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APRIL-JUNE 1976

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NOTE

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NATION REGAINS
SPIRIT OF ADVENTURE 1975-76

TOWARDS GREATER DISCIPLINE

- Marked improvement in discipline and punctuality.
- Prompt and speedy disposal of work in public and private organisations.
- Greater sense of dedication and devotion to duty.
- Growing attitude of cooperation and sense of belonging.

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ASIA AND THE LAW OF THE SEA STRATEGIC ASPECTS

MAHARAJ K CHOPRA

A WORLD Conference on the Law of the Sea was held in New York early this year, the fifth of its kind during the last two decades and in succession to the last two held in Caracas and Geneva during 1974 and 1975 respectively. It was certainly a marathon performance, attended as it was by as many as 156 countries, whose delegations and advisers ran into a few thousands and which lasted for eight weeks. That shows the great importance of sea law, the universal interest in it and the plethora of its problems. But, then, practically no final decision was reached—and that too must be a record—so that another conference has been called for August this year.

It would not be assumed of course that the world has been without a maritime code so far and what it is now trying is something *de novo*. After a spate of several maritime disputes and conflicts in the past, in which claims and counter-claims clashed, a sea law did come to be formulated. Hugo Grotius, a Dutch scholar of the seventeenth century, is reputed to have done the pioneering work, providing the main outlines of a maritime code which held the field for nearly three hundred years. This code however has been pounded by time and the tide of developments, and has become ripe for change. The Second World War in fact dealt it a fatal blow, for as it ended the old maritime regime collapsed and demands arose for almost a completely new structure.

These demands are pertinent and realistic and are rooted in the radical changes that the war ushered. The form and composition of international society has altered. New states have come into being out of old empires, insisting upon a recodification of the international sea law in the making of which, they say, they had no hand. There has been a new awareness of the World Ocean under the thrust of advanced technology and basic needs. The rapid dwindling of land resources has made the peoples turn sharply to the seas which contain immense stocks of food and minerals. The role of oceans as medium of communication has multiplied. Militarily, thanks to technological innovations, ocean-based strategy of global character has become possible. A new complex of sea-based weapon systems has come into being, some of which are vitally concerned with

deterrence and power balance, war and peace. Finally, a host of oceanic issues have cropped up in a world humming with new activities and criss-crossed by new forces, arousing differentiation in national interests.

Asia's Peculiar Strategic Features

A word about the "strategic" aspect of sea law. Sea law is a very comprehensive effort, basically of a legal nature but, in application, embracing diverse fields of politics, economics, international relations, war and peace, and multifarious sciences. "Strategic" would therefore be just one small way of looking at it. On the other hand, strategy, meaning the art of handling the problems of stability and security in their wider aspects, is a comprehensive theme by itself, embracing quite often an activity of a remote character. Take fisheries, for instance. A prime wealth of the oceans, more and more it is concerned with food, scanty food means starvation, starvation brings distress and revolt, and that means insecurity. As a matter of fact, in practically every subject that has come up for discussion in the sea law conferences the underlying anxiety for the preservation of political existence has been present.

Asia is not only the largest of all the continents but also has the widest sea front. Of the three principal and largest water expanses, Asia overlooks two *viz.* the Pacific and the Indian Oceans, with which it has the longest of all the continental coastlines. This largest chunk of the globe is also inhabited by the biggest portion of world's population, 57 per cent. Thus maritime strategy affects Asia most, from the human as well as from the dimensional points of view.

Again, Asia is predominantly a land of "developing" countries. Barring only two states—Australia and Japan—all the countries are more or less in a backward state and many of them, having gained independence rather recently, are faced with maritime problems for the first time. In this respect as in several others they line up with the developing states of other continents, forming the so-called "group of 77" (actually the number is 112). This group has not yet settled its scores with the more advanced states who have in their grip a bulk of the maritime cake. The sea law conferences often witness confrontations between these two groups with pronounced security overtones.

And finally, there is the fateful role of Asia in world strategy. One notes that one or the other part of it along its long coast has decisively queered the pitch of international events. Take the last 150 years. These have witnessed the heydays of the British empire, founded on the conquest of India, which juts into the Indian Ocean out of the Asian mainland. This empire was sustained from India's east and west coasts and collapsed when Britain lost its maritime supremacy. World War II was of course

the catalyst of this transformation. Hardly had it ended when another maritime part of Asia thrust itself upon the world stage, the coastal zone that contains China and Indo-China and faces the Pacific Ocean. It was the American thrust against this zone, resulting in the containment of China, alliances in Southeast Asia, and wars in Indo-China that shaped Asian history and world events. Now, thanks to detente, the Pacific-Asian zone has become a low-profile area, geopolitically speaking, but the pressure has shifted elsewhere. Yet another maritime region has become a converging arena of powerful forces, the Middle East, which is likely to remain a most explosive sea-front of Asia in the foreseeable future.

The agenda of the sea law conferences has been as impressive as their size. Five years of effort have gone into the making of it. Presently it appears in a form different from the over 100 items taken up in Caracas and Geneva. A draft proposal was discussed in the New York session, technically described as "Revised Single Negotiating Text". An examination of the text shows that the main issues are focussed on the following seven themes :

(1) Territorial waters.
(2) Continental shelf and economic zone.
(3) High Seas.
(4) Protection of maritime environment.
(5) Resources of the World Ocean.
(6) Freedom of research.
(7) Jurisdiction and regulation.

TERRITORIAL WATERS

The territorial waters consist of the offshore belt regarded as part of the given country's territory and coming under its sovereignty, including the air space above and the seabed beneath it. In the 17-18th centuries the general rule was to measure the width of the belt by the range of the cannon ball, that is, three miles. But later on the practice of establishing breadth upto 12 miles emerged. By 1960 most of the coastal states had territorial waters between three to 12 miles, the exceptions having been half a dozen Latin American countries who claimed breadth upto 200 miles. The consensus at the moment is that the coastal state will have a territorial sea limit of 12 miles over which it will exercise complete sovereignty and another 12 miles beyond it over which it will have jurisdiction in respect of specified matters such as customs—24 miles in all from the base line.

Presuming that agreement is forthcoming on the 12-mile limit, this would not be the end of the issues bearing on territorial sea. Of these the most important would concern the straits joining two seas. There are numerous straits, the narrow sea passages the world over, some of which

are of innocuous character, serving little purpose beyond dividing two territories, but others are along the sea routes of the globe, highly important for world communications. Even under territorial waters of less than twelve miles they have occasioned disputes—the Strait of Gibraltar is a case in point—but if the limit goes upto 12 miles, the possibilities of friction will receive a quantum jump. The reason is that the contiguous states lay claim over wider areas of the straits, indeed over the entire passage itself, to the detriment of other states and the world community.

There are, it is estimated, over 120 straits which would be affected if 12-mile limit is adopted. A rapid survey shows that among these atleast fifteen are of a highly strategic character, of which again seven lie in Asia :

1. Bering Straits—between Asia and North America, dividing the USA and USSR.
2. La Perouse Straits—between Hokkaido Island (Japan) and Sakhalin, Soviet conquered territory.
3. Tsushima Straits—at the mouth of the Sea of Japan.
4. Strait of Taiwan—between mainland China and island of Taiwan.
5. Strait of Malacca—between Indonesia and Malaysia/Singapore.
6. Strait of Hormuz—between Iran and Oman-Arab Emirates at the Persian Gulf.
7. Bab al Mandeb—between Ethiopia/Somalia and the Yemens at the mouth of the Red Sea.

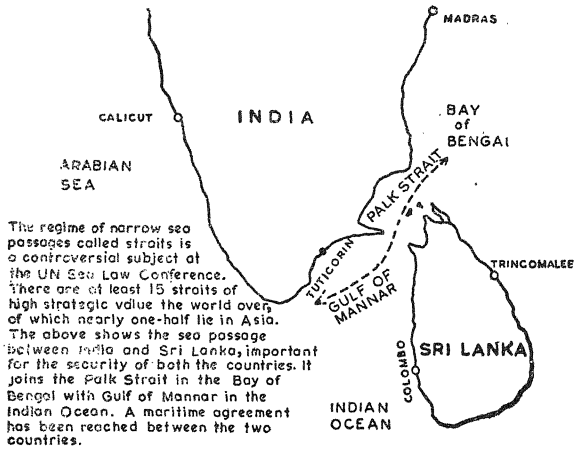
In the above list Nos. 5, 6 and 7 are of special importance for India.

One notices that these narrow passages are all located in Asia's most sensitive parts. They are also the foci of undying tension. Two super powers face each other across the Bering Strait. The la Perouse embodies the resentment of Japan against Russia, of the conquered against the conqueror of World War II. The Tsushima was the memorable scene of decisive naval battle in the Russo-Japanese war of 1904-5 which changed Asia's history. The Taiwan Strait is the line of confrontation between the regimes of the Chinese mainland and of the island of Taiwan. All three states along the Malacca have served notice that they might ban passage through the strait for security and environmental reasons. The Hormuz is associated with the explosive politics of oil. And Bab al Mandeb—which appropriately enough means the door of tears—was only recently activised during the Arab-Israeli war and now figures in the security interests of the Arabs, Israel, two African states, and France.

With the straits are also bound up several other wider issues. Connecting high seas and providing links in the world chain of communications, the straits are vital for several countries—for Japan and India for

instance, which get bulk of their oil from the Middle East via the Persian Gulf. Super powers are additionally concerned in the context of their global strategy. Both the USA and USSR have warned that they would not brook any obstruction in the free use of straits; and in the sea law conferences the Soviet Union has been suggesting that the straits be treated at par with the high seas in respect of the freedom of movement. But the states contiguous to the passages are not happy over this—Indonesia, Singapore, and Malaysia, for instance have pointed out the damage caused recently by the sinking of a Japanese oil tanker near Singapore, and want to institute the right to carry check and impose restrictions.

Of quite a critical concern for India is the narrow sea passage across which lies Sri Lanka. Two agreements have been signed between the two countries, in June 1974 and March 1976, delineating the maritime boundary in the Palk Strait and the Gulf of Mannar, with the right to "exercise full sovereignty and control" on their own side of the dividing line. As it is, this cannot be considered final till endorsed by the law of the sea which is under formulation.



The regime of narrow sea passages called straits is a controversial subject at the UN Sea Law Conference. There are at least 15 straits of high strategic value the world over, of which nearly one-half lie in Asia. The above shows the sea passage between India and Sri Lanka, important for the security of both the countries. It joins the Palk Strait in the Bay of Bengal with Gulf of Mannar in the Indian Ocean. A maritime agreement has been reached between the two countries.

Thus, clearly, the straits in Asia are of outstanding strategic importance : they embody interests of the contiguous states, and these interests are highly coloured by considerations of security; with them are also bound the interests of world community; they are dovetailed into the big

power strategic interests; and, in a way, they pose conflict between country and country, the developing and developed states, and the power blocs.

CONTINENTAL SHELF AND ECONOMIC ZONE

One thing about territorial waters is certain : the coastal states concerned have complete sovereignty over these. Beyond these waters the scenario changes, and in this connection two concepts have gained currency veering round the continental shelf and the economic zone.

Continental shelf has turned out to be a most confusing term. An early sea law conference defined it thus : "The seabed and subsoil of the submarine areas adjacent to the coast but outside the area of the territorial sea, to a depth of 200 metres or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of natural resources". But this definition was still born and has found little acceptance.

Actually, from one continental shelf to another the depth varies from 50 to 500 metres and width varies from two to 1,000 km. Anamolous situations appear in Asia, Europe and other continents. For instance, being less than 200 metres deep the seabed of the entire North Sea may be considered a continental shelf, even though it extends to several hundred kilometres. And there is no continental shelf in the Persian Gulf. The exploitability principle has also foundered on the rock of technology, which enables man to reach over longer and longer distances in the sea in pursuit of resources.

Precision in this respect is essential for purposes of tapping the resources. To overcome vagueness and introduce uniformity another notion has been trotted at the sea law conferences, the notion of economic zone. The proposal is that the coastal state be granted the right to the sea zones with a width of upto 200 miles of exploiting the organic and inorganic resources of the waters and the sea bed. The importance of this concept lies in the fact that it is within the bounds of the 200-mile limit that there are the main reserves of the fish catch and a big portion of the mineral wealth of the continental shelf, including oil. Developing countries in particular have been insistent on the score of these resources, bound so intimately with their survival and welfare.

On the other hand the 200-mile stretch of water has so far been a part of the high seas where all nations have equal rights, in which most of the international routes lie, and where there has been unchecked movement. Developed states with high maritime capabilities and possessing advanced expertise are reluctant to give up their rights over a potentially rich area and a zone of strategic value in the approaches to the sea boards of the continents.

Some consensus over the economic zone of 200 miles appears to have

been forthcoming at New York. But the question of jurisdiction is uncertain. Britain and Iceland have already fought a little war over the issue, the "cod war". Some Latin American states continue to function as if the 200-mile width from the coast constitutes their national territory, a concept which China has also pursued. Staking claims on wide "territorial sea", China and South Vietnam under President Thieu have, one recalls, fought over the possession of Spratly Island, which is less than 200 miles from each country and is claimed by both. South Vietnam and Cambodia, both as communist states, have had a row over a few islands in the Gulf of Siam. In the same gulf Cambodia seized the American freighter *Mayaguez*, charging that it had intruded into its territorial waters. And Peking props up its claim on Taiwan for the very simple reason that the width of the Straits of Taiwan is just one half of its territorial waters within 200-mile limit. It appears that the protagonists of the wider limit have some very ambitious ideas which they are prepared to uphold through the barrel of the gun.

On its part India has been carefully building its attitude over the ticklish issues. In May 1976 the Parliament passed a bill embodying its rights over the sea wealth. It appears to embody four concepts - the territorial waters, the contiguous zone, the continental shelf, and the economic zone, and specifies its rights in these zones. A major Indian claim to offshore riches is already in action, at the Bombay high where oil is being extracted; and this gives a pointer to India's support for the economic zone concept. Recently India has signed maritime agreements with two countries. It has agreed with Indonesia to draw a line in part of the Bay of Bengal designating the respective areas for exploitation—from the farthest tip of the Andaman and Nicobar island chain Indonesia is only about a 100 miles away. Two agreements with Sri Lanka, signed in June 1974 and March 1976, draw the maritime boundary through the Palk Strait and the Gulf of Mannar between the Bay of Bengal and the Arabian Sea. As things are, these measures are subject to the formulation of the international law of the sea, but there is no doubt that this offshore passage is of great significance for India's security.

In between the lines one notices that while each country is pursuing national interest in demanding jurisdiction over wide stretches of coastal waters, there is also a conflict between the developing countries on the one hand and developed countries on the other. Moscow has pointed out, certainly with good logic, that if coastal states were to be given complete jurisdiction over waters within 200-mile bounds, they would acquire territory measuring over one-fourth of the area of the earth in one stroke.

The High Seas

Beyond the territorial waters are the high seas, by far the greater

part of the World Ocean. It was, looking at this part, that Hugo Grotius laid down the doctrine that "ocean cannot become private property" and that all nations have equal rights over it. From this also arose the doctrine of the "freedom of the seas". Until World War II ships and aircraft, military as well as commercial, passed freely over virtually the entire expanse of the World Ocean, barring of course the narrow strip of the coastal territorial waters. Now this doctrine is under attack. One of the items on the agenda of the sea law conference is : "Question of the Freedom of the Seas and its Regulation".

It is obvious that freedom of the seas is meaningful only for states which have the technical capabilities and resources for navigation and exploitation, which have the sophisticated type of shipping. This means by and large the industrial states. In strategic terms, it is the more powerful countries which have stakes in the doctrine.

Free navigation enables the USA and USSR to maintain and expand their defence postures which are based upon worldwide strategy. America's forward presence rests upon ties with South Korea, Japan, Taiwan and Australia, which postulate unhampered communication lines across high seas. In the high seas of the Pacific and Indian Oceans nobody can object, technically speaking, to US developing bases in, let us say, Micronesia or Diego Garcia. Russia has given notice that it considers links with its Far East vital not only by land but also by sea, all round the Atlantic, Indian and Pacific Oceans. Among the smaller powers, Britain and France make use of the freedom of the seas for their presence in the Indian Ocean or beyond. More recently there are regional states emerging, apart from the traditional big powers, which find the doctrine highly valuable. In Asia this is true of China, India, Japan, Iran and Australia, all of which are fast developing their merchant shipping as well as sea power. Among them Japan is dependent upon secure sea communications for a number of vital commodities, including oil. India's oil comes mostly from the Middle East; hence the Persian Gulf sea route to our west coast has become of critical significance for India's economy and security which must not be interrupted by a third power.

