be counted. Of course this depends on truthful reporting, but this has to be assumed as available to the defender for the purposes of this paper, even though truthful reporting is vital and yet rare, very rare.

(g) Reinforcement is carried out well in time as an early and fairly accurate assessment of the strength of the attacker gives enough reaction time to the defender.

So far, the only action we have devised to nullify this predictability factor is to do the same thing at night so as to hide the activity from the defender. The defender now uses night vision devices and night illumination to nullify this tactic. Thus the situation is back to square one but the two opponents have now to not only fight each other but also their desire to sleep.

If one watches an attack in the present form from a defender's post one will see for oneself how vulnerable the present system of attack is. One will no doubt notice that this form is full of bravery, courage, dash and determination and that it is very photogenic and makes a good press picture or motion film—yet sad to state, it will be equally obvious that it is as futile as the Charge of The Light Brigade.

The variants of the present form of attack require troops to pass through the obstacle by platoons in single fire and after crossing the obstacle, troops are expected to move forward by fire and movement in the last 100 yards or so. This envisages a change in the formation to be done when all small arms can concentrate their fire on this platoon. The attacker is then expected to clear one or two defence works and then work outwards from the flank of the enemy position so pierced. The depth locality is to be tackled afterwards.

ATTACK IN SKIRMISH ORDER

This method is an expansion of the patrol action and the drill advocated for destruction of a pill box. In war, we may or may not find a pill box all by itself but we will definitely find a series of them in mutually supporting defences. The enemy defences can be made of concrete pill boxes or field defences or both. The problem still is the same i.e. how to clear a series of mutually supporting defences in line and in depth.

The basic tactical problem in any Combat is ' How much fire can be brought to bear on the enemy". This is tactics in a nutshell, rest is all built around it. Commanders throughout history have tried to find formations which would bring the maximum strength of their weapons to bear at the decisive point. The heart of the matter thus is, how to arrange men, how to move them, or counter move them, so that their own ranks will have a lesser exposure, while their weapons are exploiting the greater vulnerability of the enemy ranks. This is theory.

In practice at the basic level, any defender can be expected to have 3 to 4 field defences per section and a platoon desirous of attacking it

with a 3 to 1 superiority must produce a section to each defence work which is likely to contain 2 to 4 men. Thus the superiority achieved is between 5 to 1 and 2 to 1 at the point of impact. Application of the principle of war 'Concentration of Force', at platoon level is not altogether ridiculous. The higher commander's planning of superiority of force is thus actually produced effectively on the point of attack all the way down. The basic level of section can be built up to any level, the answer is the same—an attacking a force level of one section per pill box/defence work and the total troops requirement is taken mathematically. Besides, the force level attacking a defence work, it is also essential that the attacking troops are so moved forward as to permit them to use their own precision shooting weapons effectively. Self reliance of the infantry does not stop at using its specialist weapons only.

MECHANICS OF AN ATTACK IN SKIRMISH ORDER

The way we are likely to fight a war, we may face two situations as follows :-

SITUATION A

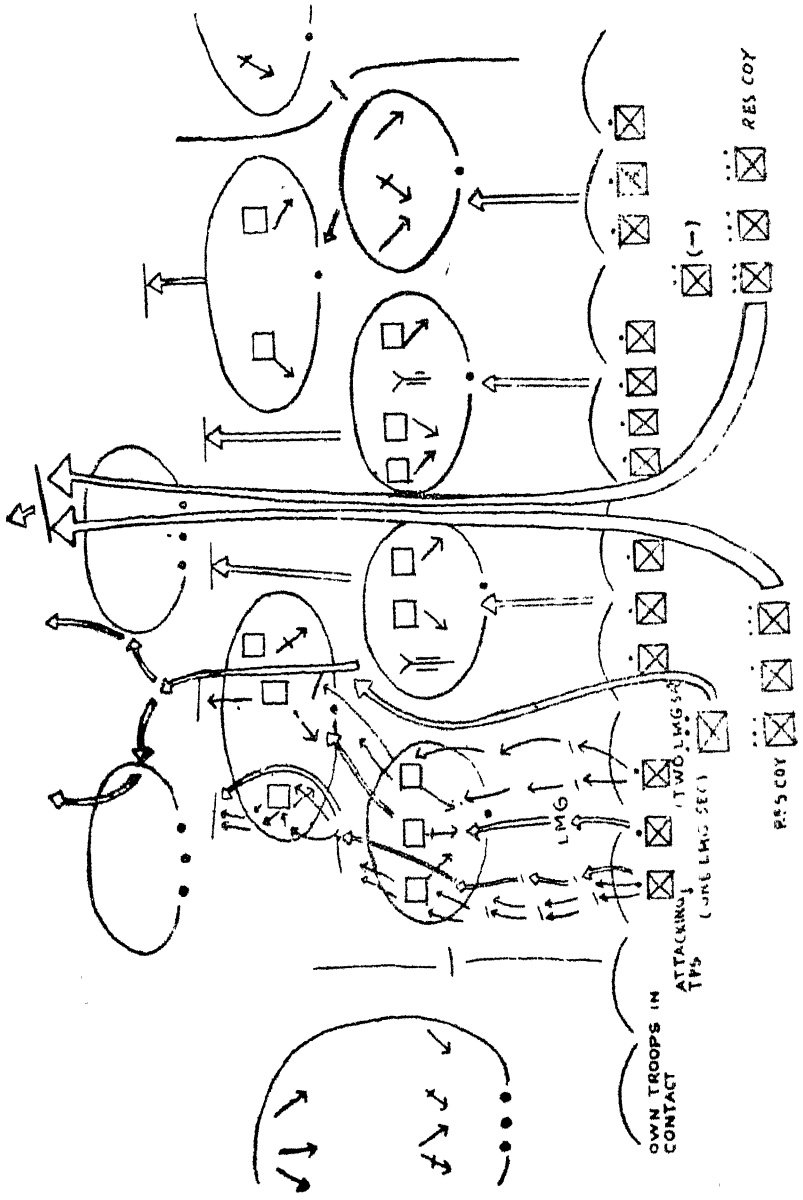
(a) Both forces are deployed in permanent defences or field defences at close quarters across the line of control. In this case both sides are expected to know the detailed layout of FDLs as each individual defence work can be and should have been surveyed and even eight figure grid references would be available. Thus the only possibility of unexpected location of any defence work can be in depth localities not under direct observation. This situation has been reflected in the sketch 'A'.

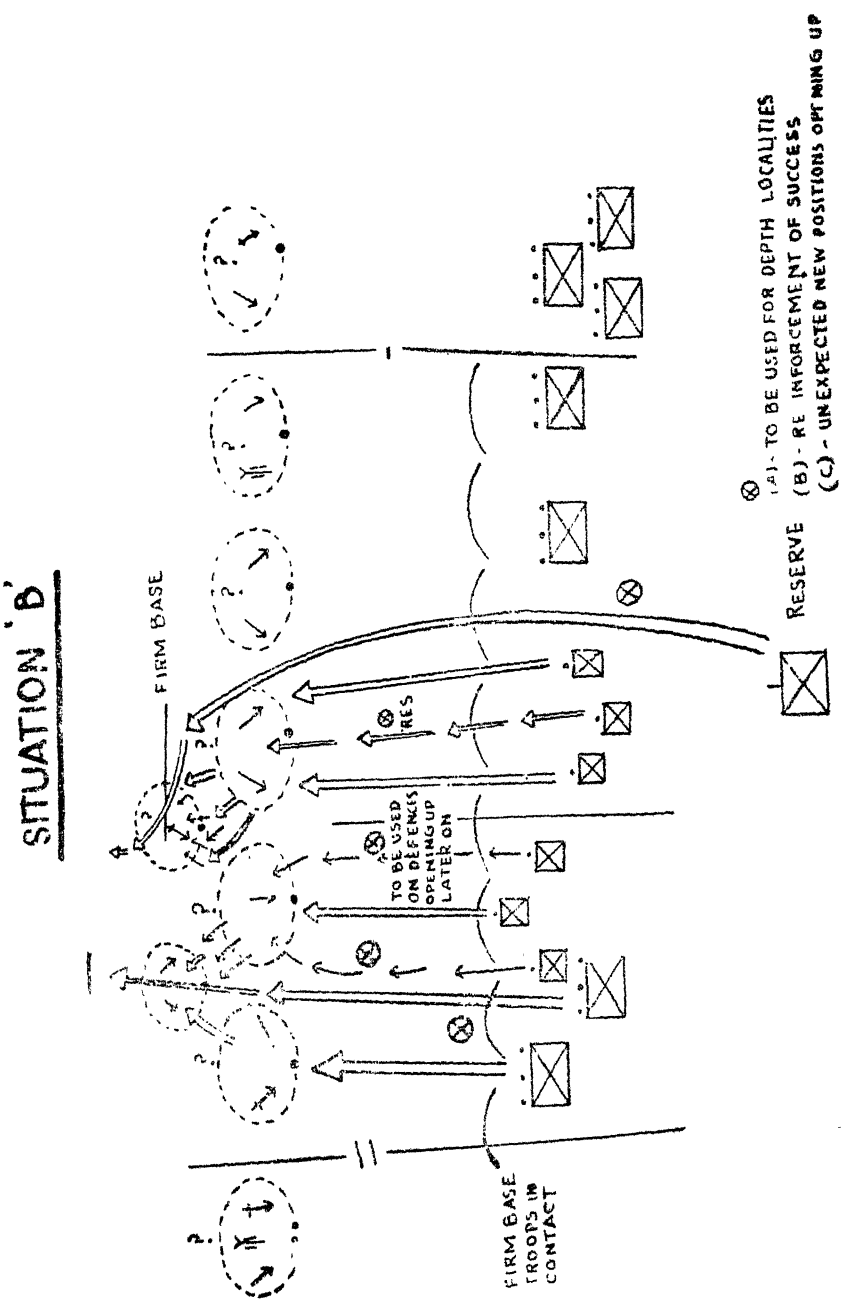
SITUATION B

(b) An attack is to be launched after an approach march of some distance on an objective where the enemy is located or is expected to be located and no details of his dispositions are available. The details of the enemy's dispositions will have to be found out by the attacker by various means he might employ. At best, after some time and effort has gone into it, the attacker can hope to know about 1/3 of the actual location of defence works only and the rest will have to be an assessment of the location of enemy's weapons and defences. Thus in any enemy company locality the attacker can be expected to definitely know the following :—

(i) MMGs	Out of possibly 4 deployed, at least 2.

SITUATION 'A'




SITUATION 'B'
FIRM BASE
RES
TO BE USED ON DEFENCES OPENING UP LATER ON
FIRM BASE TROOPS IN CONTACT
RESERVE
(A) - TO BE USED FOR DEPTH LOCALITIES
(B) - RE INFORCEMENT OF SUCCESS
(C) - UNEXPECTED NEW POSITIONS OPENING UP

(ii) LMGs	—	Out of possibly 18 deployed, at least 6.
(iii) Rifles	—	Out of those deployed, at least 10-12.
(iv) RCLs	—	Out of possibly 4 deployed, at least 2.

It will be noticed that a fair amount of intelligence assessment is to be carried out by the attacker before he makes out his plans. This assessment should give an approximate location of the enemy's platoons at least and some idea of how the sections would be deployed. This situation has been reflected in Sketch 'B'.

MECHANICS IN SITUATION 'A'

Individual defence works are given as objectives to each section. The platoon commander is required to tackle 3 defence works and any other in depth up to 30 to 40 yards, i.e. A section's defences.

Each section sub divides into three groups as per our present organisation based on one LMG. If there are two LMGs, then the section will sub divide into two equal sub-sections.