But freedom of the seas is like a double-edged weapon and has also led to conflicts and conflagrations throughout history. Invariably, the weaker states have found themselves at the receiving end of the stick. No wonder they opt for the curtailment of the aggrandising movements based upon the doctrine of freedom of the seas. Even the regional states like Japan and India, while they find the freedom of the seas valuable, they enjoin the more powerful states to exercise restraint in their activities in the World Ocean—hence the refrain of making the Indian Ocean a "zone of peace". Limited naval warfare, peripheral conflagration, amphibious

operation, brushfire war are all variants of unrestricted sea power for brow-beating the smaller maritime states, of which Asia has several.

Freedom of the seas is likely to influence Asian strategy in many, ways. After the Helsinki Accords on security and cooperation in Europe rival forces are likely to converge on Asia where divergences of interests are rampant and rapport is nowhere in the offing. A new power balance between the USSR, USA, Japan and China is developing. Old alliances are on the wane and the regional states are scurrying for new postures. In all these changes sea power will play a key role. The concepts of territorial waters and economic zone do entail some restrictions upon ocean freedoms, but they do not come to much. An indirect assault on the freedoms, by instituting some sort of international authority, is also under discussion at the sea law conference, but it is doubtful if it would have much influence on military and strategic aspects.

PROTECTION OF MARITIME ENVIRONMENT

This concept has acquired urgency in view of the mounting warnings that mankind cannot make unlimited use of the human environment with impunity. The seas and oceans, crucial element of natural environment, have been traditionally regarded as unlimited stores of organic and inorganic resources, but at the same time they are used as seemingly bottomless pit for all the refuse that mankind wants to dispose of. The deterioration of maritime environment from the usual causes is now a well-established fact, and it is growing, thanks to the growth of population and consequently higher incidence of waste being drained into the seas. This is an increasing phenomenon in Asia where population is swelling and also in Europe and other advanced regions where industrialisation poses a similar threat.

New hazards have arisen. Tanker spillage, for instance, which is a fairly common occurrence causing severe damage to fisheries. The very size of tankers is raising questions about the suitability of a number of straits. The Malacca Strait for instance is too shallow in some parts, where, further, waters are subject to movements on the sea bottom leading to hazards in the variation of sea banks : thus transit is safe only for tankers no larger than 200,000 tons. It was because of this that the Japanese tanker "Sheva Maru" was grounded near Singapore. This had its echo at the sea law conference, providing yet another handle to the coastal states to press for control of passage through the straits. This is not acceptable to the international community, in particular the big powers.

Nuclear explosions constitute another hazardous development. Despite all the progress in nuclear technology and controls scientists seem to agree that perfect immunity from accidents has not yet been attained.

The loud public protests against nuclear constructions even in the more mature countries like Britain and the USA are not without scientific foundations. As nuclear power plants are generally constructed beside the sea or near the rivers where water supply is ample, there arise the usual dangers from radiation; hence in West Germany the grape-growers are in revolt as are the fishermen in Japan.

Most dangerous are of course the nuclear tests for military purposes. This was realised in early 1960s, as a result of which some restraints have been instituted. The Nuclear Test Ban Treaty forbids nuclear tests under the sea and another bans emplacement of nuclear weapons at the seabed, while the protocol of SALT agreement also prescribes a few restrictions. But these are far from adequate. For one thing China has refused to fall in line and sooner or later it is bound to use the sea for the augmentation and perfection of its nuclear stockpile. France too has not subscribed to the restraints, insisting, despite several protests, that it had every right to carry out tests in the Pacific.

FREEDOM OF RESEARCH

This particular theme is now considered so important as to deserve a separate treatment. For one thing, even though the World Ocean constitutes 71 % of our planet it is the least known part : by one estimate as much as 95 % of the depths of the waters is still shrouded in mystery. The Indian Ocean suffers from lack of knowledge the most—hence, incidently, the International Indian Ocean Expedition of 1960-65. The UN has now specially directed its attention to the World Ocean, and has called upon the world community to observe the 1970s as the Decade of the Oceans. And while the World Ocean remains practically unknown, knowledge of the oceans is indispensable for the use of every kind of maritime environment. The knowledge is also necessary to ensure normal transport communications, to select safe routes, to improve the design of ships and equipment, to build and protect hydro-technical installations, to fortify the beaches and coastlines, and for many other purposes.

Proponents of research have further argued at the sea law conference that its use is not confined to purely practical purposes. Data obtained through such research is of exceptional importance for tackling fundamental problems in many sciences of the earth. Without an in-depth study of the oceans, of the sediment and of the structure of the submarine crust of the earth and the upper mantle, of the geological processes taking place on the ocean floor, it is impossible to solve key problems in the history of the earth, the history of the ocean itself, palaeogeo-chemistry, geo-physics and other sciences.

All this is unexceptional logic but logic is by no means the sole criterion for reconstructing the sea code. Dissenters say that there are

quite a few flies in the ointment. Comprised mostly of the developing states, the opposition asserts that the more resourceful countries are out to grab yet another fruitful part of the earth. In the name of research they promote the concept of the freedom of the high seas *as well as* the more narrow waters. Research, they say, should be conducted in furtherance of the principles of the World Ocean being "the common heritage of mankind" and therefore for the benefit of the entire world community; and so the international community and not individual states should be involved.

The worst fears of the dissenters lie in the realm of security. Suspecting the bonafides of major powers, they allege that under the guise of research they would pursue militaristic activities. Take the case of seabed: it may be a plain, a trench, or a ridge, all excellent phenomena for scientific research and yet all equally worth investigation for serving as haven for submarines. Research in the heat content and density is as valuable for understanding the nature of currents as for building military devices to be installed on warships. No scientific advance has been confined to civilian use only; invariably it has ferreted into the war arsenals.

No clear-cut solution to this problem has been found at the sea law conference, and one may be sure that Asian countries along with the "group of 77" would try to oppose unrestricted freedom of research on the part of the industrial states.

Resources of the World Ocean

Resources of the seabed and the waters above constitute the most compelling aspect of the sea law debate. Until the middle of this century contours of the sea bottom were limited; they were confined mostly to the laying of submarine cables and a little coal-mining. Now they have widened under the new discoveries. Mechanical and sonar equipment is increasing the harvest of fish, extracts from marine life are being used in medicine, and offshore mining is forging ahead. A number of minerals, notably manganese, are known to lie in the Bay of Bengal as also in several other sectors of the World Ocean.

Oil from seabed is already a major industry. And now under the energy crisis it is to the oceans that the world is looking for this liquid gold, knowing the serious limitations of availability and of the total land reserves. Several offshore areas in all the continents are under exploration or are yielding results – North Sea, the Falkland Island waters, sea fronts of east Africa and Americas, and offshore Asia.

The case of Asia in respect of oil is unique. Thanks to the Persian Gulf zone, the Middle East is world's oil supplier par excellence and, indeed, is shaping world strategy. An additional thrust to this is being given by oil finds in other Asian zones. Oil is being tapped off the Indian sub-continent in the Arabian Sea and the Bay of Bengal, in the Indonesian

and Malaysian waters, and the waters of the Pacific Ocean around Indo-China and Japan and along the Chinese coast. Several preliminary indications point to Asia turning out perhaps the richest part of the globe in respect of this prime source of energy for mankind.

Outside powers as well as the maritime countries of Asia are conscious of it. On a latest hindsight of the Indo-China wars, it is now being surmised that the prospects of oil off the China Seas have been a powerful motivation behind the marathon conflict in Indo-China. China has given notice it would regard as infructuous any arrangements for oil extraction in its coastal zones without its consent. With the oil boom already in the offing in its mainland, Peking expects further additions from the sea, thereby giving an added weight to the oil strategy it is developing. This strategy is already in action *vis-a-vis* Japan, the Philippines, and Thailand. Oil has been an important factor in the stability of Indonesia, whose economy was in a shambles till the other day; and oil has been an excellent medium for the development of close relations between Indonesia and the United States. With immense possibilities of oil off its eastern as well as western coasts, India expects self-sufficiency during the coming decade, thereby casting off its critical dependence upon the Middle East. Very likely, Japan too would get relief by sources available much nearer than at present.

Jurisdiction and Regulation

The question of jurisdiction over the regime of the World Ocean has been found highly complex and controversial. The debatable issues revolve round the limits of national control, rights and duties of states, and the nature of regulating authority. Over them all falls the shadow of the concept of freedom of the sea which defies all regulation. Asia, with the rest of the world, has joined in the fray.

The principle of regulation and jurisdiction stems from an important, newly developed concept, that the World Ocean is a "common heritage of mankind". From this it follows that its resources shall be equitably shared among all the peoples, big or small, maritime or landlocked. In view of the varying geographical situation and capability this is possible only if the exploitation and distribution is regulated under some kind of universally recognised authority.

There is general agreement upto this point, but beyond this there is a melee of divergences. There is little common approach among the 90 odd states, one-third of which are in Asia, facing the sea : some are concerned with the "continental shelf", whatever that might mean now, among whom there are states who would prefer a narrow shelf with a strong international regime while others would like to be compensated in the form of locally defined shelves of fixed distances offshore. The land-locked countries opt for a narrow national jurisdiction and as wide an

international control as possible. The more advanced nations would plumb for a narrow shelf with freedom of movement and exploitation which the under-developed states would not appreciate. And among the latter there is a divergence between the Latin American and the Arab states.

Assuming that a 12-mile limit of territorial sea is accepted, this zone would theoretically come under complete jurisdiction of coastal states. But even then legal provisions would have to be made in regard to the passage through the straits in general and rights of the land-locked countries in particular.

Beyond that range, two rather different problems arise from the point of view of resources, in regard to fisheries and in regard to minerals. There are species of fish peculiar to coastal waters over which the coastal states might claim full jurisdiction, but there are migratory fishes such as tauna in which more than one country howsoever distantly located is interested, and this might call for regional and international jurisdiction. As regards minerals, a precise limitation of offshore zone would be necessary.

Beyond the coastal waters there lie the high seas, and the principle mooted at the sea law conference states : All activities regarding the exploration and exploitation of the area shall be governed by the international regime to be established. In this field a fairly clear-cut line is drawn between the developing and the developed states. In the vanguard among the former are some of Asian and Latin American states who are suggesting an "assembly", an "elected council" and a "secretariat", which would formulate rules and exercise full control. On the other hand, while not rejecting the idea of an international body, the more advanced states would prefer that such a body should neither conduct exploration nor exploitation nor production, but seek only equitable sharing and distribution.

All this is in terms of the common heritage of mankind. But behind this there lurk several security considerations. The smaller states presume, hopefully, that the institution of world authority would also entail some possibility of ensuring restraint on the freedom of the seas and aggrandising propensities of the major seafaring powers. Their fears include the fact that there is really no outward distinction between, say, a ship for scientific research and a ship equipped with intelligence apparatus, and that international regime cannot guarantee immunity from activities of a military nature.

It is said that the key to the global strategy of tomorrow lies in Asia, the largest, the most highly populated, and the most resourceful of all the continents. In turn Asia will have its development largely determined by the waters surrounding it—by sea wealth, marine technology, communication lines, movement of ships and fleets, sea power, naval air power and merchant shipping. Hence the regime of the seas is of the highest

importance for it. The significance of the attempts to codify sea law lies in the fact that it would introduce order into this regime. As 90% of Asia faces the sea and as the remaining land-locked states are wide aware of the stakes, the entire continent is in fact deeply concerned with this regime. For the first time in history, this greatest of the world's continents is taking a hand in the ordering and disciplining of the World Ocean.

This is not going to be easy. There are conflicts among the states of Asia, between Asia and other continents, and between the developing and developed states. National interest will be the dominating force in the formulation of the sea code but indications are that there would be considerable give and take. It is certain that while the Asian countries will not get everything they will get quite a bit on equal footing. This is not to say that an oceanic utopia is about to dawn. No law is ever complete. Sea law is just one modality of world order, and discipline of the oceans is good only so long as other disciplines are also forthcoming and are good. Finally, nations are still beset with a plethora of conflicts, and there is nothing to suggest that they would not use force, in violation of the law, when the chips are down. Thus, while on the one hand, legal experts would continue reconstructing the sea law, progatonists of power would continue reconstructing their strategy. Strategy of the oceans would be outstandingly pertinent to whatever happens in the Asia of tomorrow.

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INSURGENCY IN VIETNAM

BRIGADIER PN KHANDURI

HISTORICAL BACKGROUND LEADING TO INSURGENCY

THE end of the Second World War saw the emergence of nationalism in the whole of South East Asia and the story of Vietnam is as much a story of a struggle for national liberation, as that of the other countries which had been under the colonial yoke in this part of the world.

The Japanese occupation of Indo-China during the Second World War brought many changes in the Vietnamese life, in their thinking and gave an impetus to their well-cherished aim of independence. The seeds of independence were sown by Mr. Ho Chi Minh, the man who held sway over the communist minority of North Vietnam. It was he who issued a declaration in September 1945 for the independence of Indo-China and demanded re-unification of Tongkin, Annam and Cochin-China into one indivisible entity.

The period between 1945 and 1954 *i.e.* until the signing of the Geneva Agreement which led to the withdrawal of French Troops from Vietnam was a period of turmoil, political upheavals and rivalries between various local political leaders with the French maneouvering to divide the leadership within Vietnam to gain their own ends of retaining a foothold in the country. It can easily be called a dark period in the history of the country. Political initiatives and the fortunes of war continued to frequently change hands between the two warring sides, but one tangible result the French were able to achieve before they finally left Indo-China was that they managed to create an artificial division of the country by creating an artificial boundary at the 17th parallel between the North and the South. This politically divided the leadership of the country, as a consequence of which puppet regimes came into existence in South Vietnam, whose lust for power led to an intensive conflict lasting for nearly 18 years within the country bringing untold misery to its people and unimaginable devastation to its territory.

While basically the Vietnamese people are a peace loving people and their whole life revolves around the family, the French conquest did transform Vietnam. It introduced new influences and new ideas, which all absorbed into an ancient culture. To this day the social structure of the predominantly peasant population of Vietnam, sticks to the family

"This article is based on the various studies made by the author as also on his personal observations while he acted as Chairman and Secretary General of International Commission for Supervision and Control in Saigon and Hanoi during the period 1972-73. Besides serving in Indo-China and holding various key appointments in the Army, the author has had the experience of serving in Burma, Malaya and Korea."

system, the semi-autonomous village and the Central State authority. The undeveloped communication system did, however, introduce localism. Economically, under the French colonial rule the country improved; rice production increased; new factories came into existence; rubber plantations developed, mining and textiles industries were established.

The struggle for independence of Vietnam really started during World War I, when some 100,000 Vietnamese were sent to France during the War. It was during this period that Ho Chi Minh, who was one of them, saw the vision of an independent Vietnam. The inefficiency of the colonial administration, economic dis-satisfaction of the peasantry, the shabby treatment meted out to their countrymen within their own country and the exploitation of their people by the French all led to the creation of a nucleus demanding independence from the colonial yoke. The period between 1920 and 1946 *i.e.* till the termination of the Second World War, saw the rise of various political parties within the country, resistance from the colonial authorities to various movements and demands for progressive measures to improve the lot of the common man within Vietnam. This period was utilised by the French to pitch the two dominant political parties *viz.* the Communist Party of Vietnam and the Vietnam Nationalist Party against each other. However, in spite of various setbacks and bickerings between the two, the Communist movement in Vietnam dominated nationalism with its ideas, activities and disputes between 1932 and the Second World War in 1939. Between 1930 and the beginning of the Second World War there were numerous uprisings and revolts in the French held Indo-Chinese territories *viz.* participation by the Vietnamese Nationalist Party in an abortive mutiny by the Vietnamese soldiers of the Yen Bay Garrison; peasant uprisings in Annam led by Pham Van Dong, Vo Nguyen Giap and Truong Chinh; rebellion in Cochin-China by Southern Communist leaders in 1940 and so on. With the advent of the Second World War, the French, having banned the Communist Party at home, also imposed a ban on the Indo-Chinese Communist Party in Indo-China.

After the French banned the Communist Party of Indo-China the Communists had to find a sanctuary somewhere else, and South-China provided this haven to them. It was here in South China that the Vietnamese Independence League, popularly known thereafter as Viet Minh set for itself the following goals :

(a) To drive out the French and the Japanese fascists and restore the independence of Vietnam.
(b) To unite all the forces fighting fascism and aggression.
(c) To build up a democratic republic of Vietnam.

It suited the Kuomintang Regime in China to use these against the Japanese. Because of certain suspicions, Ho Chi Minh, however, was imprisoned by the Chinese. His Lieutenants *viz.* Pham Van Dong, Vo Nguyen

Giap and Chinh were, however, able to establish communication with him. In late 1943 Giap began to lead small groups of armed Viet Minh across the border into Tongkin and by November 1944 he led large groups against the Japanese military posts on the border, so much so that by the beginning of 1945 Viet Minh forces had secured control over substantial parts of Northern Tongkin. And the irony of the whole thing is that it was the United States, OSS which supplied them with small arms and ammunition to furnish intelligence about the Japanese and help rescue US prisoners of war.

Another kind of nationalist reaction to French Rule was represented by the growth of two new religious sects *viz.* Cao Dai and Hoa Hao with marked political overtones. At one time Cao Dai had not only millions of followers but also an army of about 15,000. There was a time when these people openly supported Ho Chi Minh against Diem in the south.

It was in March 1945 that the Japanese dispensed with the French authority in Vietnam. The French Vietnamese Treaty of 1884 was abrogated on 11 March 1945 by Emperor Bao Dai who had been appointed the King of Annam by the Japanese. This was not acceptable to the Viet Minh who set up a so-called liberated zone comprising six provinces of Cao Bang, Cangson, Ha Giang, Bac Kan, Tuiyen Quang and Thai Nguyen. In the meanwhile in the North, as it became apparent, that the Japanese were on the verge of defeat, the Viet Minh influence grew stronger for the latter had it rumoured, that an attack was imminent on Vietnam by the British, Americans and the Chinese in order to re-establish the French. They also claimed that Bao Dai was a French puppet.

On 13 August 1945, the Viet Minh established a Military Committee which ordered the units of the Vietnam Liberation Army into action throughout the country and called for a general insurrection. It demanded that the Japanese Army lays down arms and that the Japanese authorities handover to the Vietnamese people only. The main aim of the Viet Minh was to be able to speak from a position of power when the Allied forces arrived in Vietnam. The Potsdam Agreement (1945) had stipulated that the Japanese forces in Vietnam were to be rounded up and repatriated by the British in the South of 18th parallel and by the Chinese (Kuomintang forces) in the North thereof. The situation was definitely in favour of Viet Minh : in Annam and Tongkin the population favoured their newly gained freedom ; Viet Minh was also acceptable in North Vietnam. The Japanese acquiesced in the arrangement ! It was in August 1945 that Bao Dai abdicated and the opportunity was seized by the Viet Minh to declare the establishment of a Provisional Government in North Vietnam, called the Democratic Republic of Vietnam (DRVN) Government, on 24 Sept. 1945. The Viet Minh cadres quickly consolidated power in the name of the new Central Government inspite of opposition, in some areas of North

and Central Vietnam. In the South the situation was different; the Viet Minh had not been able to establish influence in more than a handful of constituencies; the nationalist movement was controlled by mainly two religious sections—*viz.* Cao Dai and Hoa Hao, but by Aug 17, 1945 the Indo-Chinese Communist Party and the Viet Minh asserted themselves.

The principal appeal of Viet Minh was directed towards meeting the external danger to the independence of Viet Nam. In South Vietnam the British, however, refused to recognize the authority of Viet Minh Government and the local French were re-installed in authority by mid September 1945 : Vietnam was to remain within the French Union.

In the North, north of the 18th parallel, the responsibility to disarm the Japanese and to control the area had been entrusted to the Nationalist Chinese Army. Economically the DRVN Government at this juncture was finding it extremely difficult to face the situation of maintaining this Army. With the Chinese Army had come Vietnam Revolutionary League and the Vietnam National Party whose members, at one stage, had to flee and find refuge in South China and which had old scores to settle with Ho Chi Minh. However, ultimately in March 1946, a national coalition Government was formed in which some members from these two parties were also accommodated.

In March 1946 the Viet Minh and the French entered into an agreement whereby French troops were permitted to enter North Vietnam while the Government of France recognized the Republic of Vietnam as a free state, having its own Government, army and treasury and so on belonging to the Indo-Chinese Federation and to French Union. And a referendum was to be held in Cochin-China to determine whether it should be joined with Annam and Tongkin. The Viet Minh also accepted French military aid in re-establishing Hanoi's control over all Northern areas and the French were permitted to introduce 15000 troops, to be withdrawn by 1951. The departure of the Chinese troops left the two antagonistic parties *viz.* the Vietnam National Party and the Vietnam Revolutionary League without any protection and they declined. The Viet Minh, however, gained in strength day by day.

The referendum referred to in the above paragraph was not held and the French subsequently established a separate Government firmly controlled by them in Cochin China. Later attempts by Ho Chi Minh and his delegation on this issue in Paris failed. On 23rd November 1946 tension and local incidents resulted in French bombardment of Haiphong in which nearly 6000 civilians were killed. Viet Minh forces retaliated in Hanoi and, thus broke the eight year long Franco—Vietnamese war. While the cities remained in the hands of the French, the control of the hinterland passed on to the Viet Minh. The Viet Minh found its base of support in the villages in North Vietnam; the southern part of Tongkin

Delta, Than Hoa, Ha Tinh and Nghe An Provinces also became their strong holds. In South Vietnam, the Plain des Joncs and the Point de Gaman harboured their Southern detachments.

Thus between 1946 and 1954 battles raged between the French and the Viet Minh Forces until in 1954, the French, in spite of their modern armaments, aircraft, sea power, highly equipped larger Army and outside help were decisively defeated by Vo Giap at Dien Bien Phullu who had the support of the indigenous population.

The US continued its financial support for the French military effort during 1946 to 1954 period and its expenditure increased from $ 150,000,000 in 1950 to $ 1,000,000,000 in 1954.

THE GENEVA AGREEMENT

The 1954 Geneva Agreement signed at the time of the Cease Fire, which led to the withdrawal of French troops provided for the temporary division of Vietnam into two parts, and laid down that neither North nor South Vietnam should be used for a resumption of hostilities or to further an aggressive policy by either side.

One of the key provisions of the Geneva Agreement also provided for free and unhindered elections in both parts of the country with a view to determining the type of Government the people wanted for themselves; re-unification or otherwise of Vietnam as a country was to be decided upon thereafter by the elected Government in power. Such elections were to be conducted under the supervision of an International Commission for Supervision and Control in Vietnam, as established under the authority of the Geneva Agreement on Vietnam—1954. The Geneva conference was attended by the representatives of Cambodia, Democratic Republic of Vietnam, France, Laos, The Peoples' Republic of China, the State of Republic of Vietnam, the USSR, the UK, and the USA, Britain and the USSR, acted as co-Chairman of the conference. While South Vietnam was not a signatory to the declaration of the Agreement, the USA, took note of the Agreement and agreed that it would refrain from the threat or the use of force to disturb the agreements and that it would view any renewal of the aggression in violation of the aforesaid agreements with grave concern and as seriously threatening international peace and security. The conference recognised that the main question relating to settlement in Vietnam related to the ending of hostilities and that the military demarcation line at the 17th Parallel was only provisional and was not in any way to be interpreted as constituting a political or territorial boundary. The settlement of political problems effected on the basis of respect for principles of independence, unity and territorial integrity was to permit the Vietnamese people to enjoy the fundamental freedoms guaranteed by democratic institutions established as a result of free general elections by

secret ballot. As already stated these elections were to be held in July 1956 under the supervision of the International Commission composed of representatives of member states of the International Supervisory Commission; consultations to hold elections were to be held between the two zones from 20th July 1955 onwards.

The Supervisory Commission consisted of representatives from India, Canada and Poland : the Indian representative was to be the Chairman and Secretary General of the Commission.

The USA represented by General Beddel Smith took note of the agreements concluded at Geneva. The USA at that time agreed that it was in favour of the principle of free elections under the UN supervision and that it wanted all the three Indo-Chinese countries to be permitted to determine their own future.

INSURGENCY

Much of Vietnam's history is the story of its relation with China, its powerful neighbour to the North. During the thousand years between the second century BC and the tenth century AD when Vietnam was dominated by China the Vietnamese quietly, though sullenly and grudgingly, accepted the Chinese domination but without themselves being absorbed by their culture. Having freed themselves successfully from the Chinese control in AD 1038, the Vietnamese have since cherished their tradition of national independence and zealously guarded it. The Vietnamese are proud of their history and of their military accomplishments of the past.

During the intervening period until the French takeover of the Province of Cochin-China in 1863, Vietnam as a country saw an unsuccessful invasion by the Mangolian hordes of Kublai Khan in 1284. In the next century the Vietnamese pushed southward to conquer the once great kingdom of Champa which occupied much of what is now known as South Vietnam. They also met the Khmers from the region of Cambodia and forced them to retreat to their present position. Later between the 15th century and the beginning of the 19th century, the country passed through the reigns of the Le dynasty and two powerful families, the Trinh and Nguyen. In 1802 the last scion of the original Nguyen family managed to gain the throne and united all Vietnam under a single government. China granted the nation formal recognition. During this period foreign trade was encouraged and carried on through settlements of Dutch, Portuguese, French and Japanese merchants in several towns. Conflicts between the Vietnamese and the French missionaries, however, subsequently led to French military action and resulted in the takeover of Cochin-China by the French in 1863. Before another decade had passed, the other two provinces Tongkin and Annam were also under the French rule. The

French continued to rule Indo-China till the beginning of the Second World War. After the fall of France in 1940, the Japanese occupied French Indo-China.

It is apparent that throughout their history of subjugating and colonial rule the Vietnamese as a people wanted to belong to an independent nation. Thus when the French tried to regain a foothold in Vietnam in 1946, Viet Minh forces attacked them whenever they could. These forces had only one purpose in mind—*viz.* independence for their country. They were not all communists; but to the outside world they all appeared as such and were regarded so. So began the costly eight year Indo-China war which ended with the division of Vietnam at a Geneva Conference table in July 1954. This Agreement, unfortunately, despite its good intentions, did not bring peace to Indo-China. Having been divided into two parts by an artificial demarcation line the North Vietnamese, as also the like-minded in South Vietnam, decided not to rest until they secured reunification of their country. This quest of theirs once again, as will be seen from what follows, led to the outbreak of hostilities. Vietnam thus became a battlefield where the South was supported by the USA, Australia, South Korea, Phillipines, Thailand and New Zealand. The US involvement itself lasted for over a decade.

In spite of superior Army, Air Force and Naval support, as also superior technology, external assistance and national backing, the French proved no match to the Viet Minh forces in Indo-China. Equally, it is still beyond the comprehension of military thinkers that a small nation like North Vietnam could fight a victorious war against the most powerful nation of the world and, could last without a discernible dent for nearly a decade. Also that it emerged intact to function and impose its will over the whole of Annam and Cochin-China, and to act as a leader of the Pathet Lao forces in Laos and assist the Khmers of Cambodia without any substantial industrial backing or armaments' industry or sophisticated equipment. At the peak period of their commitment, besides two South Korean divisions, a division from Thailand, one brigade plus of Australian troops, certain detachments from New Zealand and the Phillipines, the USA had committed nearly 500,000 ground troops in the South to counter the threat posed to that part of the country by the Viet Minh forces and the local guerillas—the Viet Cong. The South Vietnamese Armed forces numbered over one million troops : it possessed a formidable Air force and had nearly 500 helicopters at its disposal; a strong naval force backed by US Air Force planes located in Thailand, South Vietnam and other South East Asian bases including Guam. These were at the beck and call of the South Vietnamese troops and the US Military command located in that country. Except for nuclear weapons there were hardly any other weapons of destruction which had not been used in Vietnam by the US and the

South Vietnamese Forces to fight their adversaries. The B-52 bombers had been used mercilessly to bombard the Viet Minh/Viet Cong concentrations; helicopter borne forces, paratroops, armed helicopters, latest fighter bombers such as F 4 and F III and so on have been employed day in and day out to fight the Viet Minh and Viet Cong. Defoliants, Napalm bombs, Laser guided smart bombs have been used mercilessly at the slightest pretext to ferret the Viet Cong/Viet Minh troops from their jungle or mountain forest hideouts and destroy pinpoint targets; electronic devices to detect any insurgents in and around bases/posts/localities, barbed wire, mines, amphicious vehicles, carriers, tanks, rocket launchers, most modern artillery equipments, were all used liberally and without any reservation. But all these, as the events proved, were unable to crush the insurgency in Vietnam and ultimately the mightiest power on earth decided to come to terms with the North Vietnamese and the National Liberation Front of the South. 700 billion dollars had been spent by the United States in Vietnam, its defence forces lost nearly 50,000 men; its involvement in Vietnam became the biggest weapon in the hands of the opposition in the Senate to hit the Government of the day with, it will perhaps be considered the most unfortunate and unpopular war ever fought by the United States in an Asian theatre. The war in Vietnam not only shook the almighty dollar but created myriads of problems for the American people in general and the American defence forces in particular. It will be of immense value to study the causes leading to the success of the Viet Minh forces/Viet Cong insurgents against the allied forces employed in South Vietnam to stem the insurgency in that country.

As a matter of fact one will hesitate to term the strife in Vietnam as an insurgency. It would, perhaps, be better to call it a limited war, but since it was a war raised by the indigenous population of Vietnam, against the so-called legally constituted government of South Vietnam, with the support, sympathy and backing of the Vietnamese local population it will not be out of place to consider it under the heading. It is irrelevant whether such support was obtained voluntarily or through coercion or intimidation. Insurgency, as is well known, covers the full spectrum of conflict from subversion to full scale guerilla war, including the emergence of guerilla bands into regular units; and the pattern of war in Vietnam fits this description.

Before going into the detailed causes leading to the success of the insurgency movement in Vietnam it is necessary to briefly enumerate the various pre-requisites for the success of such operations. These are enumerated below—

(a) An ideal worth achieving; worth devoting ones life to its achievement. It should be attractive, it should attract the

local mind and heart and it should be able to offer a better alternative to the existing conditions.

(b) Leadership and organizational ability amongst those who wish to lead the movement must be of the highest standards. The leadership should be able to recognize the popular cause and present a programme to the people to achieve their aim or aims. While planning will have to be centralised, execution of plans in such operations, perforce, will have to be decentralised.

(c) The indigenous population must offer its support to the organisation for such movements depend on it for recruitment, food, shelter, money and intelligence and on its goodwill.

(d) The terrain where operations are being conducted must be rugged, mountainous and jungle covered to retard the mobility of the superior established government forces.

(e) Proximity to international borders offers not only a haven to hide and escape from being caught by the security forces belonging to the established government, but also in some cases, it becomes source of material help. It also provides facilities for establishing training camps and base camps to insurgents.

(f) Outside help from sympathetic nations in the form of moral political, technical financial and other military assistance is required to ensure that the effort has the proper backing.

It is now possible to examine these objectively, in relation to the conditions existing in Vietnam as a whole.

THE IDEAL

The Vietnamese had set their heart to attain independence for the whole of Vietnam. The Second World War enabled them to give the idea a greater impetus. The war had weakened the hold of the colonial powers in the whole of the South East Asian Region and national wars of liberation were being fought throughout the region. In fact, the seeds of nationalism had taken root in Vietnam immediately after the First World War. It was the fervent desire of every Vietnamese citizen to live as an independent citizen in an independent country. There might have been differences over political ideologies between the various political parties within the country but on the subject of independence, they were unanimous. Immediately after the conclusion of the Second World War, the Japanese had also quietly helped them by handing over power to the local Vietnamese leaders, both in the North as well as the South. Unfortunately for the French, in spite of the indigenous leadership on the abdication by Bao Dai, having agreed to let Vietnam remain within the French Union, difference emerged and these led to the war of liberation in Vietnam. For eight years the pendulum swung from the side of Vietnamese to that of the French and *vice-versa* until the French got convinced at Dien-Bien-Phu that the Vietnamese would not accept them any more. What followed at the Geneva

Conference on Vietnam in July 1954 proved to be still worse. As against their cherished ideal of one independent Vietnam this conference created an artificial division of Vietnam into South and North by dividing the country at the 17th parallel. And irrespective of their political thinking, this was resented by the majority of the Vietnamese, both in the North and the South. The Viet Minh forces in Vietnam and their colleagues in South Vietnam, therefore, had an ideal to achieve—a united free independent Sovereign Vietnam and this ideal they were able to sell to the majority. It was an attractive ideal; it certainly did offer a better deal than a truncated Vietnam. The leaders of the Democratic Republic of Vietnam wanted recognition of the basic national rights of the Vietnamese people, to decide for themselves the type of Government. They wanted the withdrawal of all foreign troops including the US troops from within the territorial limits of Vietnam and they desired that the internal affairs of the Vietnamese (particularly of South Vietnam) to be settled by the Vietnamese themselves. All these ideals were palatable to all the patriotic Vietnamese.