There is no formal forming up place as such. The troops are required to take up initial positions, in an area, square to their objectives, providing cover from view and from fire. From here individual sections take off directly on to their objective defence work by fire and movement between groups. The movement is by short hops and not long runs for ease of command and control. Depending on the ground, the entire sub groups may dash forward or they can move forward in ones and twos at the double. The other sub group moves forward only when the previous sub group is in position and ready to fire. This movement thus provides only snapshooting targets moving unpredictably and at high speeds for about 5 to 7 seconds at a time at varying ranges to the enemy.

If there is any known observation post or a listening post or a protective patrol enroute to the main defences, a special task force should be told off for this position and others are to carry on regardless of this operation. If an unknown position opens up, the company commander can utilise a reserve section or a section can be diverted by the platoon commander to eliminate it. Even the section on whose line of march this position is, can be asked to clear it in case required. The capability of such positions to interfere with the assaulting troops is nullified as there is a direct attack on these positions themselves and if these positions do fire elsewhere they will do so at their own cost. The same applies to a nest in

the minefield, whatever its strength as suitable task forces are detailed or diverted to eliminate them. The general effect is that of a body of flood water inundating an area.

The supporting group, i.e. the LMG group in a one LMG section, or one of the LMG groups in a two LMG section, eventually takes up a supporting position as near to the defences as possible depending on the ground. The distance is not vital, but the capability of producing precision fire into the loopholes is vital. Therefore, a good position with cover from view and from flat trajectory weapons is desirable.

The other group or groups then move forward by short hops, either by crawling or running forward, depending on the ground, and then detach two parties of 2 men each to approach the defence work from two different directions. Thus, the attacker has so far been firing at fixed targets but the defender has had to fire at small, highly mobile and unpredictable targets. Here we may recall the weapon training and firing practice that is usually imparted to the troops. It will be seen that maximum time is devoted to firing on fixed targets, even if we reduce the ranges by moving forward in some practices. A few advanced practices in the range course do cater for moving targets but only lateral movement is catered for. Pop up targets on a field firing range are only fixed snap shooting targets appearing at varying ranges. Thus troops are not trained to fire at snap shooting targets moving towards them at varying speeds and reducing ranges. Thus the attacker is using the skills he has consistently been taught but the defender is facing a situation he has never dealt with during his training. This will be vital in battle.

One or both the above parties then destroy the defence work with a Bangalore torpedo or pole charge or hand grenades and clear the defence work with the bayonet if necessary. They then move forward, take up fire positions and the rest of their group/groups join up. The LMG group left behind then joins up. Use of RCLs and RPGs has to be arranged by the platoon commander well before the troops reach the defence works if the terrain so permits. In the plains, RPGs must accompany the platoon for anti tank defence later. Long distance shooting of enemy tanks counter attacking will have to be catered for with missiles by the battalion or company commander till these and the RCL guns can be got across the minefields.

In case there is another defence work in the immediate vicinity of the attacking troops and which in any case should have by now opened up, it will be cleared by the most suitably placed section under the direction of the platoon commander.

After clearing the section, the platoon carries on in a similar manner to the depth locality without stopping. They are to clear the next line of

defence works, if possible, otherwise they should establish a fire support base from where precision fire is brought to bear on the loopholes. From here, the reserves will take over the destruction. The contact line is thus again very near the depth locality. This move precludes any use of these depth locality troops for any other task by the defender.

If the attack is on an enemy company, the depth platoon or platoons are already not available for counter attack or as firm bases for counter attack. The attacker is now spread out in a line behind cover from fire, very near the defences and from here he is in a position to upset a counter attack if launched due to precision shooting being brought to bear on the attacker. Each section of the attacker is still concentrating on individual defence works with precision shooting on loopholes and enemy movements within an arc of 15 to 20 years only. On the other hand, the two or three defenders in a defence work will be tackling the equivalents of figure 12 snap-shooting targets behind cover. In the larger context the defending company commander in the depth platoon area now sees at least 18 to 27 sections spread all over his frontage under cover and bringing down accurate small arms fire, depending on whether it is a two company attack or a three company attack.

MECHANICS IN SITUATION 'B'

Here the information is scanty. Therefore narrow platoon areas are allotted. The platoon leads off with one section each on known defence works, with one or two sections in depth following up by similar fire and movement. Whenever a new defence work opens up in the immediate vicinity of the leading section's objective, the platoon commander directs a depth section on to it from the line of march. Thus roughly speaking a platoon objective should be the immediate vicinity of each known automatic weapon defence work because the other defence works are bound to be nearby and are likely to open up later. The troops detailed as reserves moving up just behind the assaulting troops are to be detailed on the basis of the assessment of the enemy locations on that line of attack.

NIGHT ATTACK

Apparently it will be felt that night attacks will be difficult if not impossible with this method. But as this attack is suitable even in broad day light, at night we have an advantage over the present form, in that, even the attacker can team up with the defender to illuminate the battlefield. However, if we do not so team up, the drill can be modified to suit a night attack as follows :—

(a) Paint or blanco all web equipment white at the back and fix pencil torches facing downwards at the back. Thus, while lying down, walking or running this light will indicate own troops position to the

troops giving covering fire and the white web equipment can also be easily seen as a recognition sign. It must be remembered that the distances between the fire groups and the movement groups are not likely to be more than 40 to 50 yards or so when leap frogging forward. Thus the presence of a light indicates the location of own troops and the absence of it, the area where weapons can fire in support.

(b) Give detailed orders after a detailed binocular recce down to all troops taking part. The orders of section commanders should include appropriate areas suitable for firing positions.

(c) Initially troops should move in sub groups in single file but take positions at their respective fire positions and are ready to fire. This movement is to be at walking pace. The groups thus leap frog forward.

(d) On loss of surprise or on illumination, resume day method.

(e) Breaches in wire obstacles should be marked with shaded torches facing backwards.

(f) Tape should be laid to mark route through minefields where attacking troops have gone through.

(g) In case of Situation B, commanders of depth sections should be with the platoon commander, on whose orders they move off with their sections to their objectives once new defences open up. So should the depth platoon commanders be with the company commanders.

(h) A certain difficulty would be apparent in aiming and firing accurately at night. This can be resolved as follows :—

(i) *LMG.* A quarter inch wide white strip should be painted on the left side of the magazine just above the magazine way. A thin sticking plaster strip will also do. A strip of white bandage should be tied around the foresight protector. It should be of the same height as the protector. Aiming is to be done by aligning the white strip on the magazine, the top of right side of the whitened foresight protector and the target.

(ii) *Rifles.* A small strip of white sticking plaster should be pasted on the backsight so as to cover the top on the aperture and a white bandage should be tied around the foresight protector as for the LMG. The top of the backsight and top centre of the foresight bandage when aligned with the target, would result in correct aim.

(j) If the rifles and LMGs are fixed, aimed and then this method is tried out, it will be seen that the aim is correct. Further, this method of night aiming and firing has been tried out at a classification range on a dark night from 300 yards at figure 11 targets very very faintly illuminated from outside the butts by lanterns kept in pits. The result of firing of LMG from bipod and rifles without rest is roughly 1 hit in 5 to 6 shots by a reasonable firer. This is adequate for purpose of fire and movement.

TALKING

American war studies have indicated that talking to and amongst the attacking troops is the most vital binder for group cohesion. Silence means isolation, talking means integration. Thus talking should be encouraged both by day and by night. What it means is, troops should be encouraged to talk and let their immediate neighbours know what they themselves are doing or about to do or what they want the others to do, i.e. field talk rather than field signals. This might upset some of us as we are taught that silence helps in maintaining surprise. Yes, it does if we mean to ensure that the enemy does not come to know about our movement. However, is it possible that the enemy will not be expecting a quick or a deliberate attack after taking the general military picture into consideration ? After the war is declared, why should the enemy be defending any piece of ground ? Would he not know of the approach of a force likely to attack him ? If he does know, the conventional surprise is achieved by the size of the force, the direction and the timing of attack. Talking at night gives away the direction and possibly the timing but exaggerates strength. Since we want to upset the enemy commander's conduct of battle, reports of exaggerated strength help us do it, as it becomes even more difficult to differentiate between patrols, feints or actual attacks. We may recall our experiences of 1962 when Chinese were reported to have used Bugles and torches at night. As long as anything we do upsets the enemy's conduct of battle, it is useful and should be done. Bugle calls, torches and talking help the attacker in maintaining cohesion and control and at the same time confuse the enemy. Therefore, it is worth our while to use them whenever and wherever we can, if we require them, without any hang ups.

EXPLANATORY NOTES ON AN ATTACK IN SKIRMISH ORDER

FIRE SUPPORT BY ARTILLERY

At present artillery fire support is restricted to 200 yards from the objective. There is a basic lacuna in this i.e. we have a safety distance of 200 yards for troops standing up in the open and yet it is the same for troops in defence even though the defences might be concrete and shell proof. This should leave the area of 200 yards from the objective in which minefields are usually located, free from all artillery and mortar fire, own or hostile ! The defenders, however, do bring down fire closer to or even on their own defences. Thus hostile artillery can be expected to be active in these 200 yards. The skirmish order permits troops to move with little interference from the artillery fire as well as the fire of flat trajectory weapons right through their entire movement because maximum use of ground is being made, which provides cover to stationery targets

and the moving targets presented are small in size while moving at high speed. Wherever the DFs might be, this method ensures that at any one time not more than 8 to 10 men are within that area and that too either behind cover in lying position or running through. This does not present any worthwhile target even if the enemy sees it in broad day light. There can be a quick reaction to this statement that the whole divisional artillery can be concentrated here. It is worthwhile remembering the constraints on ammunition expenditure i.e. for how long can the artillery continue to fire on the target; will it be freed by the GOC for such a target; what about the other similar targets in the divisional sector, be they feints or real; how many authorised OPs are available in each battalion area and if they are not available, the time taken by the divisional artillery to respond to a request from a company commander as all others up the chain have to recommend it before the shoot is authorised. The only effective answer is air burst but by the time it is called, the situation is no longer the same. At the same time we must remember as to how many Variable Time fuses are available and whether the target is suitable ? Since there is no specific forming up place or Assembly area or any wait involved or even a reasonable target, therefore, even if the enemy sees the movement, his DFs are not likely to be fired except as moral support to him only.

This movement also tends to attract attention to individuals rather than the group. The troops in defences are also likely to be unable to see and observe the "Wood for the trees". This will, therefore, result in slower reporting and it is likely to be inaccurate because attention of all is being directed to specific individual movements rather than the general movement. What is more, even the reports made are likely to elicit disbelief and lack of proper response from higher ups, e.g. if a platoon commander reports that there is some movement in ones and twos all over his front and asks for a DF or asks for reinforcement, he is most likely to be asked how many enemy troops he has seen and where. At worst he might be termed jittery. This is so even when he is accurately reporting what he sees. If there is inaccurate reporting or exaggeration, the entire plan and conduct of battle will be upset by wrong reactions.

Control of artillery fire by attacking troops is difficult from a distant OP because individual positions of troops cannot be easily coordinated. Thus after a certain stage, all artillery fire must be controlled by attacking platoon commanders. At the same time depending on the ground, the attacking troops might be able to use artillery fire even nearer than the 200 yards safety distance. Radio sets ANPRC 25 would be required for the assaulting platoon commanders for this. By the same token even if there is no artillery support or very little of it, this method is still equally effective in neutralising the enemy's commanders and their plan of battle. including their fire plans.