THE LEADERSHIP

Except for President Diem, the South was unable to produce any dedicated patriotic leadership. Even President Diem's power unfortunately stemmed from US support than from within. Ho Chi Minh and his party in the North were dubbed as communists and the dangers of communism being brought to South of the 17th parallel by the North Vietnamese leaders were propagated. But except for countering communism, even Diem could not project anything worthwhile to his countrymen. He was because of his religious repressive policies overthrown and assassinated in 1963. Thereafter the Government changed hands between Generals Van Minh and Khanh. In October 1964 the Khanh Government was replaced by Mr. Tran Van Huong. This Government lasted hardly four months when Dr. Phan Huy Quat became Prime Minister of South Vietnam. Once again the rift between the Buddhists, a sect to be reckoned with in the South, and the Military had widened and another Government led by Air Marshal KY as Prime Minister and Lt. Gen. Ngyen Van Thieu as Chief of State came into existence. Thus the administration of the country passed from civil leadership into the hands of the military. On 6 June 1966 a national leadership council was formed comprising 10 military and 10 civilian members and since then South Vietnam was governed by a council with the assistance of an 80-member military/civilian Advisory council. Of course, in the rigged up elections Gen. Thieu in 1971 ousted Air Marshal KY and himself became the President of the country.

The above changes show the instability of political leadership in the South. Lacking popular support and stability as it did, the whole of the South depended for its existence on the support of the Army, the Navy, the Air Force, the Police and the Intelligence services. It never had any-

thing concrete to offer or any tangible results to show to its people as such. It governed through its police and the armed forces; it was feared rather than respected; its methods were repressive. It was composed of opportunists whose lust for power and wealth would not let them see the writing on the wall *viz.* the peoples' aspirations. Under such a government the rich became richer and the poor poorer. Nepotism and corruption were rampant; blackmarketing flourished.

Compared to the above the leadership of North Vietnam (Viet Minh) in the hands of Ho Chi Minh had everything to offer to its people to achieve their long cherished ambition—Independence, Unity and Sovereignty of Vietnam. They stuck to this ideal. His team consisting of personalities like Mr. Pham Van Dong and Gen. Vo Nguyen Giap whose devotion, dedication, sacrifices and leadership had been tested in the country's fight against the French colonial rule naturally commanded more respect. These leaders were acceptable to the masses and their voice was heard. They had the required organizing ability and planning capacity. Instead of depending too much on foreign aid and assistance they were able to develop their own techniques to fulfil their requirements. The stability offered to Viet Minh by Ho Chi Minh and his two eminently capable lieutenants added to the stature of the North Vietnamese Government and it could carry out its long term plan uninterrupted. These leaders had made sacrifices; they were not after amassing wealth; they were not corrupt, they were one from amongst the masses, their aims were clear. They were disciplined people who had dedicated their whole life to the achievement of certain goals. There was no instability, no assassinations. They had won the battle for the minds and hearts of the masses.

THE SUPPORT OF THE INDIGENOUS POPULATION

Having suffered for years at the hands of the Chinese and the French, the Vietnamese population was all set to cast off the yoke of colonialism and live as respectable citizens of a free country. The intelligentsia in the country disliked foreign interference or domination. The eight year war against the French and the victory in their favour had boosted up the morale of the average Vietnamese. This period also gave those responsible for organization, planning and fighting the French, an opportunity to create a dedicated cadre throughout the Vietnam, including the South. It is true that the war against the French did divide the population of Vietnam into two parts—one which sided with the Vietnamese Forces and the other who fought for the French at the time of the signing of the Geneva Agreement. The French before leaving the country had at heart the well-being of the population which mainly consisted of the South Vietnamese. It was to help and protect them against domination by those who were anti-French during the war that they were able to persuade the Geneva Conference to temporarily demarcate two parts of the country at the 17th parallel. It was done so that those who did not co-operate with the Viet Minh forces during the

war had time to devise their own future through elections under the supervision of the Commission for International Control and Supervision, and thus be free either to unite with the North or remain as a separate entity. One of the provisions of the Geneva Agreement was that the Forces belonging to North Vietnam should be withdrawn to the North after ceasefire had been proclaimed. It is said that in practice, however, the northern forces before withdrawing, left behind them many hard core personnel, dispersed throughout the South. These were highly dedicated and disciplined personnel whose main aim was to educate the rural and urban population of South Vietnam regarding the goals set to themselves by the North Vietnamese and thereby get support of the indigenous population for their cause. The oppression and exploitation of the common peasant in South Vietnam by the corrupt rich and Government officials provided fuel to fire and the cadre was able to create strong support for its anti-government activities within the country ; nay it was able to create its cells in the major cities as well, so much so, that by 1959 South Vietnam had been plunged into full scale guerilla warfare. With its bases in the villages the Viet Cong was able to get for the organization new recruits, shelter, food, money and intelligence without any problem. They were able to make their own cause the peoples cause. They promised them an honest government; promised to let the tiller have the land that he had been tilling. The peasant was promised abolition of the feudal system and rationalised distribution of land. All these ideas appealed to the peasant population as these were intended to ameliorate his living conditions. Living in the midst of the local population, having their confidence in the cause, supported by the people, the Viet Cong were able to operate freely against the hated government forces. It will perhaps be incorrect to say that methods of coercion and intimidation were not at all employed. These were used to subvert the loyalty of some to compel them to support the Vietcong, but by and large the cause appealed to the local people and, except for those with vested interests, the population of South Vietnam gave both covert and overt support to the Vietcong—particularly the peasantry. Unfortunately for South Vietnam, it was a well known fact throughout the country that the Saigon Government was neither a fully representative Government nor did it enjoy the confidence of its people, it was a Government running on the support it was receiving from outside. Therefore it had neither initiative nor popularity. As and when the Viet Minh forces captured any troops from the South they tried to educate them by following a campaign of explanation and persuasion as to their own cause and ideal for which they were fighting. This technique helped to wean away the masses from the South Vietnamese Government. This principle was violated by their forces once during the Tet offensive in 1968 and they suffered because of that but the mistake was rectified quickly. In some cases prisoners, once brain washed, were sent back to propagate their

belief and ideals amongst others in the South. The massacre of the South Vietnamese civilian population of My Lai by the US troops was used extensively as a propaganda weapon against the American troops in South Vietnam to gain their sympathy and support for the Viet Minh and Viet Cong cause.

TERRAIN CONDITIONS AND PROXIMITY TO INTERNATIONAL BORDERS

Its jungles, swamps, hills, rivers, islands and continguity to the Cambodian and Laotian Border all provided ideal conditions to the Viet-cong to carry on with their struggle against the Government machinery with considerable impunity. The South Vietnamese army and its allied forces were highly mobile, but the terrain condition in the area of the operations did not let them enjoy this advantage. The terrain conditions in the Central Highlands, along the border of Laos and Cambodia and the Delta region all favoured guerilla operations more than large scale mechanised ones. Equally the climatic conditions were such as would not let a modern army to develop its full destructive power. The value of an external sanctuary for an insurgency is enormous. There cadres can be trained; bases built, wounded treated; troops withdrawn when things are not going well and provided a place for rest and recuperation. The Laotian and the Cambodian border provided these facilities to the Viet Minh forces in full measure.

OUTSIDE SUPPORT

Following the Geneva settlement, the US in accordance with its policy of containment of Communist threat in South East Asia undertook to build a separate anti-Communist State in South Vietnam. It backed Ngo Dinh Diem. Backed by the USA and being anti-Communist, Diem refused to hold re-unification elections as stipulated in the Geneva Agreement on Vietnam, 1954. Diem's Government was recognised diplomatically by the United States, its allies and a number of other countries, and from the outset received significant US economic aid. In terms of personnel the US involvement in South Vietnam grew from 300 advisers in 1959 to 23000 US troops in the beginning of 1965 to 53,000 in mid 1965. This figure rose to 2,67,000 in 1966 and to 5,42,000 combat troops in 1969. There were approximately 500 US piloted helicopters operating in South Vietnam. Besides ground troops the South also was given continuous air support by the US from their bases in Thailand, Phillipines, Guam and so on. The US 7th Fleet was placed at the disposal of the US Military Command in South Vietnam. Similarly North Vietnam received considerable support in the form of war material *viz.* artillery, mortars, anti-aircraft guns, surface to air missiles and armour to fight its war against the South from the USSR and China.

To sum up :—

Thus the Viet Cong forces in the South were well organized and

well supported; they had built up their organization since 1954. However much one may deny it, the fact still remains that since 1964 the North Vietnamese combat formations had entered South Vietnam to boost up the morale and fighting capability of the Viet Cong forces. The rural countryside sided openly with the Viet Cong for reasons already explained. The Viet Cong knew that the pillars of success in such a warfare were :—

(a) A definite political objective; it must be a popular objective.

(b) Popular support; this stems from (a) above.

(c) A sound organization—to plan, co-ordinate, command and control the initially weak insurgent forces.

(d) Necessity for seizure of tactical initiative—founded on resourcefulness and offensive action at all times.

THE PHASES OF A REVOLUTIONARY WARFARE

The war in Vietnam, therefore, followed the normal pattern of revolutionary warfare. It passed through all the three phases as under:—

(a) *The passive phase:* In this phase the main effort was devoted to the building up of an organization which could make effective use of various scattered forces by controlling their concentration. The country was divided into territorial jurisdiction for operations and coordinating committees were set up.

(b) *The active phase*: This phase was characterised by incessant harassing attacks in increasing number and strength against selected targets. Local superiority was achieved by concentrating forces within the selected area with the main aim of building up strength and to wear down the illegally established government forces by constant and telling attacks. Ambushes, hit and run raids, sabotage, attacks on convoys, dumps and depots of the adversary soon became the order of the day.

(c) *The counter-offensive phase*: The insurgent forces had been organised into conventional formations, grouped into regions. During this phase regular security forces were brought to battle at the selected place and time with a view to defeat them. This happened at Khe Sanh, Quang Tri, Hue, An Loc, Pleiku, Kontum and so on. This phase was ultimately designed to open the way for the take over of the Government.

Having understood the concept and the pattern of the war we are now ready to objectively assess the causes of the failure of the Army of the Republic of Vietnam and their allies and success of the Viet Minh/Viet Cong forces in this long drawn out war. These are briefly discussed under the following headings :

(a) Political

(b) Socio-economic

(c) Military.

POLITICAL

Except for President Diem, the South Vietnamese could not produce a leader of national stature. The political instability of the South, the infighting there and the inability to win the masses by their man at the helm of affairs could not give credibility to the Government in Saigon. On the other hand the North Vietnamese leadership had everything to offer and the masses gave full support to them and to their cadre in the South. The Vietnamese were keen to be left alone to solve their own problems. In the South regimes after regimes looked upto foreign countries for assistance to solve their internal problems. This was not palatable to the common man. Inspite of all the money, equipment, arms, ammunition, luxury goods in abundance and troops which the Americans pumped into Vietnam they could not win their heart and soul. They remained foreigners, were treated and looked upon as such. Politically the Government of the day in South Vietnam did not enjoy the confidence of the masses; it had been installed in power by rigged up elections and instead of having its base amongst the masses it was there because of the support that it got from the Army, the Navy, the Air Force, its Police and the Intelligence organizations. The South could not at any stage present a united front.

SOCIO-ECONOMIC CAUSES

While economically the South was better than the North, its economy was based on corrupt practices *viz.* blackmarketing, smuggling, profiteering, hoarding and so on. Most of the officials were opportunists whose main aim was to make hay while the sun shone. By and large, the society in the South was ease-loving, fond of social life and nocturnal activities; the false economic affluence created by the war had made it soft. Although there was war going on for years and curfew was imposed, cabarets, cafetarias, restaurants, boat clubs, cinema houses and gambling dens did a roaring business. The country lacked sense of urgency—the enforcing agencies, being inefficient and corrupt they failed to instill discipline and comply with orders. They were happy to let things slide as long as they got their bribes. It was a decaying society whose insides had been eaten by nepotism, opportunism, favouritism, bribery and corruption; whose moral fibre had decayed. Its youth was addicted to drugs—heroin and hashish. Because of corruption in high places the public did not have much faith in its leaders. The American soldier should share a square blame for this state of affairs in South Vietnam. With his money and habits he is largely responsible for introducing many social and economic evils into the society of Vietnam. It will be, however, far from truth to say that 100 per cent population of the South comprised corrupt people. There were some honest and dedicated people as well in Vietnam—but they were unfortunately a minority. Economically although rich in minerals such as coal,

the economy of the North is mostly based on agriculture, while the South is industrially advanced and has got tin, rubber, textile, tea and coffee. Neither part has yet been developed industrially as such and is dependent on imported goods. The economy of both, the South as well as the North suffered tremendously. Most of the able-bodied men and women had to be drafted to fight the insurgency, meet requirements of labour to man factories responsible to produce the sinews of war, man hospitals and so on, leaving behind old, infirm and the young. Life became insecure in the villages because of uncontrolled bombing of the country side by the Allied forces and Viet Cong and Viet Minh activities. The majority of the population fled towards the cities leaving behind their villages, and fields remained unploughed. Factories suffered because of lack of availability of skilled and unskilled labour. Unsettled conditions in the cities and villages as also constant bombardment of the countryside, damage to railways, roads, bridges, electric generating plants, mining of harbours and sabotage all brought the economy of both South as well as that of the North to a standstill. Although more resilient than their counterparts in the South the strain was equally felt in the North.

MILITARY CAUSES

The first and foremost point was that the South Vietnamese as well as the Allied commanders fighting the war in Vietnam were neither clear about the aim of the war nor did they understand the nature of the war their adversaries were engaged in. It was not merely a military campaign; it was in fact a politico-military campaign.

The US as well as the South Vietnamese Force (ARVN) depended too much on technology and sophisticated weaponry in their campaign against the Viet Minh or the Viet Cong. The war in Vietnam, because of the nature of the terrain and the tactics employed by their adversary did not allow technological warfare full scope, as employed by the ARVN and their allies, the US. It was a pure and simple land campaign to be won by the side, which would build up stealthily, move by night, move lightly without sophisticated bases or lines of communication facilities, live off the land, hide for days on end, and bide its time to strike at the right place.

The US soldier in particular was not in a mood to give of his best; he did not understand the cause he was fighting for; it was not his war. He was sent to Vietnam as a conscript for a period of 12 months to 18 months and by the time he achieved some expertise in the type of war he had been engaged in an alien territory he was ready to go home. City born and bred he found it extremely difficult to adapt himself to the jungles, swamps and rugged terrain of Vietnam.

The will to close with and come to hand to hand grips with the enemy was lacking on the part of the troops fighting for and with the

ARVN. At the slightest pretext these troops would call for massive air and artillery bombardment of a hillock or jungle or village before going into attack these suspected areas. The Viet Minh and their allies the Viet Cong having understood this technique used to feign concentration in a particular area and then leave the area or feature unoccupied, wait until it had been bombarded by air or artillery or by both and then quietly reoccupy it to the utter surprise of the attackers.

The US bombing technique was based on area bombing rather than precision bombing and results. The technique followed by the ground forces was that having made contact with the enemy they did not close with him to destroy him or capture a position but immediately reported the enemy's presence to their Air Force and thereafter left it to them to deal with the situation. This pattern became well known to the Viet Minh and Viet Cong forces and they could therefore, anticipate the next allied move and take suitable precautionary measures by either going underground or dispersing.

Equally, during the hours of darkness the allies besides using the area bombing technique with the help of information received by them through various electronic means, had used helicopters armed with flares to light up suspected areas. Once some movement came to notice the area was immediately subjected to saturated bombardment by air or artillery. This pattern also became very familiar and the Viet Minh and Viet Cong forces could take suitable evasive steps.

The sympathy of the locals being with the other side the ARVN and their allies could not get their full support. In fact many Viet Cong worked during the day in Government factories, shops, hostels and canteens and changed into garb of hostiles by night by joining the Viet Cong or Viet Minh forces acting as their contact men or providing intelligence about troop movements, store houses, ammunition dumps, wire and mine obstacles and so on.

Appointments and promotions to higher ranks in the ARVN were based on the fancies and whims of the President of South Vietnam and, personal loyalty to or friendship of the President mattered rather than experience or competence. The soldiers and the Junior officers did not therefore, have much faith in the higher leadership. In fact the majority of the generals lacked command experience or ability to handle troops and understand ramifications of higher command. There was such corruption in the Army that a divisional commander had been drawing full pay for his division over a period of years without having a single soldier physically present on the ground ! The Chief of the Army Staff himself had been accused of having embezzled millions of dollars belonging to the soldiers benevolent fund and yet nothing happened to him. The morale of the ARVN soldiers, therefore, remained low. On the other hand the leaders

of the North Vietnamese Army had been through thick and thin, knew their job and had mastered the art of the type of warfare they were engaged in; so did their junior leaders. The soldier was, therefore, ready to follow them. Generals of the fame of GIAP did not need to qualify at any tests.

Being of peasant stock the Viet Minh or the Viet Cong was adept at night movements, it was not so with the town bred youth of the South.

The Viet Minh soldier and also the Viet Cong could live off the land or move self-contained for days on end. His requirements were few, the ARVN soldiers lived lavishly; their logistic requirements were far too much and movement of these requirements alone needed a vast fleet of vehicles, gasoline, food stuffs, clothing, canteen and modern gadgets. Such convoys thus presented an ideal target for ambushes and raids by the Viet Minh or Viet Cong forces at will; such large movements, had perforce to take place by day. On the other hand the North Vietnamese supply line followed the Ho-Chi-Minh Trail. This trail complex covered 25,000 to 30,000 miles, paved and unpaved roads. It mostly passed through hills and jungles and thus did not present an easy target to the US bombers. It had a number of laterals which linked it to various by-passes. Most of the stores and dumps had been placed on the Korean War pattern, inside tunnels cut on the sides of hills which could neither be easily destroyed nor detected. The convoys mostly moved during the hours of darkness, well dispersed and using as many by-passes as possible. The trail was well provided for with anti-aircraft defences at various vulnerable points, radars were deployed to detect and give early warning of the approaching US bombers.

The North Vietnamese and the Viet Cong soldier was adept at concealment and camouflage as also at digging underground, but not their soft and sophisticated adversary who relied mostly on machines for manual work and was helpless without it, thereby once again making himself vulnerable when suddenly caught.

Inspite of having wired in and mined miles of area surrounding their defences, depots, bases and having deployed electronic detectors and sensors the ARVN and US forces in the South were relentlessly harassed and attacked by their adversaries whose soldiers because of their higher training and motivation were not deterred by these hazards in approaching their target and finding a way to circumvent all the obstacles. They were imbued with a will to win. 'It is still people, not weapons that decide the outcome of historical developments'.

The length, duration, bitterness, extent and ravages of war could not have been withstood by the Indo-Chinese people but for the mass support for the Viet Minh and Viet Cong in rural areas.

'Vietnamisation' of the Armed Forces in South Vietnam did not prove as effective and successful as the USA thought it to be. The main

reason was that junior and senior leadership of the ARVN lacked the basic ability to employ the wherewithal given to them by the USA; many a soldier lacked the will to fight and the general ability to motivate him to fight and to use the resources effectively. The ARVN leadership had lost self-reliance and looked upto the US officers for directions at all times when confronted with a tricky situation. When left on their own and attacked by the well trained Viet Minh and Viet Cong they found themselves at sea and instead of grappling with the situation ran away in panic.

LESSONS LEARNT FROM INSURGENCY IN INDO-CHINA

By its very nature operations by security forces to counter an insurgency tend to be protracted. Patience and close surveillance of events will, therefore, pay handsome dividends. Bludgeon tactics do not pay in such operations.

Public opinion must be won and whichever side wins it and can offer an ideal which attracts the public opinion will ultimately be the victor. The principle field for action in an insurgency operation should be in the political field and action in the military field should be aimed at furthering the attainment of the political aim.

The leaders at the top must not only have strength of character but they must also be high grade organizers; they must have relentless determination. Only leaders whose mettle under various circumstances has been tested should be given independent command.

National character must be built up and its youth disciplined.

The nature and requirements of the type of combat one is engaged in must be understood by all responsible for planning, co-ordinating and executing it. In considering ones tactics, the first thing to pay attention to would be to identify precisely the problem posed to one. Tactics must be correlated to the tactics of ones adversary and to the terrain conditions obtaining in the area of the operations.

Initiative once seized must not be allowed to pass on to ones adversary.

Troops must learn to live off the land; live simply and the leaders must set an example in this respect. The North Vietnamese soldier wore very simple clothing--*viz.* a pithhat, green or khaki shirt, olive green trousers and Ho Chi Minh chappals. He carried a rucksack on his back which contained perhaps one blanket, seven days rice and some dried fish and a mess tin. Besides carrying his personal weapon he normally tied a bandolier consisting of ammunition around his waist. Light and self contained as he was, he could move across country for miles without waiting for his logistic column to join up. As compared to this the Army in South Vietnam being sophisticated, depended too much on lavish logistic system

and consequently it was mostly road bound and had to look over its shoulder all the time.

A nation must fight a war as a nation; all able bodied men or women must be made to contribute their mite to the war effort. The total youth must be mobilized, and everyone allotted specific tasks.

The conduct of the military forces must be above reproach. Military action must not alienate support of the indigenous population. The My Lai massacre of civilians by the US soldiers and later, the harsh treatment meted out to the local population of South Vietnam by the Viet Minh during the Tet offensive of 1968 are examples how a military force can antagonise and alienate the local population and lose its support.

It would pay a commander handsome dividends if his troops acquire intimate knowledge of the habits and the ways of the nationality they are required to deal with before arrival in the actual theatre of operations.

"The history of Asia must be reappraised and events in Asia re-interpreted by Asians themselves". The Asians must realise that 'no sun rises in the West for Asia'. Nations must learn to solve their problems and each nation must respect the independence, territorial integrity and sovereignity of the other.

Such nations as have been able to attain independence from colonialism will have to devote considerable time and thought on developing qualities of self-reliance and discipline amongst its youth. No nation can place 100 per cent reliance on foreign aid alone. Manpower is Asia's greatest asset; it is the most important and precious source of capital and North Vietnam exploited this asset to its maximum in its war against the French and South Vietnam and its mighty allies.

Given ideal and determined leadership and will power no nation can be subjugated entirely by indiscriminate strategic bombardment of its cities, villages, wharps, factories, bridges, roadways, railways and power houses. Manpower must be harnessed and organised.

The 'Domino Theory' and the much repeated 'cliche' containment of communism in South East Asia' has not worked. It was on 7th April 1954 when Eisenhower said "The loss of Indo-China will cause the fall of South East Asia like a set of dominoes". Nations must be left to find out themselves as to the type of society that would suit them best without any outside interference. Freedom is won only by those who are ready to fight for it; it cannot be bestowed by anyone as a favour nor can any other nation, however great and powerful, do it for them.

'Insurgency is not the blind reflex act of oppressed narrow minded peasants but a sophisticated politico-military operation. Where the Government is not only inefficient, indifferent but also corrupt and oppressive, the insurgents have a ready-made 'cause'.'

Population control by the authorities is more difficult in rural areas than in the cities, and it is also less easy to protect villagers than city dwellers against coercion by the insurgents. A rural base, therefore, is a distinct advantage for an insurgency.

One of the most important tactical developments of the war in Vietnam was the use of the helicopter in a list of roles. Helicopters, besides being used for evacuation of casualties, directing artillery fire, reconnaissance and so on, were used for airlifting a fully armed airborne cavalry division, for lighting areas suspected of hostiles, and in direct offensive role duly armed with machine guns, rockets and so on.

The war in Vietnam also proved that guided missiles had not made conventional anti-aircraft guns obsolete, even against high performance aircraft. The cities of North Vietnam were heavily protected by anti-aircraft batteries of conventional guns and by relatively few surface to air missiles.

Against the radar jamming tactics of the US bombers to interfere with effective firing by surface to air missiles the North Vietnamese had to resort to the firing of salvoes by a group of missile batteries to inflict deterrent punishment on the intruders.

However disciplined and determined a nation may be to survive concentrated air raids, besides dispersing its industries, dumps, bases and stores, its civilian population must be educated about measures to be adopted when subjected to air raids and civil defence machinery geared to the highest pitch of efficiency. Alternative arrangements must exist not to let the morale of the population be affected adversely by denial of essential services to it due to enemy bombardment.

CONCLUSION

The war in Vietnam has shown that Asian countries can't be taken for granted by the West. It has also shown that freedom is won only by those who are ready to fight for it. Nations, to survive, must instill discipline in its youth, and must utilise most judiciously that most vital commodity—its manpower resources. Upright, determined, honest, enlightened and ruthless leadership both in the political as well as military field is a must for the survival of new born nations in Asia.

Perhaps the insurgency in Vietnam would not have lasted for such a long period but for the untimely intervention in it by the United States of America. Had free elections as contemplated in the Geneva Agreement on Vietnam of 1954 been allowed to take place as scheduled perhaps the Vietnamese could have been spared the misery, privation, hardship, death and destruction which they ultimately had to suffer. President Eisenhower's obsession with the theory of "containing Communism" in Indo-China ultimately did not work. His remark that "had elections been held possibly 80 per cent of the population in South Vietnam and North Vietnam would have voted for Ho Chi Minh" clearly shows that the

problem of Vietnam and its implications had not been studied in depth by the policy makers in Washington. America spent nearly 3 per cent of its GNP per year in a war from which it gained nothing and lost a great deal.

Peaceful peasants and other groups of hard working people do not take up arms lightly against superior forces of the Government unless they have been driven to it by undurable hardships, onerous taxation, property confiscation and naked violence. In such circumstances before success is achieved peaceful life is disrupted, the country's economy is disorganised, trade comes to a stand still, communities are devastated and many lives lost. But then these sacrifices pay and ultimately the 'Sun Shines'.

Now that the war in Vietnam is over and the Vietnamese left to decide their own future the country's rehabilitation should attract the greatest attention of the whole world.

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COMPUTER AIDS TO COMMAND AND CONTROL

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INTRODUCTION

COMPUTER utilization in the Armed Forces is almost two decades old. In fact, the first electronic computer designed and built during the early forties was mostly supported by the US Army because of its utility in ballistic calculations [1]. Like any major technical innovation, the computer has to be evaluated by examining its capabilities and limitations in the military context. This paper is concerned with one specific category of the military uses of a computer—its use in command and control. The use of computers for data processing operations such as inventory control, maintenance and updating of personnel records, pay-roll calculations, etc. is not covered, although these operations are important to the Armed Forces. The use of computers as an integral part of a physical system, such as an on-board flight control system in a high speed aircraft, is also not considered.

The subject dealt with is the processing of information in direct support of the command processes, to supply information to the commander and his staff and to help them in the control of their forces. One of the salient characteristics of such systems is that they have an interactive aspect, demanding rapid and convenient communication between human elements and the machine.

In certain cases, the use of computers is clearly mandatory. For instance, early detection of a missile attack and prediction of the target area of the missiles from their computed paths within minutes is otherwise impossible. But keeping in view the present Indian context, this paper considers the far more important problem of the utility and feasibility of computer-aided systems for Command Centres directing armed forces which are more concerned with conventional threats.

The importance of command and control systems can be seen from the fact that in the year 1964 it was reported [2] that the U S Department of Defence was spending an amount estimated to be 4 to 6 billion dollars, nearly 10% of its total annual budget, on the acquisition, operation and maintenance of such systems including their supporting communications. A substantial part of the developmental activity has been in the area of providing computer-aided systems to support the direction of conventional forces [3, 4, 5].

It is necessary to emphasize the following points in the beginning of the discussion :

(a) This paper is concerned with general-purpose stored-program digital computers. These computers have an electronic store for data and instructions and possess the capability to carry out a very large number of arithmetic and logical operations every second, to read data and instructions at high speeds from punched cards and also from a large number of simultaneously active electrical typewriters. These computers also have facilities to print out hundreds of lines per minute and type out messages. Visual displays can be operated by these computers giving a dynamic picture of developing situations. Digital computers are so versatile that the same model computer could be used at various echelons of command in all the three services.

Special-purpose units—analog computers and computing elements of an electrical or hydraulic control system—belong to an entirely different category. They do not have the versatility of general-purpose computers. These units are not very relevant to the theme of this paper.

(b) The hardware required for use in Command and Control Systems, the computer, peripheral equipment, data links, etc., are commercially available* and are likely to be indigenously available in the near future. The cost of computer equipment required for a large Command and Control System compares favourably with that of a modern fighter aircraft. Computers required for lower levels of command would be considerably cheaper.

(c) Software—a large collection of instructions that direct the functioning of the computer—is unique for every command and control system, and has to be custom-designed. Development of software forms a major part of the work that goes into the creation of such systems.

(d) The most essential resource needed for developing Command and Control Systems is the technical know-how. Since such work has to be done in close association with armed forces, most of the work in this area is classified. So this know-how will not be available from foreign sources and will have to be developed in the country. Sooner or later this know-how has to be generated in the country and can be developed by a moderate investment in work of this nature.

COMMAND AND CONTROL SYSTEMS

The phrase 'Command and Control Systems' (C & CS) is of fairly recent origin and has become very popular with the increasing use of computers. For the purpose of this paper, command is a term denoting

* Computers made abroad are commercially available and their sale is not generally restricted. But for security in terms of planning and procurement, for reliable supply of spares and for keeping pace with newer development, one has to eventually develop and rely on indigenous manufacture of computers.

a general capability related to the direction of Armed Forces; while control is military activity at a level lower than that of command and is subordinate to it.

Command functions involve broad problems of planning, assessing the capabilities of own forces and those of the enemy, allocating resources, alerting, and committing the command's forces, etc. These functions require gathering large quantities and many categories of information, aggregating and processing the information to enable a commander to make knowledgeable, deliberate decisions in the context of changing objectives [6].

Control characteristically involves direct control of weapon-systems in situations where, although the volume of information is large, it can be categorized in relatively few classes; objectives are fixed, and the problem is to maintain action towards the objective through error detection and corrective action [6].

In order to carry out its mission effectively, a command requires a great deal of information such as :

Resources available to it at a given time.

Status of its forces—state of readiness, combat effectiveness etc.

Physical deployment of elements of its force.

Combat Intelligence.

Enemy disposition and order of battle.

Tactical counter intelligence.

Support conditions—communication and logistics.

Phase of conflict—tension, potential warning, exchange, recovery. On the basis of this, the commander formulates alternate courses of action open to him, evaluates them by detailed analysis and makes choices. This involves the making of plans, for various possible courses of action. The plans range from those meeting several contingencies to a single plan of operation. Initiation of a chosen plan of operation has to be followed up, to see how its execution compares with the intentions. The results may initiate new planning.

The number of staff personnel depends upon the level of command, and is of the order of a few hundreds at the highest levels of command. This complexity brings its own problems. Increasing the number of personnel in command staff beyond a limit may do no more than complicate the problem. The effective coordination of all command activity requires substantial analysis and systematization, training and exercising.

The demand for various services at control centres have grown dramatically with increasing sophistication of military hardware. For instance, the use of radar systems and very advanced gun directors at Air

Defence Centres has been rendered indispensible by the increasing speeds of modern aircraft. In general, the control function requires :

Communications.
Tactical intelligence.
Direct control of weapon systems.
Tactical planning and optimization of operations.
Liaison with sister units.

POTENTIAL ROLE OF COMPUTERS

The impact of the computer as an aid to C & CSs is twofold. In the first place, it meets certain existing needs by performing various services faster, better and more reliably than a number of men. More important than this is the fact that the machine makes available enormous resources for doing what is now impossible, and what cannot even be visualized in the absence of these resources. With the increasing availability of these resources, it is natural that an analysis of the potentialities has to be made.

Computer-aided systems enable a command to analyse situations, to plan and to perform evaluations and calculations at a level of detail and precision that is not possible without them. In the control environment, computers improve the performance of weapon systems manifold. Performance of radar systems can be improved by the incorporation of computers. Optimization of interceptor flight paths, direction of anti-aircraft and naval gun-fire, mortar location and sound ranging are examples of uses of computers in control systems. Many of these tasks cannot be performed by human elements satisfactorily and need very complex and expensive special-purpose hardware in the absence of a computer.

A computer can maintain a huge centralized information store, filing and retrieving information at very high speeds and routing messages in a complex network coordinating the activities of hundreds of people. Planning a computer-aided C & CS involves, in the first place, a detailed analysis of the command and control functions and their systematisation. This means that the responsibilities of personnel of a command will be defined and that various classes of contingencies that command personnel might have to face will be foreseen and procedures will be laid down to fix guidelines. Naturally, this activity is not new; it is an essential need of a command whether any mechanical aid is used or not. But the use of a computer-based C & CS places great emphasis on analysis and systematization, and forces a command to carry this out in much greater detail than in normal practice.