FIRE CONTROL OF INFANTRY WEAPONS

The MMG and LMG numbers cannot find a suitable target as the pattern of the entire move presents snap shooting targets moving at very high speed in a zig zag manner. MMG, MAG 58 is in any case not suitable for spraying an area. Even if spraying is made possible, there is too much distance between these high speed snap shooting targets. Any firer can try it out on the range and see for himself what kind of a marksman he will make on such targets. Therefore, any casualties inflicted will be by luck and by God. At the same time this movement upsets the fire control completely as no coordinated orders can be given for opening of fire by single shot and automatic weapons, except for permission to fire on targets when and where seen, i.e. snapshooting.

When light infantry was equipped with very cumbersome and crude muskets, Marshal Saxe had computed the rate of fire of advancing light infantry as—"To cross three hundred yards will take 6 to 7 minutes. Light infantry can fire six shots a minute but in battle 4 shots a minute should be expected. Each man will consequently fire thirty shots during the advance. As there are seventy men in a company, two thousand shots will be fired." We have to ask ourselves, as to how many shots can one advancing company fire today with self loading rifles and other automatic weapons ? I will give some statistics. In the Second World War, approximately 400 companies were interviewed immediately after battles in the Pacific and European theatres. Whereas all commanders felt that everyone had at one time or another used his weapons in attack, the truth was that not more than 15 per cent had factually fired at the enemy positions or personnel, with rifles, carbines, grenades, bazookas, LMGs and MMGs during the course of the entire engagement. Taking casualties into account, it was felt that not more than 25 percent had used their weapons. This was so, in conditions where at least 80 percent should have fired, and this was the best showing of any aggressive commander; only one in four had used their weapons. Yet these were decisive actions and not casual engagement. It is only in Korea that the US Army could increase this to 50 per cent men firing, after changing their training system based on this study. Even this is a sobering thought.

In skirmish order, the attacking troops use their weapons to move up and provide intimate fire support of precision variety by the automatics and rifles from ever closer distances on an 'as required' basis as a planned measure. No ad hoc measures need to be resorted to, as at present one has to do, when the attack bogs down. There is no future in a spoiling attack as the entire frontage is being swept clear.

MINEFIELDS

Minefields pose the same problem as in the present form of attack, yet the density does not have the same effect as in an extended line

attack. However, since attacking troops have to take positions even in the minefields, the area in contact with the ground is more i.e. a full body instead of the two feet. This might apparently result in more casualties but needs a trial with a minefield laid with pressure switches in place of mines. However, it must be remembered that men will be taking positions in any suitable depression or behind some cover. Shell holes are not only free of mines but are also suitable for this. A deliberate shelling of the minefield area by medium guns can provide mine-free fire positions to the attacker. In a variant of the attack pattern at night, the troops cross the minefield in single file by platoons. This method avoids the larger casualties which would occur in the extended line. However, we must compare this method with the one proposed in a night environment when the enemy has illuminated the battlefield and for the purposes of comparison we should accept the premise that the enemy has now spotted the troops in the open. It will be seen that in the present form the troops are vulnerable to artillery and MMG fire if they stand still and if they scatter or take position they are taking lying position in or running through a minefield. On top of this, they are reacting to a situation created by the defender and loss of control is likely if they move or take positions. In the proposed pattern, only half the troops taking part are moving at any one time, thus only they can be spotted. Then the movement is in sections and not platoons, thus the enemy has to spot a large number of groups consisting of 3 to 4 men. These do not produce an artillery target and are less vulnerable to MMG fire. If they lie down or take position or even run, these troops are acting as per a rehearsed plan. Thus there is nothing ad hoc about this. On the other hand, all movement forward is purposeful and it will not result in any confusion or lack of control. As far as the defender is concerned, his assessment and reporting is likely to be more accurate if we use the present form of attack then what it is likely to be if we use the proposed method.

MORALE

This movement and attack has been tested from the defender's angle. The troops were required to aim and fire their weapons as is done in limbring up and were to report their assessment of probable hits and the effectiveness of their fire. The commanders were asked to 'fight' a defensive battle. They fully appreciated the difficulties of the defender in assessing the strength of the attacker, and most important, in aiming and firing accurately on the attacking troops. The troops prefer this method to the older one. The age old attacker's problem of getting the troops to rise up again in attack formation once they have gone to the ground, no longer exists, because the superiority of this technique as felt by the

troops themselves is a morale booster particularly due to the difficulties of the defender. Since everyone knows what the other is doing or is likely to be doing at any particular time, there is no loss of contact or communication and the attack does not bog down. Field talk, as suggested earlier, helps in retaining contact and communication between the men. Similarly, since they know that the enemy's artillery fire is less eflective and his commanders are likely to be somewhat helpless and that the fire of flat trajectory weapons is less effective, the attacking troops show more elan in attack. One typical reaction of a spectator cum participant was "This is not war, this is cheating the enemy."

There is far more intimate fire support available to the attacker than in the present form of attack because the real close buddies within the section help each other move forward and the commitment to the task in hand is more than in the present form of attack. The motivation is superior as it is based on a man helping his immediate circle of friends i.e. a section and no call is being made on higher ideals.

Command and Control

The attacker has to ensure that all commanders of sub units or groups must move ahead, well ahead, as in days of old so that unexpected situations can be tackled and own supporting fire can be controlled. There can be no "Go and do it." It has to be "Follow me" at all levels.

Use of Reserves

For the use of reserves in attack, we must resolve a conceptual conflict i.e. who is to use the reserves—every one or the commander whose battle it is. At present all commanders from platoon upwards have a reserve of some kind. Thus troops in line are reduced. This is so, as each one has a task and he is told to get on with it, the responsibility in all its aspects being his. I am aware that platoons and companies have depth and not reserve. But this depth is used to overcome opposition which the troops in front cannot tackle. Thus in simplistic terms this depth is another term for a reserve which is moving forward and is readily available at the expense of the frontage i.e. a company has a frontage of four sections with two sections in immediate depth and three more further in depth or reserve. The difference is in semantics.

Now let us take another scenario. The highest commander fighting a battle takes on this responsibility of using reserves and fights it as his own battle and is himself responsible for the results of the battle. Usually in a deliberate battle it will be the brigade or the battalion commander. In this case the commander of a brigade or a battalion can now have much more troops in line, and a solid reserve to use in an area

of success but he has to accept partial failure elsewhere on his own shoulders, the subordinates are not blamed for it. The idea is that the success or failure is that of the entire force taking part and not its components individually. What is applicable at higher level, "Lose the battles and win the war" applies here. Do we want in a Brigade battle for example, that an odd battalion may lose a 'battle' but the brigade wins the 'war' ? If we do so, then maximum reserves must be held by the commander whose 'war' it is and not distributed mathematically all over with very little central reserve. At present each battalion commander has two companies in reserve and the Brigade Commander keeps the subsequent phase troops in reserve finally ending up with one or two companies. If we accept a change in concept, he could well expect the battalion to be fully committed with almost no reserve but use a complete battalion as a brigade reserve to exploit success only.

In skirmish order, the above system can be very usefully employed in situation A. However, in situation B, apparently this may not appear feasible, yet it is. The attack still goes in with the full force as in situation A but its components keep coming into action as the enemy keeps opening up from so far unknown positions in each sub unit commander's area of the objective.

Assessment and Reaction

As the attention of every one is perforce attracted to specific individual movement, it becomes more and more difficult to judge the over all strength of attacking troops. This is very evident during day and it is sure to be much worse at night as night illumination devices and night vision devices will not be able to cope with it due to shortage of time of illumination and too much of movement in small groups. Surely, if the eye gets deceived during day even the most sensitive radar cannot be more efficient at night. The assessment is thus more than likely to be inaccurate i.e. either more or less, particularly due to other self evident battle psychology factors.

In order to react to an attack, either by reinforcement or by counter attack, the defending commander must know the exact situation on the ground. This, as has been brought out earlier, is difficult due to a more than likely wrong assessment of strength and difficulty in knowing exactly where the enemy is and in what strength. Depth localities would come in contact much faster as those troops who have cleared the defences will continue to move forward and not stop till at least contact is established with localities in depth which they cannot clear. The expanding torrent concept of high command terminology is equally applicable here. No mopping up is necessary if the positions are known as in Situation A as every

position is being tackled. In case they are not known as in Situation B, 'task' forces have to keep getting detached to tackle any defences which come alive during battle. The other troops keep by-passing positions being tackled. Thus there is more momentum to the attack and the enemy gets very little reaction time. The rate of advance in skirmish order is roughly 100 yards in 4 to 5 minutes during day. It is almost the same at night.

It will be seen that an attack in skirmish order achieves the disintegration of the enemy's plan of battle and upsets his conduct of battle with minimum loss to the attacker. What is more, it also does so in broad day light even if the 'defender' is permitted freedom from artillery fire. This will upset some well established notions. In practice, I tried this method against the best type of defensive layout possible in broad day light to a gathering of selected officers when hand picked and experienced officers were formed into a syndicate and asked to conduct a defensive battle against it. The rest of the spectators were permitted to advise the syndicate. The attack was launched. It was interesting to note that the assessment in one case was three times the actual strength and in another it was 50 per cent of the attacking troops. In no case was it anything like accurate. In one case, no artillery fire was called for and no MMGs or LMGs were specifically ordered to open fire throughout by the defender and in another case, the fire orders given were "*Fire when you see the enemy, but do not fire too much*". This was without there being any artillery fire or even smoke on the defender and there was very little pressure on the battalion and company commander in the syndicate—from the brigade and divisional commander to find out what was happening.

This method has also been tried out practically. The defenders knew that the attack would come from the direction from which it came, they knew the strength of the attackers and lastly the defenders themselves had to decide the success or failure of the attack. Answer—the entire defending company down to sepoys conceded defeat.

CONCLUSION

What has been proposed is nothing new. This method has been used before in war throughout history. It does require initiative in the junior leaders and the jawans. It does require a lot of training but then what technique does not require training or initiative. In this method, we do tell everyone what is expected of him and what he can expect from his comrades. We also tell him the limitations of the enemy and how these are being exploited. Having made known this, we expect courage from all of them. However, we do not hope that some brave person will get the attack going again if things go wrong. These eventualities have been planned and catered for.

It must be remembered that in the ultimate analysis, at company level, there is nothing known as a flanking attack or an attack from

the rear. They are all frontal attacks against the enemy in varying strength facing them, no matter from which direction the attack is mounted. This is so, because of all round defence layout.

This method lends itself to a frontal attack from any direction with no loss in effectiveness. The conventional approaches and their limitations, as we understand them, also do not apply to this form of attack. It suits any approach, any ground, any cover or lack of it and any enemy dispositions even with little artillery fire support if so necessitated by battle conditions.

It does require junior leadership of a high order, properly motivated to lead from the front. But we must bear in mind that these requirements are imperative for the present forms of attack also. The casualty rate of junior leaders will, of course, be probably higher than today. This we should be able to accept. As a matter of general interest and comparison, it is worthwhile noting that in the Israeli Army each casualty is treated as a national loss. Every one killed in action, officer or other rank, gets an obituary notice in a newspaper with photograph and write up. Yet in this country, their officers casualties are about 50 per cent of the total casualties in war and this is acceptable to them.

This method can be used by infantry alone, or by infantry and engineer or infantry and armour partnership in any environment, be it plains, hills, desert or against a ditch cum bund or canal, albeit with some modifications in the drills.

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Modern Arms for Defence Forces-1
Anti-Tank Guided Systems

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Introduction

THE October War of 1973 between Arabs and Israelis had several new features in tank warfare. Anti-tank weapons were used in very large numbers against tank targets on both sides. Egyptians used Soviet Sagger AT-3 wire guided missile and RP 67 small unguided rockets against tanks while Israelis made use of American TOW missiles, S-11s and Cobras. The extent of the use of these missiles (estimated to be 55 A/Tk missiles per Km front) can be gauged by the large losses of tanks in the War. Egypt lost 895 tanks, Syria 880 tanks while Israelis lost 850 tanks on two fronts. This speaks of the intensity of armour battles in the 18 days war. An observation by an Israeli tank Commander who saw the slaughter of his tanks by Egyptians infantry weapons was pertinent. One out of every three infantry soldiers he felt was issued with an anti-tank missile. As to the effectiveness of the anti-tank missiles, an independent analysis (*Av. Week & Sp. Tech.* Oct 15, 1973) attributed the majority of 550 Israeli tanks losses in the first week to ATGWs.

Superiority of ATGWs

The anti-tank weapons normally available to the troops have very short range. The range and the time available to shoot a moving tank on an average battle speed is shown in Table No. 1.

Table 1
Range of Anti-Tank Weapons

Weapons	Eff. Range in yds.	Time available to shoot a moving tank at battle speed (in seconds)
Tank Grenade	80	8
3.5-in RL	150	15
57 mm RCL	800	80
6 pr A/Tk Gun	800	80
104 mm RCL	1500	150
Tank Guns	1000-1500	100-150

The anti-tank missile has a range of 2 to 3 Kms and has an advantage over all anti-tank weapons of Table 1 above when operated from the ground or from a soft vehicle. This is further shown in Fig. 1, where the hit probability as achieved by an average operator after training has been plotted against the range. When targets appear beyond 2 Kms range, the anti-tank missile is superior to tank fire even for most modern tanks.

HIT PROBABILITY OF A TANK Vs ATGM

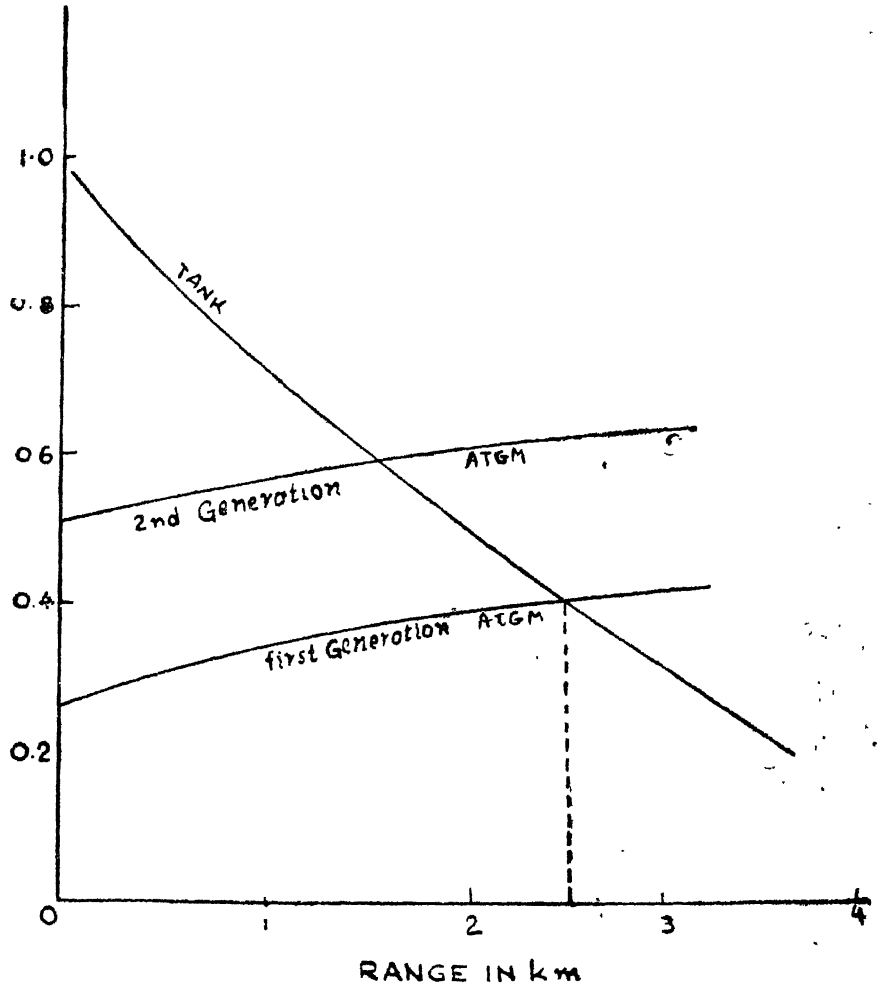

Fig. 1. Hit Probability of ATGMs Vs Range.

WARHEAD IN ATGM

The warhead in a normal ATGM is a conventional heat round or hollow charge which on impact on the target transforms into a powerful

jet capable of boring a hole into the most powerful armour. Armour piercing capability of a HEAT round depends on the precision of manufacture of this ammunition. Armour penetration at optimum stand-off distance of about 4.5 to 5.5 times the charge cone diameter are easily attainable. The thickness of armour of tanks since 1930 is shown in Fig. 2 and the capability of tank ammunition to penetrate the armour is shown in Fig. 3 including that of HEAT round which is able to bore hole in 600 mm thick armour plates. It is for this reason that HEAT rounds are used in ATGMs. The newly developed APFSDS (Armour Piercing Fin Stabilised Discarding Sabot) by RARDE, UK is reported to be more effective at ranges of 2000 m and above as compared to other types of ammunition. However, this ammunition is not suited for use in ATGM.

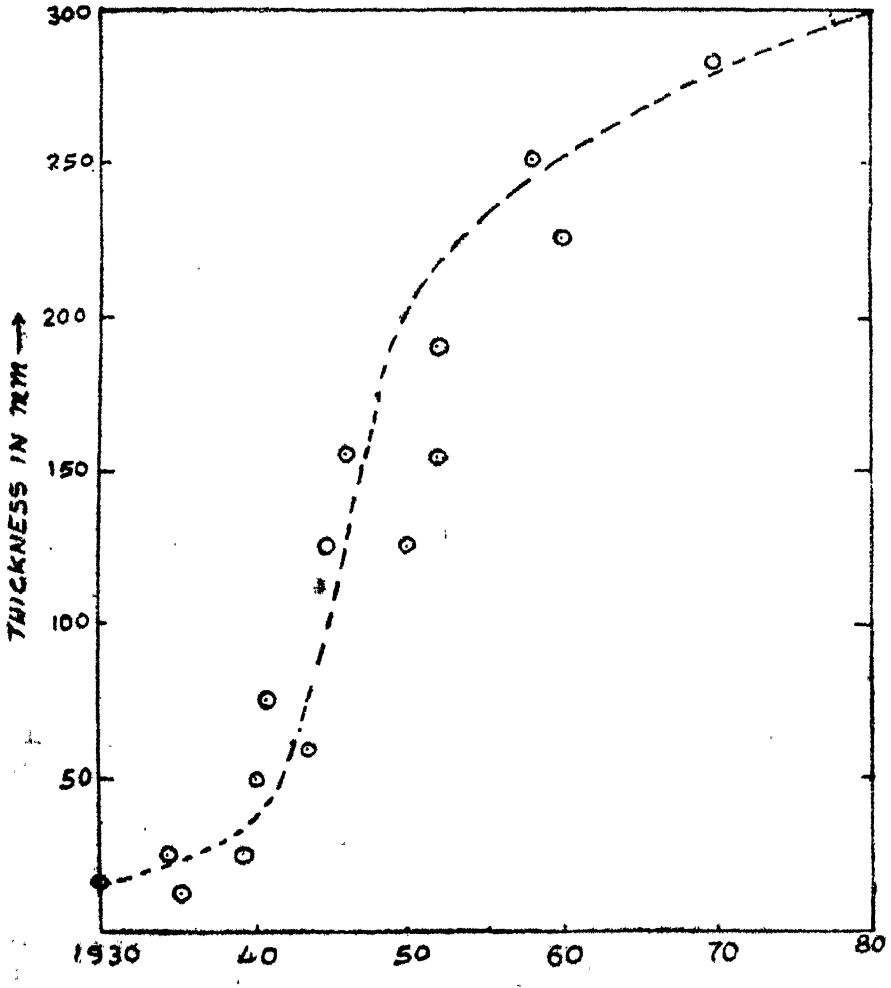

Fig. 2. Growth in Armour Protection of Tanks.

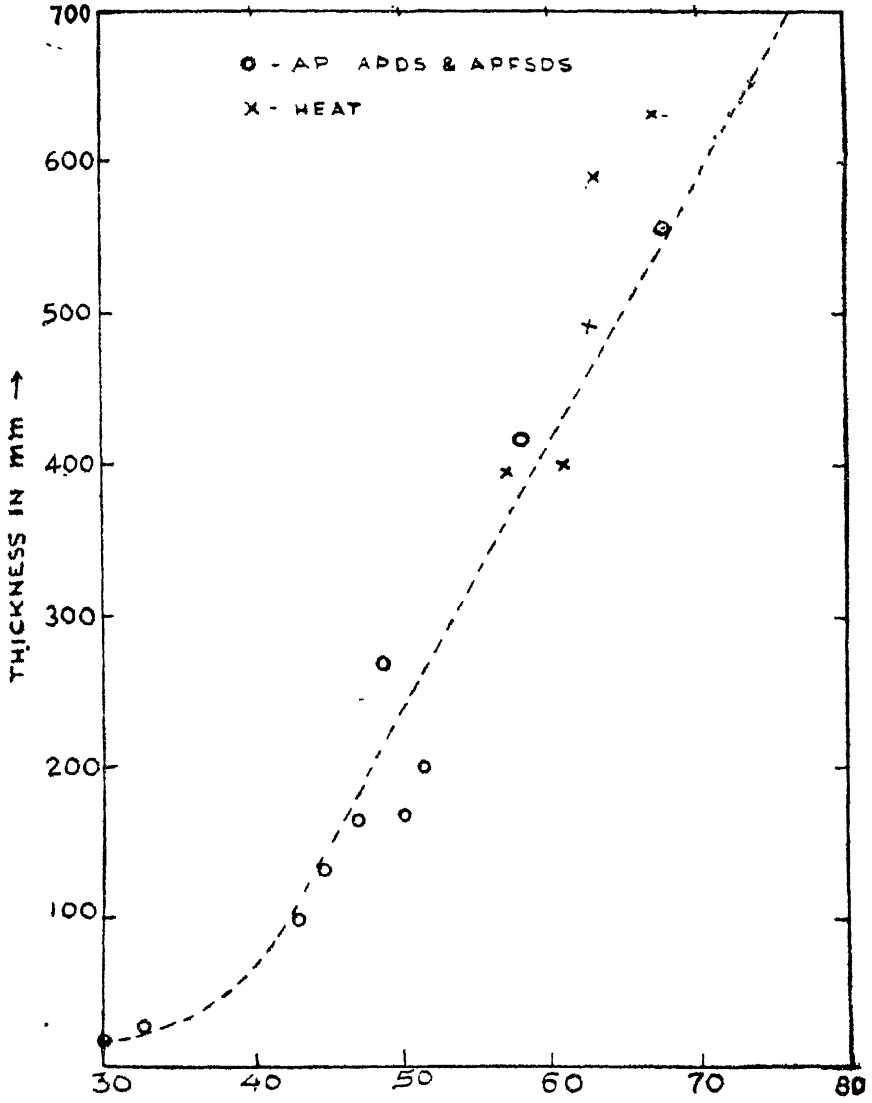

Fig. 3. Armour-piercing capability of Tank Guns at Normal Impact of 500 Metres.