Wargaming is a traditional activity of importance in the evaluation of command efficiency and effectiveness, in evaluation of operational plans,

in training and exercising command personnel. Realistic exercise of a command system involves all the command elements. Field exercises, for instance, at a high level involve extensive movements of men and material and cannot be carried out very often. A computer provides a powerful tool in wargaming for training and evaluation.

SPECIFIC SERVICES PROVIDED BY A COMPUTER TO A COMMAND

1. DATA STORAGE, ORGANIZATION AND RETRIEVAL :

The most elementary contribution of a computer is the storing and retrieving of information. This is done with the use of mass storage devices such as the magnetic disc file which can store as many as 500 million characters, roughly equivalent to 2,50,000 book pages. Well over a hundred command personnel can simultaneously enter material into this store or examine portions of it independently.

The time required to choose a particular portion of the stored information, for entry, modification or for examination, is of the order of one tenth of a second. Once the selection is done, information can pass into or out of the store at rates as high as 20 pages in one-tenth of a second.

In addition to storing and retrieving huge masses of information at very high speeds, the computer can organise this information systematically. It is well-known that in the case of all large files, various indexes and a large amount of cross referencing is necessary. The computer can create indexes and cross references automatically at high speeds and keep on updating these indexes after every change. It can also prepare lists of items selected by some criterion—say the list of all transport squadrons meeting a given specification, which can reach a specified airport in a given time and operate from it.

One of the important data-processing operations that is possible with a computer is sorting—the ordering of a large list of items in some specified manner, such as alphabetical, numerically increasing or decreasing order. Examples are sorting the entries of a specified class of ports in order of proximity to a given location, or a set of signals in the order of priority.

When a reference is made to some stored information, the computer can make an automatic reference to the concerned indexes for speeding up the search. The utility of automatic data processing is best depicted by considering laborious and time-consuming searches that have to be made through a large file, when an index is not available. In such cases, a very detailed search can be made by the computer in a matter of seconds. Searches of this nature are forms of activity that are often impractical manually, because of the time required.

Another aspect of automatic data processing is the reliability with which information can be searched for, listed, ordered or copied. Mistakes that result from monotony of human elements are avoided. Similarly, the reliability with which indexes and cross references are updated can be significantly improved by automatic data processing. This will avoid the painful experience of having some items in a file and having it unavailable because its existence is not known or because it is untraceable.

2. COMPUTATION :

It is best to start a description of the nature of computation that a machine may perform in command and control environment by citing examples of extended computations normally done manually.

(*i*) *Air Defence* : Given a number of interceptors at various airfields guarding a sector, and the positions, courses and speeds of intruding aircraft, a good deal of computation is required to ensure optimal utilization of the available resources. Some of the factors which would have to be taken into account are :

Distances between different interceptor bases and the intruding aircraft.

States of readiness of interceptors.

Interceptor capabilities including speeds and armament carried.

Speeds of intruding aircraft.

Meteorological data.

In a large sector having many radar units, and many possible targets for the intruding aircraft, the problem becomes very complex. It is not possible, in general, to track the intruders continuously and reliably using one radar unit. Many radar units are, therefore, used and the coordinating centre has a mass of data pouring into it. The computation involved is the allocation of resources, in the form of interceptors, to the different hostile aircraft and the calculation of optimal courses for each interceptor in action till contact is made with the intruding aircrafts.

(*ii*) *Artillery Fire Planning and Fire Control* : When a number of artillery units are to participate in a planned action, there are advantages in centralized fire-planning. Such planning has to take into account the following factors :

Resources available and their deployment.

Targets, their locations, amount of shelling to be concentrated on each target, time at which target should be engaged, duration for which it should be engaged.

Priorities assigned to requirements as stated above, so that suitable allocation can be made if all the requirements cannot be met.

Zones which should not be subjected to shelling, such as planned positions of own patrols and civilian areas.

Meteorological data.

The calculations are to result in a fire-plan which coordinates the action of all the units involved, synchronising the commencement of fire and ensuring the optimal use of resources.

Fire control involves the use of mathematical tables and calculating aids to direct shelling accurately. Fixing the location of targets, on the basis of information from many observation sights, and the location of artillery pieces of the enemy on the basis of sound ranging data, are all aspects of the problem which involve computation.

(*iii*) *Movements :* Estimation of time needed for moving a large unit, such as a division, from one place to another, requires considerable calculation. Such estimation and detailed planning of the movement are based mostly on calculations of routine nature. Standard procedures and tables exist for aiding the personnel carrying out the work.

Some of the factors that have to be taken into account in these calculations are :

Rail and Road axes available for the specified movement, their capacities and current status.

Transport requirements for moving the men and material.

Rolling stock and transport availability.

Existing plans for movement, if any.

Transport assignment priorities and regulations controlling movement.

Extensive calculations, lasting several hours, are generally required for such tasks.

(*iv*) *Planning of Naval Response to a New Sighting* : Quick and effective naval action against a newly sighted enemy ship or submarine involves planning and calculations taking into account the following details :

Availability of ships that can be deployed in this operation, their location, states of readiness, and starting delays, if any.

Speeds of the available ships and distances involved.

Meteorological data.

The extent of search that can be attempted in terms of area and the mode of search.

Armament and other weapon systems carried by these ships and other relevant factors.

Given a list of participating vessels and a specification of the search to be carried out, the ability of the fleet to neutralize the target, taking into account the information adopted for search.

The problems discussed above, and several other similar problems, could involve hours of computation. In view of the fact that part of the planning process is routine, it is likely that a computer effectively employed can significantly reduce the time required. It can also help in taking

into account a larger number of factors and in obtaining more accuracy and reliability in planning. Reduction of time taken to prepare a plan, can enable the consideration of many alternate plans and the choice of the optimal one.

It is not being suggested that the planning process can be automated. It may not even be desirable to do it. It is natural that all important decisions, such as those involving commitment of forces, should be made by men. On the other hand, functions that are routine, and can be unambiguously specified once for all, could be delegated to the machine whenever it is advantageous. Even in this case, effective human supervision should be provided for. In general, there should be provision for the supervisor to take over the function or to override the computer.

Planning becomes very complex and time-consuming if a high level operation centre takes all the responsibilities. But, in practice, it is natural and desirable that the responsibility of calculation and keeping track of details are distributed over several echelons of command reducing the complexity of the work. Centralization and decentralization of command is a matter decided by military doctrine and not by a single factor such as the availability of a computer.

On the other hand, there are certain calculations which have to be carried out at a higher level of command also while all the possible courses of action are being evaluated. For example, a division may do the detailed planning for its movement ; but, at a higher level of command a quantitative comparison might have to be made of two possible movements to choose the more suitable one. This centralized evaluation might require consideration of ten possible actions before the appropriate one is decided upon. At this level of command, the use of computer aids by the command personnel will materially increase the reliability of the calculations and the total number of possibilities considered. Better computation at this level will increase the coordination by enabling greater attention to detail at the centre, and speed up the directives given to the lower echelons of command.

Even though a computer may be located at the Command Centre, access to it can be provided to units several hundred miles away from it, through standard communication channels such as telephone lines and wireless. This access can support independent planning and computation at lower levels of command.

3. Direct Control of Weapon Systems :

Weapon systems control can be classified into various categories in terms of complexity. Flat trajectory weapons and short range weapons do not benefit from sophisticated control. Large calibre, long range artillery

could benefit, to some extent, from computer aided fire control. These aids would contribute in performing accurate calculation of the bearing and elevation for a given range, taking into account a large number of factors. They will improve the accuracy of fixing own position and target positions especially when only distant sightings are available. The effectiveness of sound ranging equipment in locating artillery pieces of the enemy can be improved by the use of a computer.

In naval gun fire, when ships engage each other, at long range, while moving at considerable speeds, the utility of sophisticated control equipment is obvious. An even more complex problem where computer control becomes a very significant factor, is the direction of anti-aircraft fire control.

When a simple weapon is to be controlled, the control unit is generally simpler than a computer. Even for a fairly complex single weapon, simple computing equipment such as a special-purpose analog computer might suffice ; a general-purpose digital computer may not be necessary.

The coordination of data from many sensors—such as radar sets—and the control of many weapons in one system are more demanding tasks, and in such cases, a weapon-control system based on a digital computer is necessary. For instance, a low flying aircraft may not be visible to all anti-aircraft gun batteries during crucial moments. Making each battery depend on its own radar set only makes the system ineffective. Manual communication of data and coordination is practically impossible at the required speeds. Conventional gun directing equipment, generally, cannot control widely separated gun emplacements. They require tracking radar sets which take appreciable time to acquire the targets and such equipment is ineffective against low flying aircraft because of high traversing speeds required and because of the target acquisition delay. An air defence regiment appears to be a very suitable example of a unit, whose performance can be upgraded by the use of a computer.

4. Co-ordination of Command Personnel :

In order to make it possible for the command personnel to exploit an available computer, it is essential that there should be good man-machine communication. Entering new information into the computer of a C & CS and retrieving required information is generally facilitated by the availability of a man-machine communication language. This language is specially designed so that command personnel can learn it without any special training. While this language is a very specialized one permitting only such communication as is relevant in a C & CS, it is designed to be as close as possible to the natural language of the command personnel.

Communication with the computer is normally through the medium of an electrical typewriter console, often supported by a large television-like display. The display screen can be used by the computer to present readable text, tables, messages, etc., at a rapid rate. Further, maps with added information such as troop concentrations, target areas for shelling or bombing, planned moves, etc., can be displayed. The information displayed along with the maps can be altered to describe changing situations.

The primary result of introducing a computer into a C & CS is that all available information can be pooled into central files maintained by the computer.

One of the implications of such pooling is that provisions can be made for making upto-the-minute information on any aspect of a situation available to all those concerned with it as per predetermined rules. To a great extent, routine notifications of a decision or of a change in situation to those who are connected with these changes in a secondary way can be automatically and reliably effected. The pooling of information, and its easy availability, and automatic notification will ensure that all information on a situation is uniformly available to those connected with it. This will reduce the possibility of a component of command working without the knowledge of information that is available elsewhere in the command. Automatic notification of selected information can also ensure good liaison with sister commands. Elements of a command can be widely separated but still have access to a central computer-based system through any standard communication channels. Computers can upgrade such channels by providing for better utilization of such channels, for enciphering and deciphering messages and for introducing such features as message redundancy for increasing the reliability of these channels. They can also provide for automatic message routing.

While command personnel should be able to query the system and obtain all information relevant to their task, it is necessary and possible to ensure security. For instance, clearance to various levels of information can be given to various consoles, ensuring that an element does not obtain information not appropriate to its level of clearance. Provision for a higher level decision to upgrade an element's clearance status can also be made. The clearance levels of various elements and various classes of information can be flexibly decided using some predetermined criterion such as the 'need-to-know', and entered into the system.

WAR-GAMING

One of the features of a computer-aided C & CS is that it is possible to arrange tests and exercises conveniently and frequently. An exercise program can be prepared which gives reports of a hypothetical action to

the command personnel undergoing the exercises. This is roughly the computer equivalent of a Sand Model exercise. The machine keeps track of the progress of the exercise in precisely the same manner as it would keep track of a true action. Information at the same level of detail is maintained and made available to the participants. They react, as they would in a true action, by responding to the events in the progressing exercise by taking appropriate decisions. The commands from the personnel are not routed out to the subunits of a command during an exercise. The computer programme responds to these commands by predicting the likely results these commands will have. Making these predictions is nothing but umpiring; the machine can do this taking a very large number of factors into account, and acting in an objective manner. It can introduce an element of chance into the exercise Human umpiring has its own limitations and can take into account only a limited number of factors, and cannot always effectively imitate the play of chance. Computer-aided wargaming, for the purpose of training personnel, can also be extended to lower levels of command. Economical and efficient tactical training can be imparted, for instance, to junior armour commanders [7]. A simulation of a planned operation can be used as an exercise to ensure that concerned personnel will have a good familiarity with the detailed plans of that operation.

Such computer-aided exercises are useful in evaluating the effectiveness of organizational structure, efficiency of command personnel and the command's capability in crisis management. At a different level, computer exercises can be useful in evaluating different types of military hardware. For instance, they can throw light on the relative utility of two different types of tanks [8, 9, 10]. Computer simulation of hypothetical actions can be done without the direct participation of personnel in those cases where the outcome of the action is more dependent on the military hardware than on the men. These simulations can be very detailed and can give considerable information on the effectiveness of the system. For instance, given a description of an air defence system consisting of a number of radar controlled guns and ground-to-air missiles, it would be possible to estimate the survival probability of attacking aircraft. Survival probability estimates can be made by calculating at various levels of detail, but a well-designed simulation model becomes necessary, if drastic simplifications are to be avoided.

CONCLUSION

Computers have an important role to play in the armed forces. General-purpose, stored-program computers provide data processing and computing resources that aid command and control. A considerable part of the reported developmental work in this field is connected with providing such aids to the commands of conventional forces. Computers enable the acquisition and organization of detailed information

relevant to a commander's tasks and make them easily available to him. While decision-making will always be the responsibility of command personnel, the computer can enable them to examine a much larger number of courses of action in a given situation than would otherwise be possible. This should, in general, provide for greater flexibility. It can free human elements of routine work and enable them to devote their time to planning and decision-making tasks. Computer aids reduce the reaction time of a command to a threat and improve crisis management.

Significant improvements can be made in the performance of complex weapon systems by the introduction of computer control. By providing for easy availability of pooled information, the computer improves the coordination of human elements in a system. It provides for simulated exercises for training and evaluation of command personnel.

General-purpose computers are easily available and the equipment necessary for a large command and control system can be acquired at a relatively small cost.

Computer-aided command and control systems demand a special type of expertise which has to be generated, as such systems cannot be procured on a turn-key basis.

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PSYCHIATRIC BREAKDOWN IN A BATTLE ZONE

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INTRODUCTION

Psychiatric casualties were responsible for a large loss in effective manpower in World Wars I & II. During the last world war the proportion of the psychiatric casualties in the field varied between 5 to 30 per cent of total casualties in different theatres of war. It was also found that in addition to the psychiatric cases occurring among the troops engaged in actual combat, there were a large number of such cases among those stationed in communication zones and base camps. The boredom of a stale and static existence appeared to result in stress of a prolonged nature which is more harmful than a short-lived intense battle stress. Supporting non-combatants and civilians also provided a considerable number of psychiatric casualties. It is therefore considered important to be aware of the causes and types of such breakdowns and their management, so that we are not caught unprepared in the event of a future war.

CAUSATION

IN addition to the personality make up of the individual the following factors play a significant role in the causation of combat neurosis :—

(a) Conflict between the individual's conscious and unconscious desires to perform creditable duty and his conscious and unconscious desires to preserve his life preferably with honour.

(b) Environmental factors such as physical exhaustion, loss of sleep, persistent or overwhelming noise, non-availability of wholesome or adequate food and drinking water and uncongenial climatic conditions.

(c) The incidence of psychiatric casualties varies directly with the intensity of combat and with the number of surgical casualties occurring in respective units and formations.

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(d) Factors promoting morale, such as motivation, adequate training and skill in the use of weapons, good leadership and discipline, group indentification and *esprit-de-corps*, self respect and self confidence, faith in the higher leadership of the nation and conviction about the righteousness of the cause for which the country is fighting, sense of security about the family and regular mail from home, a fatalistic attitude and efficient medical services, help in lowering the incidence of psychiatric break-down.

(e) The capacity to withstand stress varies from person to person but it should be remembered that everybody has his breaking point although the threshold is different in different persons. Many soldiers who have been decorated for gallantry in action have been known to suffer from psychiatric breakdown in a subsequent action.

(f) A study of psychiatric cases occurring during recent Indo-Pak conflicts (1965 and 1971) showed that the incidence was extremely low. The morale of the troops engaged in fighting was very high. A clinical study of surgical battle casualties confirmed that their morale too was extremely high.

NORMAL BATTLE REACTION

Everybody experiences fear under stress such as that found in combat and it is not a thing to be ashamed of. Normal battle reaction should be distinguished from pathological reactions. The normal battle reaction may manifest itself by symptoms like muscular tension as evidenced by statements such as "I can't relax"; tension headaches of moderate degrees, tremulousness under the impact of battle stress, excessive perspiration especially on the hands and under axillae. Some soldiers feel chilly under combat stress, while others feel too warm, sometimes these sensations may alternate, vague abdominal distress, nausea and mild diarrhoea are not infrequent. Urinary frequency is one of the commonest normal response to combat stress. Tachycardia and palpitation are frequent and so also is some disturbances of sleep. But all soldiers do not experience these symptoms to the same degree.