CHOBHAM ARMOUR

A variable sandwitch of several materials like steel, ceramics and aluminium has been developed by RARDE UK called Chobham armour. This is being used on Chieftain tank which is being redesigned as SHIR IRAN (*Def. Rev.* Aug 76). The armour may consist of an energy-absorbant material possibly aluminium by a variable thickness of ceramics behind the steel plates. This armour is likely to give better protection

on tanks of the same weight. However, an appropriate heat round of proper calibre and design would be able to penetrate and bore hole in the armour.

FIRST GENERATION ATGM SYSTEMS

Some selected ATGMs developed in the Post-war years and which are in current use are shown in the Table 2 below :

TABLE 2

Surface-to-Surface ATGM in Operation in 1970s

Designation	Min./Max. range (m)	Wt. of round Kg.	Guidance	Remarks
Cobra	400/2000	10.3	Manual Command	No connection with the American AH-1Q Cobra helicopter.
Entac	400/2000	12	Manual Command	Production completed 13,000 produced.
SS-11/AS-11	350/3000	29.9	Manual Command	Anti-submarine version for helicopters, 1,60,000 produced.
Swingfire	150/4000	34	Manual Command +aids	Operator can be offset 100 m.
Snapper AT-1	500/2300	22.25	Manual Command	Used in several Pact armies. Mounts on BRDM. Armoured reconnaissance veh.
Swatter AT-2	2500	About 20	Manual Command	Mounts on APC & BRDM Reconnaissance vehicle.
Sagger AT-3	500/3000	11	Manual Command	Mounts on APC and BRDM Reconnaissance vehicle (which carries 6 under a retractable plates).

The first generation ATGMs have been slow mostly in 80-100 m per sec. speed bracket, with the result that targets at battle ranges can spot missiles in flight and escape or take cover. They can even take evasive action or put up Smoke Screen. These systems have been bulky with a high minimum range. The range estimation has also been poor and degradation in battle very fast. The use of Cobra in Indo-Pak War

of 1965 is an example. Although quite a few missiles were fired, the system failed to hit any targets.

Defence R&D started development of a first generation ATGM in the post-war years after 1965. Many teething troubles had to be resolved in designing the motor and the guidance system. The wire which unreels itself as the missile is guided to the target by the manipulation of the joystick, presented several difficulties which took time. Although the prototype of the missile was made and successfully fired, it was given up because, the range of the weapon was not considered adequate for operational use. The Ministry decided to purchase French produced SS-11 System which has a maximum range of 3000 m and can be operated from ground, a soft vehicle, a tank and a helicopter. The system is also now being produced indigenously at Bharat Dynamics Limited.

The greatest weakness of the first generation systems is the limitation of the human operator in aiming and landing the missile on the target. He sees the target either visually or through a telescope. The displacement of the missile from the line of sight of the target is appreciated visually. The correction by moving a joystick has to be provided manually. Between these two, there is a lag of 0.5 secs. Further the operator observes angular errors and he has to translate it into a linear error for necessary control. This requires intensive judgement and training, that is why there is a lot of rejection of the ATGM operators during training. These limitations have been overcome to a great extent in the semi automatic versions.

Second Generation ATGMs

The second generation ATGMs are the semi-automatic type. The systems available are given in the Table on the next page.

The semi-automatic type of ATGM are the 2nd generation systems where the operator tracks the target and the missile is tracked automatically. The operator has to use an optical sight for locating the target, when the missile is launched. The infra-red light of the tracer flares which are at the back of the missile, is detected by a precision goniometer which is associated with the optical sight and has a reference axis which is parallel to the optical axis. Any displacement of the missile from the optical axis gives rise to an angular error signal which is used as a measure of the linear departure of the missile from line of sight knowing the range and the flight characteristics of the missile. This measure is then used to generate the necessary command signals for correcting the missile whose flight is controlled by means of jet vane system. To operate the system, all the operator has to do is to aim carefully at the target, launch the missile and maintain the crosswires of his optical sight on the target steadily during the missile's flight. In this process, the great advantage is the

TABLE 3

Selected ATGMs of Late 1970s For Anti-Armour Use

Designation	Min/Max. Range(m)	Wt. of round (kg)	Guidance	Remarks
SS-12/AS-12	800/6000	76	Semi-automatic	Anti-submarine version for helicopters 8000 max. range.
HOT	75/4000	23	Semi-automatic Command	May be used in light helicopters.
Milan	25/2000	6-7	Semi-automatic Command	Two-man crew. Inf. Use.
Shillelagh MGM-51C	NA	27	Semi-automatic Command. Infrared link	Fired from 152mm gun mounted on the M-551 Sheridan or M-60A2 medium tank.
TOW BGM-71A	65/3750	19	Semi-automatic Command	Many carriers, but M-113 APC and AH-1Q Cobra predominate in US Army.
Dragon M-47	NA/1000	6.35	Semi-automatic Command	Man-portable

quickness with which the missile is gathered on to the line of sight. This gives the system a good short range performance.

Systems like 'HOT' and 'MILAN' incorporate a semi-automatic guidance system. In one of the comparative trials between UK and Franco German ATGMs, the Assistant Chief of General Staff (Operation) UK remarked "It is in terms of speed of engagement and user confidence.....that the semi-automatic systems stand out way ahead of Hawkswing".

ATGM FOR INFANTRY ROLE

The Arab Israeli War has established the importance of ATGM in the hands of infantry in preventing the armour from overwhelming it. Assuming that at least one third of the Israeli tank losses in Senai might be due to ATGM attack and that the hit probability of the Soviet ATMs was approx. 0.5, (of this class) it is estimated that nearly 1200 anti-tank missiles have been used in Senai warfare alone. Those on the Syrian front were perhaps even more. Thus with proper deployment of ATGM, in infantry role, it is possible to blunt the armour thrust.

Tanks in future also need not overwhelm infantry operating from ground or from APC provided it is epuipped with ATGM with as short a minimum range as possible.

Manportable ATGM become good deterrents for small Defence groups guarding an important sector, bridge or a mine field. It should also be possible to deploy a large number of missiles and achieve a higher degree of mobility in defence by using helicopters to transport anti-tank teams equipped with manportable ATGM like Milan. Such contingencies as possible Chinese threat of armour in a Ladhak in 1962 operations where we had to airlift AMX-13 tanks can be taken care of ATGM units in future.

Minimum Range of ATGM for Infantry Role

For infantry operations the minimum range of ATGM is very important. In 1965 operations most of the tank battles were fought in 600--1000 yd range. Due to standing crops, manmade and natural obstacles, a significant portion of tank targets in battles appeared at shorter ranges. This figure was as high as 75 to 85% and could even be higher in special deployments. An ATGM with a minimum range of 25 to 50 m is a powerful weapon in the hands of the infantry to blunt the armour attack. Infantry operation can be well concealed on the ground against tank attack. It happened in 1965 operations.

The 3rd Generation ATGM Systems

The 3rd generation ATGMs are laser guided. These systems can be gun launched. A system of this class is ACRA (Anti-Char Rapide). The missile is cylindrical in shape and has four narrow-chord flip out folding tail-fins for guidance and four small anti-roll fins for stabilisation. Being gun launched the calibre is 142 mm. The gun launch gives the missile a high initial velocity of 150 m/sec., while in flight the sustainer enables it to achieve a speed of 500 m/sec (1800 km/h). Thus the time of flight to 3 kms range is less than 7 sec. The missile is guided along a director beam emitted by a laser. The beam is held on the target and the target is held on the cross wires of the sight. The command signals are generated much in the same way as in the semi-guided versions.

The ground equipment of this class of missile consists of the laser emitter working on a wavelength of 1.06 micron, the beam modulation device, laser cooling systems, power unit and servo unit. The system can be operated from a tank or a helicopter also. This class of missile is extremely complex and costly. The laser propogation is affected with the pollluents in the atmosphere, like dust, vapour, moisture, haze and smoke. The scattering of the laser beam depends upon the particle size of impurity.

The cost of a single round of 3rd generation system with a range of 4 kms would be 5 to 10 times of a semi-guided 2nd generation system and the research and development cost would run in several crores.

Before embarking on the development of 3rd generation laser guided ATGM, of 4 kms range, it is quite pertinent to ask whether such a system is needed in the light of the threat as appreciated in the immediate or distant future and whether the degree of sophistication in such systems can be absorbed and worked by the type of crew/ trained men normally available in the Services. Also whether battle ranges of 3 to 4 kms are available in the likely areas of future warfare ?

Operational Parameters

The type of tanks in operation in our neighbouring countries are such that in the next few years they are likely to be obsolete if not declared already. This is because of their age, and obsolescence of technology. Pattons are of 1950 origin and T-54, T-59, and T-55 were introduced in Service in 1952, 1960 and 1961 in the countries of their origin. They would require refurbishing as Israelies have done by replacing the Sherman and Patton guns with 105 mm or engine or both. The refurbished tanks will also be easily penetrated by the HEAT rounds of the ATGM of the 1st and 2nd generation class. It is unlikely that any super tank with undefeatable armour thickness can be introduced in neighbouring countries in the next decade.

The operational ranges in which most of the tanks battles have taken place in 1963 and 1971 wars have been 600 to 1000 m only. The normal line of sight range in the plains of Punjab and North does not exceed 2000 m due to natural terrain and man-made obstacles. This considerably reduces when crops are standing in the fields. Even in the deserts of Rajasthan ranges of 3 km are available for a very small percentage of time. Thus an ATGM of 4 km range cannot be used for its optimum performance both on the Western and Northern borders.

The crew selection and training for operation is quite important. The selection for operators is undertaken from the class and strata of society available for 'Jawan's' recruitment in the Army. The rejection at various aptitude levels and at the initial training period is high. The recruits have to undergo an intensive skilled training followed by training on simulators. They are then given training on practice missiles followed by firing on live rounds. Each year certain number of missiles have to be fired to keep the old hands in trim. Thus on an average the annual training cost per regiment of ATGM operators runs into several lakhs and this will considerably increase in case 3rd generation systems are introduced. Firing of live rounds would further add to the costs.

Scenario of Tank Battles

Refurbishing of old tanks with 105 mm gun can inject a lot of fire power at longer ranges than experienced in 1965 and 1971 operations. Engine replacement in Pattons can further improve the mobility. Thus tank battles of future are expected to be highly mobile with increased fire power at longer ranges. The forward edge of battle (FEB) is determined normally by the tank gun range and the target availability depending upon the terrain and other environmental conditions. An analysis of the tank casualties shown in Table 4 reveals that 70% tank casualties have been in ranges below 1000 m and that only 12% were confined in ranges 1500-2000 m. With the introduction of 105 mm tank gun and the ATGM in future wars, the FEB is likely to be pushed to 2500 m for operational planning for the next decade in Indian Sub-continent.

Table 4

The Percentage of Hits at various Ranges by Anti-Tank Weapons in Indo-Pak Wars

Estimated Range (m)	% of Tanks Hit	Cumulative %
200	14.5	14.5
200-600	15.4	29.9
600-1000	41.2	71.1
1000-1400	14.4	86.5
1400-2000	12.2	98.7

ATGM On Mounts

ATGMs have been mounted on soft vehicles, APC and on tanks. A few of the known systems that are in service are as follows ;

(a) Swatter AT-2 on BRDM Reconnaissance vehicle ;
(b) TOW BGM-71A on M-113 APC ;
(c) Swingfire on FV 438 Armoured Car.

SS-11B1 has also been used on soft vehicles as well as on light tanks. In the latter case the missiles were mounted externally on a moving rail. Fitting a missile on to an existing tank with normal tank gun on it has not been very successful. Mounting of ATGM on armoured vehicles definitely solves the problems of crew protection and provides flexibility to the system for operating under enemy shellings. But the constraints

on the line of sight in terms of obscurity and terrain shielding still affect the acquisition of target at FEB. Clear visibility and an uninterrupted line of sight upto 3 km or more is not attainable in our terrain conditions when ATGM is mounted on an armoured vehicle. This leads to think whether operation of ATGM can be maximised by mounting it on a helicopter.