TYPES OF PSYCHIATRIC REACTION IN TROOPS

(i) Acute Conditions

(a) Battle Exhaustion—Due to environmental conditions, physical discomforts, fatigue, lack of sleep, some soldiers may become weary, apathetic, markedly tremulous and their speech may become incoherent; and they may complain of generalised ache and pains. A majority of them are individuals with good personality who have tolerated anxiety in distressing circumstances for long periods but have eventually broken down under excessive physical and emotional stress.

(b) Anxiety reactions—A small proportion of cases of anxiety reactions develop symptoms of *acute terror reaction*. The onset is sudden and the condition generally affects immature youth in

their first battle. The individual may shout or scream, run about aimlessly and show typical signs of acute panic or he may appear dazed, confused or even semi-stuporous. In majority of cases, however, the symptoms consist of excessive sweating, trembling, insomnia, battle dreams, startle reaction and anxious expectation, *i.e.*, an exaggeration of normal battle reaction. In other cases the symptoms are severer, coarse tremors affect the limbs and there are sudden bouts of crying. Somatic signs of anxiety in the form of palpitation, giddiness, dyspnoea, precordial pain, hyperhidrosis are also seen. Anxiety state may last for weeks or longer and may take the form of phobias, lack of concentration, memory defects, headache, depression, gross tremors, cardiovascular or gastro intestinal symptoms.

(c) Confusional or Stuporus states—In some cases prolonged and severe anxiety leads to confusion. This may vary from inability to recall the day or the exact circumstances of a battle to a complete disorientation and resistive stupor. The patient ignores food, is inattentive and resists attempts to help him.

(d) Hysterical reactions—are quite common. They may be characterised by paralysis of various parts of the body, sensory disturbances, deafness, amblyopia, aphonia, amnesia or hysterical seizures. Such reactions were very common during the World War II but were found to be less frequent during the subsequent Indo-Pakistan conflicts in which our troops were involved.

(e) Reactive depression—resembling mourning reaction following the death of a relative. It may follow when a comrade or a popular officer has been killed in battle. Strong feelings of guilt usually play a part in the genesis of this condition.

(f) Mixed reactions—A combination of two or more of the above syndromes is not uncommon.

(g) Psychotic reactions—There is no psychotic reaction peculiar to war but a manic depressive reaction or a schizophrenic reaction, of sudden onset may be precipitated by stress and strain of battle, in a predisposed individual. Usually such reactions have a favourable prognosis.

(h) Psychosomatic disorders—These disorders, the commonest of which is battle exhaustion, are the somatic manifestations of unrelieved anxiety in the battle field. The visceral symptoms may be referred to heart, in the form of "Effort Syndrome", to the respiratory tract as dyspnoea and air hunger or more commonly to gastro-intestinal tract as varying degree of dyspepsia.

(ii) Chronic Conditions

(a) Depression—Some individuals as a result of a long campaign and cumulative stress of battle become depressed, quiet, unsociable, inactive and cease to take interest in unit activities. In severe cases long standing insomnia, fits of crying, and excessive smoking and drinking are commonly found.

(b) Paranoid reaction—Such patients become unduly suspicious, disgruntled, cynical and bitter, and not easily amenable to discipline.

PROGNOSIS

Approximately 50 to 60 per cent of psychiatric casualties, if treated early can be sent back to their units within a period of one week. The secret of success lies in treating them *as early and as forward as possible.* In those individuals who are evacuated beyond the Corps level the prognosis of a permanent recovery becomes poorer.

TREATMENT

Treatment mainly consists of—

(a) Careful history taking
(b) Complete physical examination
(c) Reassurance followed by a firm and definite statement that the patient will be fit to return to his unit within 3-4 days
(d) Rest with or without sedation
(e) Provision of wholesome food
(f) Facilities for bathing and writing letters home.

EVACUATION

Discomfort must not be regarded as synonymous with disability and soldiers with minor but unprogressive complaints and symptoms should be made to perform their duties and must not be evacuated from the combat zone. The main aim of army psychiatry is conservation of trained manpower and this has to be borne in mind constantly. Those cases who do not improve within a week require evacuation. All cases of psychotic reaction also need evacuation.

TROOPS STATIONED AT HIGH ALTITUDE

Some of our troops have to be stationed at heights of 10,000 ft. to 18,000 ft. for period varying from two to three years and have to withstand the effects of hypoxia which reduces one's physical capacity. Unless men have undergone gradual acclimitization, besides developing the physical ill effects of hypoxia, psychiatric symptoms are also likely to set in. They consist of inability to concentrate, headache, insomnia, disordered perception as characterised by illusions and hallucinations, impaired auditory acuity. There are marked changes in mood and the individual may show lethargy, irritability, euphoria, hilariousness, pugnacity or uncontrolled laughter. It is difficult for him to do simple calculations; there is impairment of judgement and insight and disregard for danger may be prominent. He may show irresponsible behaviour and resent discipline or he may gradually lose interest and become markedly depressed. The psychological ill effects, like the physiological ones, due to high altitude are sudden in onset when the individual is suddenly taken to such heights by air. A planned

acclimitization in phases prevents many of these ill effects from appearing. A prolonged stay at high altitude however promotes the onset of some of the psychological manifestations mentioned above. Such manifestations are not entirely due to the effect of the altitude and the associated hypoxia. The contribution of other factors such as low temperature, isolation, sensory deprivation, separation from near and dear ones, battle stress (if involved in fighting) and other conditions causing physical stress and lowering of morale, cannot be forgotten. All types of psychiatric reactions described on pages 149-151 may also be found in the troops employed at high altitude. A well planned and phased acclimitization process, promotion of morale and regular turnover of the troops employed at high altitude after a fixed tenure, say 2 years, are important prophylactic measures.

CIVILIAN POPULATION IN A COMBAT ZONE

The modern warfare does not make much distinction between the combatants and non-combatants, and between the military and civilian populations. Even the latter are exposed to air raids and artillery shelling. In many cases the civilian population has to be evacuated from the fighting zone and this brings in the psychological problems of the uprooted people, who become refugees away from their own homes. Those who choose to stay in the battle zone and are allowed to do so, are exposed to the danger of being killed, maimed or captured by the enemy in the same way as the troops involved in actual fighting, with the disadvantage of not being able to retaliate at the enemy themselves. In addition they are under the constant threat of losing their homes and hearths. The risk of some harm coming to their families, if they have not been evacuated, and uncertainty and feeling of insecurity about their safety, if they have been evacuated, are very real.

The identification of the civilian population of the border areas in the Punjab with the army, during the Indo-Pakistan conflicts of 1965 and 1971 and the willing sacrifices made by them are too well known to need to be restated. The morale of the civilian population as well as that of the troops was extremely high throughout these hostilities.

Although the exact incidence of psychiatric casualties among civilian population during the Indo-Pak conflicts is not known, it could not have been high because the morale remained at a very high level.

The types of psychiatric breakdown in civilian population cannot be different from those found in the troops except that the psychosomatic manifestations are likely to be more common than overt psychiatric syndromes.

The incidence of psychiatric reactions in any civilian population during a war would depend mainly upon its morale which in its turn is related to many factors, some of which are given below :—

(a) Faith in the leadership of the nation

(b) Faith in the righteousness of the cause for which the country is fighting

(c) Efficiency of communication system and availability of reliable information

(d) Sense of belonging together as a social group as useful members who can contribute effectively for the achievement of the objective

(e) Confidence in the air raid alarm and provision of adequate air raid shelters

(f) Faith in the superiority of own armed forces as fighting men and inadequacy of the fighting equipment

(g) Enemy propaganda and measures adopted to counteract the same

(h) Active participation in some form by the civilian population in the activities which are known to help in the achievement of an ultimate victory, *e.g.*, by joining organisations such as home guards, civil defence, industries responsible for supplying the defence needs, agencies looking after the welfare of servicemen and their families etc. etc.

SUMMARY

The occurrence of psychiatric casualties in the fighting troops results in loss of trained manpower and thus in impairment of fighting efficiency of a formation. Psychiatric reactions also occur in the supporting non-combatants and civilian population living in the zone of action. It is important that we should be aware of the causes and types of such breakdowns and their treatment so that we are not caught unawares in the event of a future war.

A brief description of the types of psychiatric reactions occurring under battle conditions and an outline of their management are given above. The secret of success lies in treating such cases as early and as forward as possible.

MULTIPLE BARRELS

LIEUT COLONEL G. S. SUBBA RAO

INTRODUCTION

'Firstly, there was now what we called Stalin's Church Organ—they themselves called them Katies—nerve-racking, stupefying things; the rockets reared up flaming a long way behind the lines...to engulf everything in life—destroying fire.....We were absorbed by a fear against which there was no weapon.....'. Thus reminisces a Wehrmacht soldier who had fought at Stalingrad. On the other side of the hill, a Canadian cavalryman at Caen speaks, '. . . . the dreaded moaning mannies, the electrically propelled rocket motors; to be caught in their fire was certain disaster . . . .'. Each of these seasoned fighters was voicing his feelings and reactions on being subjected to the fire of one of the weapons of World War II—The Multiple Rocket Launchers. The aim of this paper is to study the historical background, development and tactical employment of multiple rocket launchers and to assess their suitability for our army.

HISTORICAL BACKGROUND

CHINESE are credited to have used rockets against Mongols originally in the beginning of the thirteenth century. By the end of the same century the technique of rocketry was known to almost the whole of Europe.

Rockets, inspite of the tremendous effect that they had on the morale of the enemy troops, were relegated to a secondary position with the introduction of Cannons. However, they were used to great effect in Napoleonic and other naval battles. In 1846 William Hale, an American developed a spin stabilised rocket which was later introduced in their army. However, with the rapid development of accurate, long range artillery, rockets lapsed from service in almost all countries.

WORLD WAR II AND AFTER

During World War II as the number of tanks increased and as the development of tracked and other vehicles all led to greater mobility and flexibility on the combat units in action, the necessity arose for weapon systems and techniques capable of striking these types of dispersed and mobile targets quickly and effectively in conjunction with conventional artillery.

In principle such destruction is possible with guns and conventional ammunition. But as the conventional artillery has a limited rate of fire and somewhat restricted supply of ammunition it would be impossible to provide the number of such guns and the appropriate number of personnel and the quantities of ammunition to give effective saturating fire on this type

of area target, on tactical, technical and financial grounds. In their search for weapons that would provide this area bombardment capability both the Allied and German forces made extensive efforts to develop rocket launcher from 1940 onwards. Amongst those which came into operation were the Russian 'Stalinorglen' and the German 'Nebelwerfer'. These were in the early stages of development, both in rocketry and launcher systems and they had neither the great capability or higher degree of accuracy by modern standards. But because of their ability to provide prompt and massive engagement of dispersed targets at short range, they were relied upon, and feared by both sides. Some idea of comparison of effort between conventional artillery weapons and a rocket system on a target area can be drawn from a simple example. One rocket launcher battery, comprising of 8 multi-purpose launchers each having 36 rocket barrels can deliver 288 rounds in 20 seconds. To deliver the same fire power with guns, 96 would be required, firing at a rate of 3 rounds per 20 seconds. Apart from the cost of this effort, the effect on the target would be much less damaging.

The immediate post-war years were followed by a period conspicuous for the over-estimation of the merits of the guided missiles and of the artillery shell with a nuclear warhead and their application to all types of operation. This attitude also led to the simultaneous neglect of army development of conventional weapons. Gradually, however, it was realised that the threshold of the employment of nuclear weapons, in both limited conflict and large-scale wars, would be continually pushed higher. Thus between late 1940's and mid 1950's there came a renewed development of modern conventional artillery weapons and in parallel with this, the development of area bombardment systems using unguided missiles. The latter stems from the modern military requirement of being able to engage armoured formations spread over a fairly large area, at ranges of 15 kms—or even as far as 30 kms if possible—by means of indirect fire.

The engagement of these massed vehicles by conventional anti-tank artillery would be quite inadequate for a number of reasons. For example, the collection and computation of accurate details required to engage targets at such ranges would be complicated. Studies of results of hit—probability from long range indirect artillery fire show that this method of attack cannot be advocated. The large quantities of ammunition required are out of all proportion to the success likely to be achieved. The massive, short duration area bombardment necessary can best be achieved by rocket launcher batteries.

DEVELOPMENT OF EQUIPMENT

During the past few years, therefore, greatly increased importance has been attached to the development of this type of area bombardment weapon, discharging nonguided missiles. In NATO, the Eastern Block

countries and also in the non-aligned countries, development work is in progress. The countries which have made the maximum use of multiple rocket launchers were the USA, USSR, Germany and to some extent Britain. A brief survey of the development of rocket artillery in each of these countries would be of interest.

THE UNITED STATES OF AMERICA

Research into the study of employment of rocket projectiles, commenced at the outbreak of World War II resulted in the development of 4.5 inch M16 and 7.2 inch rockets. To fire the 4.5 inch rocket T66, T27 and T34 multiple projectors were designed each having 24, 8 and 6 launcher tubes respectively capable of firing two rockets per second. These launchers were either towed, or were employed in various self-propelled versions. Another notable development was the invention of the 12-round gravity-feed automatic barrage projector, which further enhanced the rate of fire of multiple rocket projectors.

SOVIET RUSSIA

Development of multiple rocket launchers commenced in 1941-42 primarily to replace the heavy losses of artillery equipment suffered in German hands during 1941-42. They were rockets of 132 mm and 140 mm Calibre, discharged from truck mounted, 16 tube M13 and BM14 launchers.

The Soviet Army concentrated the tremendous firepower of multiple rocket projectors by grouping such units into rocket divisions which were employed en masse. With the advent of nuclear weapons, rocket projector units have been made organic to the tank and motor rifle divisional artilleries.

GERMANY

Under the terms of Versailles, Germany was restricted to employing only non-toxic smoke projectors. Research on the development of large calibre mortars for laying smoke diverged into the field of military rockets. The result of this research was the 'Nebelwerfer' or 'Smoke Mortar' which was actually the first rocket weapon. Nebelwerfer was a multi-barrel electronically operated mortar which was developed in the following versions:—

(a) The six-barrelled 150 mm Werfer 41 and its ten-barrelled self propelled variant, the 'Maul Tier' (Mule).
(b) The five-barrelled 210 mm Werfer 42.
(c) The six-barrelled 300 mm Werfer 42.

The Bundshehr appreciates that the Soviet Army, in a non-nuclear campaign, regards the tank as the principal combat weapon. All the Eastern Block countries also have very large numbers of armoured vehicles, at their disposal. Engagement of such massed targets by conventional anti-tank artillery will not only be uneconomical, inadequate but also

ineffective. A massive, short-duration area bombardment weapon would be ideal. After lengthy technical evaluation and troop trials Bundshehr has introduced a multiple rocket launcher into service. This consists of two clusters of 18 barrels from which 110 mm ballistic, flight-stabilised surface to surface rockets can be fired. The launcher is built on to a 7-ton, cross-country vehicle. This 110 mm rocket, by virtue of its construction offers a very high degree of safety in handling and operation. To achieve the minimum of maintenance, components and ancillary equipment likely to cause problems have been eliminated. In service, any small problem arising can be attended to by the crew itself. With the introduction of this Rocket Launcher, an artillery commander has been given a powerful and reliable weapon of decisive value to engage large area targets.

BRITAIN

In 1944, the British Army used multiple rocket projectors for the first time at the Caplux of Walcheren. Subsequently, they were employed at various places in North West Europe as well as in SEAC. The first projector to be employed was a 40-barrel equipment, mounted on a 21 cwt general service trailer. Later a 30-barrelled version was introduced into service. A range of 8000 yards was achieved, by firing a rocket projectile which amalgamated the body of a 3 inch aircraft rocket with the warhead of a 29 lb naval high explosive shell. For SEAC, a lighter 16-barrelled jeep towed rocket projector was designed, weighing 835 lbs.

Rocket projector regiments were used as part of Corps Artillery Brigades. Later, as the air threat declined, particularly in SEAC's theatre of operations, rocket projectors were made the alternate equipment for Corps Light Anti-Aircraft Regiments.

CHARACTERISTICS

Multiple rocket launchers were highly publicised in the Second World War, principally as they were new to the public. Though it has added to the fire power tremendously as a weapon, yet it cannot replace or substitute for artillery. They are valuable weapons for achieving quick concentrations over an area, simple and light wins a high rate of fire and have a devastating effect on morale. Their characteristics are studied in succeeding paragraphs.