ATGM ON HELICOPTER

The line of sight range on target rapidly increases as the height of the hovering helicopter rises above the ground. It is possible to estimate the probability of getting the increased line of sight in any terrain conditions and environmental situations. A randomised approach can be through a process of simulation in a given situation. Some results of an exercise carried out are shown in Table 5.

TABLE 5

Line of Sight Probability for Operator Located At 1.7 m and at a Height of 20 m

L-O-S Range Km	L-O-S Probability (P_L)	
	Operator Ht 1.7 m	Operator HT 20 m
1.0	0.31	0.80
1.5	0.08	0.75
2.0	0.05	0.70
2 5	0.03	0.50
3.0	0.01	0.20
3.5	NA	0.10

TARGET EXPOSURE FACTOR

Terrain restricts the time available for a weapon to deliver fire on a moving target once it is in the open and detected. However, ATGM when operated from a helicopter overcomes the terrain obscuration and the target exposure to the weapon increases. Target exposure factor in a tank battle simulation has been estimated. The attacking forces selected their routes of advance under assumption that defenders ATGM locations were known. The attackers used cross-country mobility and terrain masking to maximise concealment and minimise losses. The probability of tank target exposed for a particular duration of time while moving with a specified speed has been determined. This is shown in Table 6. The exposure time is found to be independent of the range.

TABLE 6

Probability of Exposure of Tank Target on the Move

Length of exposure in secs	Prob. of exposure (P_E) on the move	
	10 mph	20 mph
12	1.00	0.95
24	1.00	0.80
36	0.85	0.58
48	0.75	0.40
60	0.65	0.35

TARGET AVAILABILITY

The target availability for a particular duration can be estimated by multiplying the probability of that range being available in a given terrain as given in Table 5, multiplied by the probability of exposure of the target as listed in Table 6 for a given speed of the targets. As the L-O-S probability increases by putting the operator on the helicopter the target availability at higher ranges is much better for helicopter operation than when ATGM is operated from ground or from the body of APC, tank or a soft vehicle. Thus mounting ATGM on helicopter gives better ability to intercept tank targets at higher ranges and at forward edge of battle in actual operations.

TARGET KILL FACTOR

The target kill factor is estimated for different ranges for targets moving at different speeds, in the battlefield. At any particular range the kill probability is

$P_K = P_L \times P_E \times P_H$ (n)

P_K = Prob. of a target kill at a given range

P_L = Prob. of line of sight at that range

P_E = Prob. of target exposure at that range for a given speed of the target

P_H(n) = Cumulative prob. of hit of n missiles fired from launchers.

It is assumed that more than one ATGM can be fired form a launcher or several launchers. The missile firing time being only 10-12 secs and atleast 4 to 6 missiles are carried in each launcher be it, a tank, a helicopter, APC or soft vehicle. The target kill factor is $P_K \times 100$.

Effectiveness of Helicopter Mount

It is possible to compare the effectiveness of helicopter mounted ATGM in a tank battle. The target availability is higher at higher ranges because of higher probability of the line of sight above the natural man-made obstacles and dust in battlefields. The probability of the time of exposure is independent of the range. Thus if the same ATGM was mounted on APC/Tank and was also put on a stabilised platform on a helicopter, the target availability will increase for the same range thereby increasing the target kill and effectiveness of the system. The combat effectiveness ratio of the ATGM in the elevated mode to the ground based mode for a moving target at a given range can be as high as 8 to 10 and will vary with the range. A similar result has been observed in a combined US/Canadian/German exercise with TOW missile fitted over HUEY COBRA Helicopter pitted against Leopard tanks.

Cost-Effectiveness of ATGM Mounts

The cost-effectiveness of ATGM has been investigated for cost of systems at 1971 price. The results are shown in Fig. 4. The ATGM on

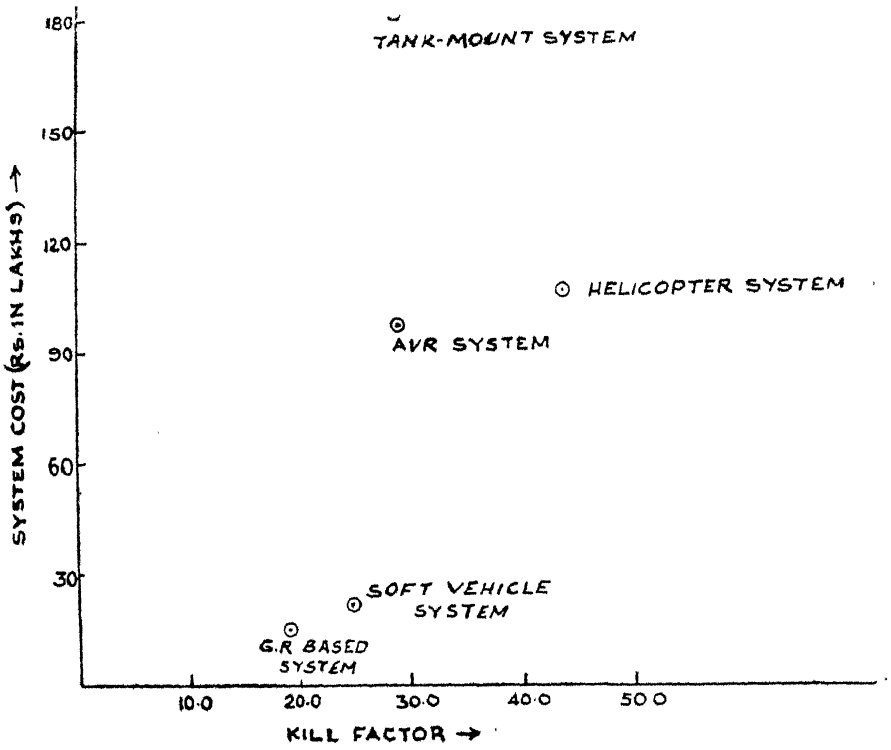

Fig. 4. System costs Vs Kill Factor of ATGM Mounts.

an Alouette helicopter has a gyro-stabilised platform. The operator aims through the sight mounted on this platform and maintains the L-O-S to the target even in the midst of movement and manoeuvres. The helicopter based system is cost-effective as it gives the higher target kill than when ATGM is mounted on other vehicles. R&D costs for this class of ATGM are shown in Fig. 5.

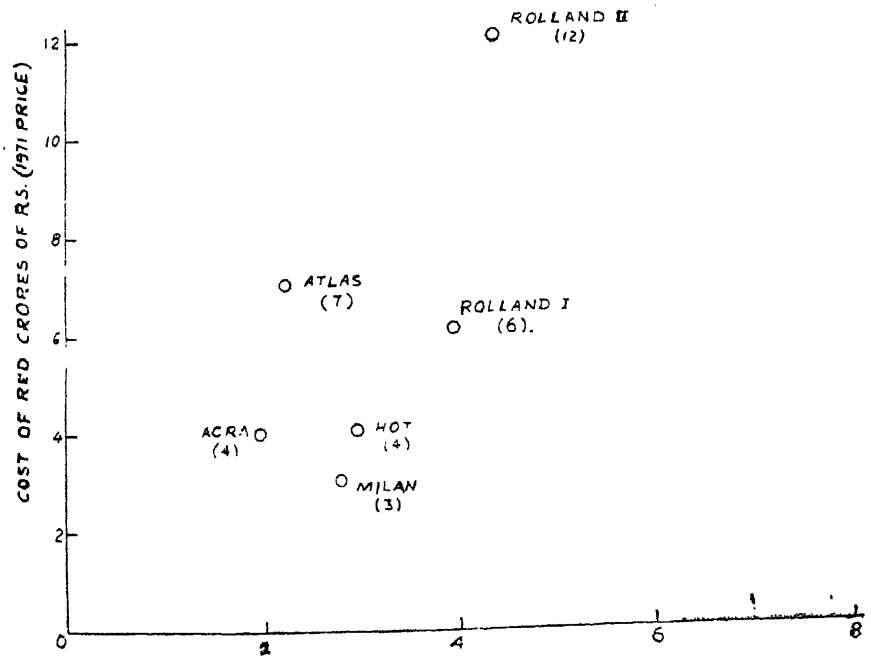

Fig. 5. Years of Development.

The greatest weakness of helicopter mounted ATGM is its survivability in the battlefield. The system is vulnerable to ground fire, heat seeking missiles and artillery fire. But this is true for all other similar systems which are vulnerable to other ground and air weapons. The survivability of ATGM on helicopter system lies in using it on a ground for the maximum range of operation of ATGM (which is 3000 m) almost at the outer boundary of the battlefield when the system is beyond the range of small arms fire and of AA guns on tanks. The hovering height can be just above the obstacle height so that visual and radar detection is lowest.

Night Fighting Abilities

The present generation of ATGMs does not have any night fighting aids. They are all dependent on visible and to some extent on infra-red

band of the spectrum. Most modern tanks are now fitted with infra-red light sources for night movement but very few aids for night fighting. Night illuminating devices become easy targets for guns. Infra red command telescopes and driver aids have too short range for any tank hunting during night. The passive heat detecting devices are promising. They work well on clear nights and even in dust cover. However, these will take another decade for being put to any operational use for target acquisition and night fighting.

CONCLUSIONS

The future battles are likely to be armour dominated employing large number of tanks. ATGM of 2nd generation (semi-automatic) in the infantry role can prove very effective in inflicting heavy casualties on armour. AGTM team can also be airlifted to become highly mobile. The 2nd generation ATGM in infantry role should, therefore, be introduced in the Army. The system may be indigenously developed or with technical collaboration with outside agencies.

The operational performance of the first generation ATGM; SS11BI can be optimised by mounting it on a helicopter with a gyro-stabilised platform. Such a system can blunt effectively the armour assault at the maximum range before our tanks get involved. The AGTM is cost- effective as compared to other modes of its operation.

ACKNOWLEDGEMENT

The author acknowledges many useful discussions with colleagues particularly Shri SN Ganguli of DSE on several aspects of ATGM Warfare & data compiled by him.

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BOOK REVIEWS

JAWAHARLAL NEHRU : A BIOGRAPHY (VOL 1 : 1889-1947)
by SARVEPALLI GOPAL
(Published by Oxford University Press Bombay, 1976) pp 398: Price Rs. 100

THIS is the first of a projected three-volume biography of Jawaharlal Nehru by an eminent professional historian of India who had also had the good fortune and privilege of serving Nehru for 10 years in the Ministry of External Affairs. There is, therefore, no question about the ability, competence and qualifications of Dr. Gopal to write about the 'hero' of this and the two forthcoming volumes.

However, before mentioning the many merits of the book, one would like to point out a serious structural flaw in the scheme of the biography. The volume under review covers the first 58 years of Nehru's life up to 1947, while the next two volumes will deal with Nehru as Prime Minister, a period of only 17 years—less than one-third of the period of the first volume.

The influences and circumstances of childhood and youth of a person which mould and shape the character and behaviour of the period of maturity are of supreme importance in a biography as providing an explanation of some of his later action. But the space given by the author to Jawaharlal's early life is disproportionately, and regrettably, too little. After giving the Nehru family's background and something about Jawaharlal's grandfather and father in three or four pages of the first chapter, the author has abruptly brought us to the partition of Bengal by Curzon and the beginning of Jawaharlal's interest in politics, followed by an account of his public activities, his rise to the top of India's public life, freedom struggle and partition of the country. There is thus very little of Jawaharlal's personal life, friendships, intimate relations and the inner urges without an understanding of which many of his later acts will perhaps never be satisfactorily explained.

The vibrant personality which is the raw material of this Biography is not brought out adequately. Jawaharlal in the making is absent from the book and, therefore, many of his actions, decisions and traits of character will never be explained satisfactorily. To give just one example :

Motilal Nehru was a cheerful extrovart, fond of the good things of life and social intercourse. Jawaharlal on the other hand, "had no intimate social circle, no close friendships without reserve ; nor does he seem to have known any women." (p 25) There is nothing in the biography to enlighten us as to why it was so. Perhaps, having once decided to compress 58 years of his life in the first volume, the author had no choice but to deal only sketchily with his hero's personal development, say up to the age of thirty.

Having said that, one has nothing but praise for the other facets of the volume. It is a clear and well written account of the events of the period and Jawaharlal's important part in them. The author knew Jawaharlal so well personally and admired him so much that, as he says himself, it was hard for him to be objective about him. And yet, Dr. Gopal has tried to be objective and has not been afraid even to criticise his hero at times. This is as one would expect from a historian of Gopal's standing. For example, regarding the accession of the princely states to the two Dominions in August 1947, Jawaharlal had adopted a rigid attitude and was insisting on popular representation in the States. But Patel was willing to reach agreement with the rulers and to give lower priority to popular representation. This facilitated Mountbatten's task in securing the accession of the States on the three subjects of defence, external affairs and communications. In Dr. Gopal's words, "though Mountbatten had a greater personal liking for Jawaharlal, it is clear that he found it easier to work with Patel." The princes resented Jawaharlal and his way of thinking and so Mountbatten set him aside and dealt with the princes through Patel who was "essentially a man of government, unhampered by the theoretical considerations."

Though by and large, the biography is a chronological narration of facts and events already known, the author has, at places, been able to clarify certain points and remove some misconceptions. There was an absurd but popular story at the time of the formation of the first Cabinet of free India that Jawaharlal had decided to omit Patel but was persuaded by Mountbatten not to do so. The author proves that the truth is quite different. He quotes from Jawaharlal's letter to Patel formally inviting him to join the Cabinet and Patel's warm reply accepting the invitation. (p. 361)

The book has a profusion of references in the foot-notes to source materials of which the author had no dearth. Apart from the vast published literature on Jawaharlal, and many books and speeches by him including his autobiography, Dr. Gopal had also unlimited access to Jawaharlal's personal papers then in the possession of his daughter, Srimati Indira Gandhi, but now lodged in the Nehru Memorial Museum

and Library in New Delhi. The result is a very authoritative and authenticated volume.

The production and get-up of the book are of a high standard and it has a fairly large number of illustrations, 37, a few maps, biographical notes, a glossary, a bibliography and an index. In the end one has no hesitation in agreeing with the *The Times* London that "it is indispensable reading for any serious student of modern Indian affairs."

PNK

THE COMPLETE MEMOIRS OF GEORGE SHERSTON
by SIEGFRIED SASSOON.
(Published by Faber and Faber, London 1972) : pp. 656, Price £ 1.60

THIS definitive, paper covered edition combines the three parts of Siegfried Sassoon's famous masterpiece—Memoirs of a Fox-Hunting man. Memoirs of an Infantry Officer and Sherston's Progress—in a single volume.

Part I of this trilogy deals with a period which has now lapsed into history—Country life in England nearly a hundred years ago, with horses, carriages, grooms, house servants, water drawn from hand pumps and candles for illumination—all of which may seem remotely familiar to English readers, but to Indian readers is straight out of Thomas Hardy. I believe fox-hunting continues in England today on a limited scale, by Hunts maintained at great expense by lovers of horse and hound. However, in India, the several Hunt Clubs set up by Englishmen during their sojourn here have, to the best of your reviewer's knowledge, all closed down either with the passing of British rule or, through lack of sufficient interest and funds, some years later. Only their famous names—the Peshawar Vale Hunt, the Ferozepore Hunt, the Delhi Hunt, the Ooty Hunt—being some of them—may now remain, in the memories of older readers of the Journal, of colourful days gone by.

Siegfried Sassoon captures the fox hunting milieu with great realism and descriptive detail. He has a good anecdotal style. His accounts of the numerous meets attended by George Sherston, (surely this is a pseudonym for what is clearly an autobiographical character), may tend to mystify the present day reader, who lives in a highly mechanised world, and who may wonder why the whole business could not be ended by simply shooting the fox. This would have ranked as heresay at that time—it probably does still—and almost at par with shooting at sitting duck or partridge. It simply was not sport and is not done. If any legacy has been left by this typically English pastime, it is to the vocabulary—"Gone

away", "View Halloa", "Yoicks", "Tally Ho" are amongst those printable.

Parts II and III are of greater topical interest, dealing as they do with the life of a sensitive young Infantry officer in the First World War. Here, the author needs no introduction, for Siegfried Sassoon's cynical poetry of the 'War to end all wars', will remain a classic of its kind. It is only recently that general criticism of the leadership of that war, which was responsible for the senseless deaths of hundreds of thousands of soldiers, has seen print. Siegfried Sassoon was a generation ahead of these critics, when criticism of such crass stupidity was rare. Readers of his poetry will remember his famous lines : referring to an unnamed commander of those times :

"He is a cheery old card, said Harry to Jack
As they marched to Arras, with rifle and pack
But he did for them both with his plan of attack"

Siegfried Sassoon writes his wartime memoirs with sensitivity. His sympathy for the uncomplaining private soldier is limitless, he sincerely believes in the great brotherhood of the corps of officers and he is unsparing in his criticism of that odd phenomenon World War I—the booted and spurred higher commander and his gilded staff, who lived miles behind the front line, in comfort and security, without any idea of the conditions of the fighting soldiers. Here is a vivid description of a war, which went on for four years over the same piece of ground, with staggering losses and little gains to show for them :—

".....we were among the debris of the intense bombardment of ten days before, for we were passing along and across the Hindenburg Outpost Trench, with its belt of wire (fifty yards deep in places); here and there these rusty jungles had been flattened by tanks.....The Outpost Trench had been solidly made, two feet deep with timbered fire steps, splayed sides and timbered steps.....Now it was wrecked as though by earthquake or eruption. Concrete strong posts were smashed and tilted sideways, everywhere the chalky soil was pocked and pitted with huge shell holes; and wherever we looked the mangled effigies of the dead were our *memento mori.* Shell twisted and dismembered bodies.....German and British..... I can remember a pair of hands (nationality unknown) which protruded from the soaked ashen soil like the roots of a tree turned upside down; one hand seemed to be pointing to the sky with an accusing gesture. Each time I passed that place the protest of those fingers became more expressive of an appeal to God in defiance of those who made the war. Who made the war ?"

And here is another snippet, which will appeal to the battle hardened regimental officer reader :—

"At the Fourth Army School.....a gas expert from GHQ would

inform us that 'gas was still in its infancy'. (Most of us were either dead or disabled before gas had time to grow up). An urbane Artillery General assured us that high explosive would be our best friend in future battles, and his ingratiating voice made us unmindful, for the moment, that explosives often arrived from the wrong direction. But the star turn in the school room was a massive sandy-haired Highland Major whose subject was 'The Spirit of the Bayonet'. Though at that time undecorated, he was afterwards awarded the D. S. O. for lecturing."

Sherston won the Military Cross in that war and was wounded twice. After his first wound, whilst convalescing in England he felt that prolongation of the war was an "unnecessary torture of humanity". He wrote to his then commanding officer accordingly. The subsequent course of events are feelingly described in the closing chapters of Part I and in Part III, where he is persuaded to change his opinion by a fellow regimental officer and return to the fight, to be wounded a second time.

This is a book of moving candour and vivid portrayal of the War, in its horrific and its lighter moments. It cannot be recommended too strongly for reading by civilians and soldiers, responsible for the formulation and execution of national policy and its continuation by military means. They will then obtain some idea of what war means if they have had no personal experience of battle and, perhaps, lead them to sounder, practical decisions. The armchair war strategist will then, hopefully, be consigned to the lumber room.

MLT

THE CHINESE COMMUNIST ARMY IN ACTION—THE KOREAN WAR AND ITS AFTERMATH

by ALEXANDER L. GEORGE

(Published by Columbia University Press, London 1967) pp 256 : Price 63s

IN his preface, written in October 1966, the author suggested that "the findings reported here about the Chinese Communist Army are, I believe, of more than historical interest. The Chinese Communist Military model described in this book has been influential in the organisation of guerrilla forces and armies in other parts of South East Asia and may be initiated elsewhere."

There is a good deal of force in this observation since "other guerrilla forces"—an unfortunate euphemism for national liberation movements in South East Asia and elsewhere—have adopted in many cases and may continue to do so in future, the organisational patterns, tactical doctrines, battle philosophy and attitudes towards weapons developed by Chinese political and military leadership.

Communist China's army which intervened in Korea in 1950, was a carry-over of Mao Tse Tung's guerrillas who had liberated the mainland. The guerrillas, no doubt had been reinforced by the main body of Chiang Kei Shek's nationalists who did not or could not move out to Taiwan. These veterans were by no means young. Although they had inherited the weapons and equipment that Chiang's troops had, they were in comparison with those available to United States and allied troops, simple and obsolescent if not primitive. After observing the Chinese soldier's amenability to discipline, his austere life, seemingly stoic resignation to fate and the comparative simplicity of the weapons he had to rely upon an allied commander had remarked that Communist China had first class army but its equipment was third rate.

Thirty years of subsistence on a diet of Mao's thoughts may have, if anything, made the Chinese soldier more stoic, perhaps, and more capable of bearing physical hardships uncomplainingly.

But because of political indoctrination, and because of the general environment being built up in China, the Chinese soldier too would be changing and in some respects at least, the Chinese soldier of today may not be the same as his predecessor of the Korean War era. Yet, although those at the helm of affairs who lay down policy may—and indeed have proved to be—exceptionally flexible in their policies and attitudes to technological changes, those at the bottom have to conform to the Party Line, whatever that may be at any given moment and the soldier likewise accept what his commanders and political educators may say.

In understanding the Chinese Army and assessing its likely performance in a given situation in the future, one would have to take note of these factors as also the strength that adherence to rigid doctrine in the form of Maoism—or its variant whatever that may be, in vogue at a given point of time confers on commanders and troops. Commanders need only carry out, regardless of consequences, the orders handed down to them ; and troops would find it easier to carry out orders because of the ingrained habit of obedience. As Du Picq observed in 1880, in his "Battle Studies", special social and organizational requirements are needed to sustain the individual soldier under the conditions of stress to which they are exposed in war. To quote Du Picq—

"But to order discipline is not enough :...
Discipline itself depends on moral pressure which actuates men to advance under sentiments of fear or pride. But it depends also on surveillance, the mutual supervision of groups of men who know each other well."

"A wise organisation ensures that the personnel of combat groups change as little as possible so that comrades in peace time manoeuvres shall be comrades in war. From living together and obeying the same chiefs, from commanding the same men, from sharing fatigue and rest,

from co-operation among men who quickly understand each other in the execution of war like movements, may be bred brotherhood, professional knowledge, sentiment, above all unity. The duty of obedience, the right of imposing discipline and the impossibility of escaping it, would naturally follow".

Mao Tse Tung too extolls discipline and obedience to authority, and in fact expected his commanders to exact it from their troops and he himself expected unqualified obedience from army leadership because although power flows from the barrel of the gun, politics would be in command. Recognising the limits beyond which it may be unwise to force discipline, especially in the case of guerrillas, Mao appropriately extolls the virtues of self-discipline and voluntary obedience to authority.

As Mao himself had declared—

"A revolutionary army must have discipline that is established on a limited democratic basis. In all armies, obedience of the subordinates to their superiors must be exacted. This is true in the case of guerrilla discipline, but the basis for guerilla discipline must be the individual conscience. With guerrillas a discipline of compulsion is ineffective. It must be self-imposed ; because only when it is, is the soldier able to understand completely why he fights and how he must obey. This type of discipline becomes a tower of strength within the army and it is the only type that can truly harmonize the relationship that exists between the officers and soldiers."

In practice, however, the Chinese in their own way appear to have perfected techniques for 'persuading' suspected non conformists to 'voluntarily' accept group norms and codes of conduct prescribed by commanders and political cadres within a unit. One of the methods used is isolating a 'doubtful' individual socially and psychologically and making him feel insecure outside the group, so that he may quickly learn to think and act as the group does. "Mutual criticism" and "self criticism" meetings are held frequently within squads, platoons and companies, to allow individuals to 'let off steam' and ensure cohesion among members of the flock and more important to enable political cadres to know what is happening. Over the years, these self and mutual criticism sessions have become such formidable institutions within the Chinese Army (and indeed in the other armed services, in farms and factories) that even those individuals who may like to dissent from current party or other line, find it dangerous not to participate in them.

There is also the other institution—the 'three by three' organisation. The smallest unit, the squad is divided into three or four sub units each with three or four men. General Van Fleet, Commander of U.S. Eighth Army in 1951 observed after studying the behaviour of Chinese troops whom his troops had encountered ;—

"The Red Army (Chinese) is divided at the very bottom into units of three men with each assigned to watch the others and aware that they in turn are watching him. Even when one of them goes to the latrine, the other two follow. No soldier dares fail to obey orders or even complain...The little teams of three, each man warily watching the others begin the advance...Yet—although terribly alone in the fight despite the two men at his side, made even more lonely by the doubt whether the two are there to help him or to spy on him—the Red soldier moves ever forward..."

There are sound operational considerations in sub-dividing the infantry squad into three groups of three (or four) each, as elements of the squad could rely on support from other elements of the squad, weapons could be deployed and used more effectively, and command and control would become easier. From the point of view of maintaining morale also this structure could be helpful as Du Picq (to quote him again) had remarked :—

"Four brave men who do not know each other will not dare to attack a lion. Four less brave men, but knowing each other well, sure of their reliability and consequently of mutual aid, will attack resolutely. There is the science of the organisation of armies in a nutshell."

This in fact was the basis of the organisation of the old Indian Army under which men from the same area and same groups were put in one regiment, battalion or company, in order to develop espirit d'corps, mutual trust and moral obligations to stand by one's comrades in battle regardless of one's own safety.

In the case of the Chinese—and perhaps of other Communist armies the three by three system serves the other important function of surveillance—close and continuous.

On the positive side, the rise of Communists to power has meant for the common soldier, liberation from the tyrannies of senior NCOs and officers. The latter cannot for example flog a soldier or inflict any physical injury or punishment.

In a sense, the right to absolute control that war lords and officers had over their soldiers in China is no longer available to the Chinese regimental officer of today. He has to be a conformist, take his cue from his commanders as well as political officers attached to units and live under the dreaded "three by three" system.

In recent times—especially after the convulsions of the Cultural Revolution—the Chinese army is facing the problems of modernisation. As more modern weapons are introduced and as the private soldier becomes better educated—which is also happening in China at an astonishing pace—the problems of command and control also would become more complex.

The question that General Staffs—and not merely of armies of countries on China's peripheri—would ask is "how would the large masses of humanity under the banners of PLA (People's Liberation Army of China) fight on the battle fields of tomorrow ?" Alexander George has not posed this question, nor indeed did he set out to do so or suggest answers to it.

All the same it is very relevant. Given the key role of political officers within the PLA, it would be fair to assume that strategic planning, appropriately enough, would be dominated by political considerations. Hence campaigns would be planned with meticulous care and political and military policies effectively integrated to secure limited and attainable national objectives. In the matter of operations, would Unit Commanders be in a position to use their individual initiatives and re-act quickly to the changing tactical situation or would they, at least the majority of them, go by the book ?

RR

VALOUR TRIUMPHS; A HISTORY OF THE KUMAON REGIMENT
by K. C. PRAVAL
(Published by Thomson Press Faridabad, 1976), pp. 443 : Price Rs. 80

THE Kumaon Regiment has a long history. Its present 4th and 5th Battalions have descended from the two 'regular' battalions of Muhammad Salabat Khan, the Subedar of Berar, who as a vassal of the Nizam of Hyderabad, committed these two battalions to wars against the ruthless Pindaris, marauding Bhils, and the Marathas in the beginning of the nineteenth century. The two regular battalions, known as the Russell Brigade for being raised by Nizam in March 1813 on the advice of the British Resident, Mr. Russell, and equipped, trained and partly officered by the British, had formed part of the Kumaon Regiment till April 15, 1952, when the 1st Battalion left to join the Parachute Regiment, and the 2nd Battalion continued as the Kumaon Regimental Centre. The men of the Russell Brigade, being mainly Hindus recruited from Oudh and nearby areas, belonged to the Nizam's army only in name, because they were not given duties in the city of Hyderabad or with any other troops in the Nizam's service ; and they considered themselves as the Company's troops for all practical purposes.

As far as the present name of the Regiment is concerned, it was only in 1917 that the term 'Kumaon' was used for the first time for naming a military unit, when the 1st Kumaon Rifles was raised. This unit was subsequently affiliated to the Kumaon Regiment in 1923.

Soldiers of the units which formed the Kumaon Regiment later had served not only in India, but also overseas in Burma during 1885-87, in China in 1900; in the Middle East and Africa during the First World War, in Afghanistan in 1919, in North Africa, Burma and Malaya during the Second World War, and in the three campaigns against Pakistan, and in one against China after 15 August 1947.

The regiment has won a large number of Battle and Theatre Honours and also a very large number of gallantry awards. (These have been listed in the book, although a bit haphazardly; Battle and Theatre Honours have been placed before the Preface, whereas the gallantry awards have been serialised under Appendix 'D'. It is not understood why Padma Bhushan, Padma Shri, AVSM, VSM and Arjuna Awards, etc. have been shown as gallantry awards in that Appendix).

Besides the texts, spread out over three parts, the book contains certain additional information in Part-IV, under Appendices, e.g., family tree of senior battalions, names of Commanding Officers and Subedar Majors, and those of the recipients of the gallantry awards; class composition of the regimental recruits, etc. Also, there are 26 maps and 49 illustrations (unfortunately, page nos. have not been given against them in the 'Contents') and also a brief bibliography.

The book will surely be read with great interest by soldiers and civilians, not to speak of the students of military history.

BC

DATE OF MAHABHARATA BATTLE
by S. B. ROY
(Published by The Academic Press, Gurgaon, 1976) pp. 223 : Price Rs. 50/-

THERE are still doubts in the minds of students of history about the dates of certain important events of ancient Indian History, and the date of the Mahabharata War is one which is debated very keenly. Recently eminent historians in India exchanged volleys over this particular date, and one of them has gone to the extent of declaring that the Mahabharata War never took place. Although it became almost axiomatic to say that ancient Indians never produced historians, nevertheless chronology had an important place in ancient Indian scholarship. It is due to the foreign invasions of the post-Hindu period of Indian history that many chronological links of the ancient period were missing and a coherent historicity could not be established.

Mr. S. B. Roy, Director of the Institute of Chronology, New Delhi, deserves the thanks of students of Indian history for his untiring

work in correcting certain chronological inaccuracies in Indian historical treatises with the help of five methods—literary, archaeological, radiocarbon, astronomical, and cross contact. After testing his subject matter on the whetstone of these five methodological investigations, Mr. Roy has come to the conclusion that the date of the Mahabharata war was about 1400 B. C.

Although the search for the correct date through a chronological jungle of facts and figures is by no means easy or pleasant, nonetheless it is very interesting. Scholars of Indian history (ancient period) will, I am sure, find the publication satisfying.

BC

THE BATTLE FOR EMPIRE : A CENTURY OF ANGLO-FRENCH CONFLICT
by JOCK HASWELL

(Published by Cassell, London, 1976) pp. 310, Price £ 6.00.

ENGLAND and France were in conflict with each other for centuries in the past,—from the Norman conquest of 1066 to the end of the Napoleonic wars in 1815—of course, intermittent with periodical peace and respite. One of these stormy periods of Anglo-French struggle is known as the Hundred Years' War which ended in 1475 with the Treaty of Amiens. But another equally stormy period, beginning in the middle of the seventeenth century and ending with the Treaty of Utrecht, after the Seven Years' War, in 1763, followed, which is the subject-matter of this book. Actually, this period of Anglo-French tussle was centred round their commercial and colonial rivalries and spread over the three continents of Europe, Asia and America. The result was the defeat of the French contest, and the grand success of the British. This story of the spread of the British empire has been well told by the well-known author Haswell who has a large number of historical treatises to his credit. The author has not only traced the roots of the enmity, but also discussed the course of the conflict area-wise, and even analysed various important battles with maps and charts in a very lucid way. He has also added an epilogue to his 12 chapters, assessing how the British Empire after reaching its pinnacle began to decline through colonial revolts, starting with the American War of Independence which was supported by the French in a spirit of revenge.

The book contains a good biblography. This readable and interesting publication can be recommended to all students of modern history,

BC

SECRETARY'S NOTES

ANNUAL SUBSCRIPTION

I would like to thank all those members who paid their subscription so promptly at the beginning of the year. To those of you who have not yet paid, may I remind you that your subscription was due on the First January. Would you please, therefore, put a cheque in the post to me today ? There are some members who have also to pay their subscription for 1976. They are requested to make the payment for both the years to avoid unnecessary reminders.

SUGGESTIONS FOR THE JOURNAL

The USI Journal is in its hundred-and-seven years of publication. As you will no doubt appreciate, the Institution spends a great deal of its funds on producing this publication, we would like to have your comments, criticism and suggestions so that we may improve the publication to meet your requirement.

CHANGE OF ADDRESS

Several cases of non-receipt of Journal have been reported due to members not informing the Secretary of their change of address. Members are requested to inform this office promptly whenever there is a change of address.

NEW MEMBERS

From 1st April to 30th June 1977 the following new members joined the Institution :—

ABHYANKAR, Captain S.M.
APPAIAH, Major P.K.
ARANHA, Captain P.A.
ARORA, Captain P.C.
ARORA, Sqn Ldr S.K.
ARTI, Major S.S.
ATHALE, Captain ANIL A.
AWALEGAONKAR, Sqn Ldr A.V.
BABU, Flt Lt G.M.
BADONI, Sqn Ldr P.D.
BAGGA, Captain G.P.S.
BAINS, Captain B.P.S.
BAINS, Captain S.B.S.
BAKSHI, 2/Lieut A.K.
BALAKRISHAN, Major K.K.
BALBINDER SINGH, Captain
BALJIT SINGH, Lieut Col
BANERJEE, Captain A.K.
BANERJEE, Flt Lt B.
BANERJEE, Flt Lt B.K.
BANERJEE, Captain G.
BANSAL, Captain S.K.
BATHLA, Sqn Ldr L.D.
BHAGWAN SINGH, Major
BHALLA, Major A.J.R.S.
BHARDWAJ, Flt Lt A.S.
BHARDWAJ, Captain K.K.
BHARGAVA, Sqn Ldr D.C.
BHASIN, Captain S.K.
BHATIA, Major B.L.
BHATIA, Major V.P.
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