ADVANTAGES

Weight. A multiple rocket launcher weighs far less than an artillery piece of comparable calibre. For example, T66 Rocket Launcher designed to launch 4.5 inch rockets weighs 2240 lbs fully loaded as against a 5.5 inch calibre medium gun which weighs approximately 9 tons !

Manufacturing Costs. Since they are designed to fire rockets, multiple rocket launchers have no requirements for gun cradles, recoil systems or breech mechanisms. Hence they are cheaper and quicker to

manufacture than conventional artillery pieces. In fact, they compete strongly with mortars for the title of the 'Poor Man's Artillery'.

Fire Power. Multiple rocket launchers can achieve far greater concentrations of fire than guns. Thus, one T 66 launcher with 24 barrels can fire 24×4·5 inch rockets in just 12 seconds. Compare this with a 25 pounder gun which at its intense rate can fire only one round in that time. This particular characteristic gives the following added advantages :—

(a) The use of a few rocket launchers produces the fire effect of a much greater number of guns and thus avoids the necessity of presenting large concentrations of guns as targets for enemy counter-bombardment and air strikes. Necessity for vast gun areas to deploy large number of guns to produce this fire power with its attendant problems of camouflage and concealment, is avoided.

(b) It greatly facilitates rapid and speedy engagement of area targets, particularly armoured formations which present themselves as fleeting targets.

(c) It produces maximum fire power with minimum personnel. The crew of one rocket launcher will produce in effect the same fire power as the combined crews of a large number of guns.

Effect on Morale. Evidence from various sources proves that fire from multiple rocket launchers has a very great demoralisation effect. Even well trained and seasoned troops are adversely affected both by the sight and noise of incoming rockets, and by the intense 'blanket' of fire produced by them in the target area.

Mobility. Due to its light weight and small size rocket projectors are extremely mobile. They can deploy rapidly, fire a number of quick salvos and move to a new firing position to avoid detection and retaliatory action. Their lighter weight also enables these weapons to be brought into action over terrain which is inaccessible to guns of comparable calibre.

LIMITATIONS

Range. Rocket launchers can achieve comparatively limited ranges. For example, the US T66 Projectors attained a range of 5250 yards and the Russian BM24 upto 7700 yards only. This necessitated their deployment as forward as possible and thus be vulnerable to counter-bombardment. However, this limitation is being overcome by research and new developments in ballistic rockets and projectors.

Inaccuracy. This is the most serious drawback. Inspite of all the advantages it has over artillery, it can never replace guns due to this drawback. This relative inaccuracy restricts its use for engagement of area targets only.

Replenishment of Ammunition. The high rate of fire of rocket launcher poses a problem of ammunition replenishment. Rocket projec-

tiles are bulkier than gun ammunition and hence present difficulties of transportation and stowage.

TACTICAL EMPLOYMENT

Multiple rocket launchers can be employed tactically to great advantage, making use of their advantages in all operations of war.

Advance. In advance rocket projectors can be employed to bring down sudden concentrations of intense fire on known or suspected locations. The use of rocket projectors may well speed-up the advance by demoralising the enemy by sudden weight of fire and crumbling his resistance.

Defence. They can be employed for harassing fire and defensive fire tasks in depth as well as counter bombardment, should opportunity arise.

Attack. The greatest effect of multiple rocket launchers would be during the attack. The intense concentrations of fire obtained from these weapons together with their great demoralising effect, would be of tremendous value in conducting harassing fire, counter-bombardment and preparatory bombardment for the destruction of enemy defence works and the demoralisation of his troops. Enemy gun and mortar areas also can be engaged with good demoralising effect.

Withdrawal. The tremendous fire power will be of great assistance in support of covering troops and intermediate positions and to carry out harassing fire tasks.

Besides the above they are ideally suited for fire on airfields, towns, factories, headquarters, signal centres and administrative installations.

ROCKET LAUNCHERS FOR OUR ARMY

As we have seen from our past experience, in the event of hostilities with our neighbour in the West likely theatre of operations for our Army will be the plains of Punjab and vast deserts of Rajasthan and Kutch. In such a terrain the opposing forces are likely to employ armoured and motorised formations and the enemy's tactical emphasis will be on mobile operations on a wide front. Whatever the nature of operations might be, the enemy would, in effect be presenting a fleeting series of targets. For reasons already brought out conventional artillery and ammunition would be inadequate, at the same time to miss fleeting opportunities is inadvisable. It is therefore felt that multiple rocket launchers would be very useful weapons to supplement conventional artillery for rapid and effective engagement of such targets. In addition they are cheap, easy to manufacture and maintain. They require minimum training for crew—all of which make an attractive proposition for our country.

Some of the requirements of suitable multiple rocket launchers would be :—

(a) *Range.* The maximum range should be of the order of approximately 25-30 kms to enable the projector to supplement the medium artillery effectively.

(b) *Leinality.* The warhead of the rocket should be of a calibre large enough to be effective against armoured vehicles. This would necessitate a calibre at approximately 100 mm—120 mm.

(c) *Mobility.* In order to facilitate fast movement across country it is preferable to have them to be self-propelled on tracks or wheels.

(d) *Accuracy.* Though rockets are inherently less accurate than projectiles fired from guns, spin stabilised rockets offer a greater degree of accuracy than their fire stabilised counterparts.

(e) *Demoralisation Effect.* Noise will add to the demoralising effect of rocket projectiles. The German Nebelwerfer Multiple Rocket Mortar has perpetuated itself in the memory of Allied Troops as 'Moaning Minnie' due to the unnerving noise made by its incoming mortar bombs. The proposed rocket projector for our Army should aim for similar effect.

ORGANISATION

A careful study or review of organisations used by various countries which have adopted this weapon has shown that, so far, the particular characteristics of these weapons have been best exploited when they have been used concentrated under centralised command. The present concept, however, envisages the use of long range multiple rocket projectors primarily as area weapons, to supplement medium and field guns for rapid engagement of opportunity area targets. It is therefore felt that if rocket projector regiments are introduced in our Army, they should be integrated with Artillery formations at the scale of one regiment per independent artillery brigade.

CONCLUSION

Multiple rocket launchers have tremendous fire power and great demoralising effect. They in conjunction with conventional artillery weapons can produce devastating results against armoured and motorised formations in mobile operations.

Considering their characteristics they are ideally suited for our Army. They have the added advantage of being easy to manufacture and maintain and cheap. Training of the crews is also quick and easy. If allotted at the suggested scale of one regiment per independent artillery brigade it will form a formidable asset.

Multiple Barrel Rockets to be introduced in our Army should have a range of 25-30 kms, a calibre of 100 mm—120 mm and it should be based on self-propelled tracks or wheels. It should also have rockets which are fire stabilised.

NIGHT FIGHTING

Lieut Colonel Hari Nath Hoon

INTRODUCTION

Night operations were very rare in World War I. The general resistance to try such a course was all the more curious since the machine-gun dominated the battle field, and was the main factor in producing the prolonged deadlock, while losing much of its deadliness in conditions of poor visibility. Yet although the difficulty of assaulting a well entrenched enemy in daylight was universally recognised, the possibilities of assaulting under cover of darkness were neglected, except in minor attacks and raids. Commanders were so obsessed with the risks of confusion that they habitually chose the more certain risks of annihilation for their troops and stultification for their plans. One of the few exceptions was the attack delivered by the Fourth Army in the second phase of the Somme offensive in July 1916.

During the years that followed the importance of night fighting grew and in World War II, the Allies were forced to resort to night fighting. The opening assault at Alamein, on 23 Oct 1942, was launched an hour after mid-night. The further thrusts were mostly made under the cloak of darkness and Rommel says in his papers "Night attacks continued to be a particular speciality of the British". In the East, the Japanese made striking progress by resorting to night operations, and later in the Korean War the Communists could effectively counter a modern army by fighting at night. Experience in the more recent conflicts with our enemies has clearly demonstrated the advantage and need for conducting operations round the clock and at an increased tempo.

The aim of this paper is to discuss the concepts of night fighting and night training that we should adopt with special emphasis on the following :—

(a) The importance of night fighting and its special problems.

(b) The developments in night fighting and observation aids.

(c) Their influence on tactics and changes in tactical concepts.

(d) Special aspects concerning the supporting arms and services.

(e) The methods of night training and their improvement.

IMPORTANCE OF NIGHT FIGHTING AND ITS SPECIAL PROBLEMS

Importance of Night Fighting

The cloak of invisibility is the best means of surprise, and better

than any armour as a means of protection. Moreover, the cloak that nature provides nightly, has the advantage of being more consistent and predictable than any artificial one. Its value, however, depends on the degree of training far more than in the case of other tactical aids. Darkness is a friend to the skilled soldier, but a cause of confusion to the unskilled.

We must make full use of this darkness if we are to retain the initiative, conserve manpower, and overcome many tactical, numerical and material advantages that would accrue to the enemy from operations conducted only in daylight. We must become proficient in night defence as well as attack, because the effectiveness of modern weapons is leading all armies towards operating increasingly during darkness.

PROBLEMS IN NIGHT FIGHTING

The problems in Night Fighting are varied with units and formations, and these normally stem from the degree of training that has been received in the conduct of the various operations.

In defence, due to the feeling of uncertainty created by darkness and battle noises there is a tendency to open fire even without seeing the enemy. In order to locate our automatics the enemy will fire at random, which at night may seem in close proximity to our locations. There is a temptation to return the fire thereby giving away our positions. Fire control is of paramount importance and every commander must ensure that fire is held till the enemy is seen clearly. Then there is the problem of speedy and silent preparation of defences including laying minefields and wire obstacles.

In attack, maintenance of control when attacking troops come under fire during battle and speedy reorganisation and move forward of reorganisation stores are the major problems. Good subunit training would go a long way to overcome these difficulties.

In advance cross country, there is a problem of keeping direction and the ability to move stealthily across country over long distances and to lay ambushes and construct road blocks behind the enemy lines. Coupled with this is the difficulty in negotiating natural and artificial obstacles which would be encountered.

Common to all operations of war is the inadequacy of fire support from the guns as well as from the air. There is always a feeling of isolation in the battlefield which reduces morale. It would be best for the troops to realise that the enemy suffers from the same disadvantages and by relying on stealth and silence they would be able to achieve surprise which would give them greater dividends.

Then there are the physical and psychological problems of fear, lack of confidence and fear coupled with maintenance of weapons, functioning of administrative echelons, evacuation of casualties, and difficulty in night vision.

THE DEVELOPMENTS IN NIGHT FIGHTING AND OBSERVATION AIDS

General

The Army's efficiency in night fighting can be judged by its ability to carry out successful night operations under really dark conditions. In general, it is quite wrong to judge night fighting efficiency on ability to carry out successful noisy attacks under conditions of real or artificial moonlight. The mastery must include the ability to move, patrol, defend and assault in absolute darkness aided by observation aids if available. These aids are being used extensively by most of the modern armies of the world and if proficiency is attained in their use, they can be extremely valuable.

Observation Aids in the Soviet Army

The Russians use the infrared searchlight and telescope combination at the observation posts. The searchlight and telescope are separately mounted on bipods and provide night vision for about 1000 yards. Most of the border control posts within the Soviet Union are provided with equipment of this type.

The infrared simperscopes are now a common feature in the Soviet Army and are liberally issued to the battalions. It enables the simper to see about 200 yards, depending on such factors as the size of the target, weather and type of terrain.

The anti-tank guns in the Soviet Army possess the infrared gun sights having a range of about 900 yards and we are well aware of the night fighting and driving capabilities in the Russian tanks. Most Soviet trucks and jeeps are equipped with windshield mounted on helmet mounted infrared binoculars, headlights with filters and vibrator power units to provide night vision about 50 yards ahead.

In defence, the Russians use the infrared intrusion alarm device effectively. These are similar to the electric eye gadget which automatically opens doors and windows of shopping centres and supermarkets. A narrow infrared beam is emitted from a fixed position towards a fixed receiver, and an electric response is kicked off whenever the beam is interrupted. Soviet forces guard some sectors of the Iron Curtain in this manner.

Besides the night vision periscopes, the Russian troops are issued with metascopes. This is a small passive device used to detect radiation from infrared searchlights or simperscopes of hostile forces. The effective range depends upon the strength of the infrared light source detected. It might detect a searchlight well over 1000 yards, a simperscope or filter equipped headlight at over 100 yards. These are similar to binoculars.

OBSERVATION AIDS IN WESTERN COUNTRIES

RADARS

(a) *Short Range Radar.* Radar sets weighing not more than 2½ kilogram can detect enemy personnel moving half mile away in darkness and fog, and vehicles three miles away. Objects hidden by natural foliage are in no way immune to detection. This is an infantry company radar, suitable for use with our forward platoons and patrols.

(b) *Medium Range Radar.* The British set Radar GS No. 14 has proved to be a very useful gadget for ranges upto 6,000 metres. A set used in the American Army has a maximum range of 18,000 metres and is capable of being manually or automatically operated for tracking and detecting targets with accurate range and azimuth readings. The whole equipment weighs about 215 kilograms and is transportable in a quarter ton truck with trailor. A team of three men is required to operate it. This equipment is ideal for use in battalions or brigades.

(c) *Long Range Radar.* The American Army has an ultra sensitive equipment which can spot a moving tank, truck or a jeep upto 24 kilometres, a walking soldier upto 16 kilometres under ideal conditions and even spot a crawling soldier upto three kilometres.

IMAGE INTENSIFICATION

(a) *Individual Weapon Sight (IWS).* The IWS is extremely useful, both as a weapon sight and as a night telephone. A useful instrument in the infantry section, it weighs approximately three kilograms.

(b) *Crew Served Weapon Sight (CSWS).* Useful as an anti-tank gun sight only. It weighs approximately 10 kilograms.

(c) *Night Observation Device (NOD).* The NOD is of value to Commanders, Forward Observation Officers and Mobile Fire Controllers. Due to its weight (approximately 20 kilograms) and size, it would be more useful if it could be built into tanks, armoured personnel carriers and command vehicles.

INFRARED DEVICES

(a) *Infrared Weapon Sight.* The equipment consists of a scope fitted on top of a rifle and its weight including the light source and power supply is only five kilograms. It has a viewing range of 230 to 270 metres. It is adaptable for fitting on to machine guns, rocket launchers and 106 mm recoiless rifles.

(b) *Infrared Binoculars.* These binoculars allow troops to drive vehicles and perform innumerable tasks in complete darkness. The binoculars are strapped over the helmet to fit the eyes and counter balanced by a transistorised power supply on the back of the helmet. This type of equipment has been adopted for use as periscopes and telescopes for night driving and firing in

tanks. Binoculars have a range of about 50 metres. Periscopes have ranges varying from 60 to 300 metres.

(c) *Thermograph and Evapograph.* These are passive infrared devices used for detecting personnel, vehicles and terrain. The devices are sufficiently sensitive to record body heat given off by personnel, and solar heat which is given off during hours of darkness. The thermograph produces a similar vision to a radio photo. In the evapograph, the thermal pattern is imaged on a thin oily membrane which absorbs the radiation and forms a picture. The picture can be viewed directly or photographed.

(d) *Metascope.* This device detects infrared rays. A small 200 grams instrument, it can easily be carried by a soldier. This device gives an audible warning in an ear plug. Very useful for issue at section level.

Lasers. This is a very short pulse of high intensity. Their military use at present is restricted to range finding and for providing auxiliary illumination to improve the performance of image intensifiers.

Television. Low light television is now practicable and when miniaturised, television can be built in armoured fighting vehicles for driving, surveillance and weapon fighting.

LIMITATIONS

Infrared Equipment. Some of the limitations of infrared equipment are as follows :—

(a) Fog, smoke, dust and rain affect its performance. It also does not pass through water.

(b) Bright moonlight considerably reduces the intensity of the image.

(c) White light on infrared equipment causes a blackout to the viewer for about 10 to 15 seconds.

(d) A green image which is normally two dimensional, makes it difficult for the viewer to discern and distinguish various targets. It is also difficult to estimate the range of targets viewed through infrared.

(e) Natural obstacles like hills and mounds affect the line of sight path.

(f) Operators must be very highly trained.

Radar. Radar has its limitation in that it can be jammed electronically. Its operation requires great skill and prolonged practice, and will impose considerable strain and fatigue on operators. The siting of medium and long range radars whether these are located in the screens or in the main defence will always be a problem. Surveillance equipment is normally most effective when operating from forward slopes and prominent high ground. It may be very vulnerable when sited in this way particularly by

day and must be protected. The siting of radars will therefore always be a compromise between line of sight requirement and concealment, protection and mutual support of defended localities which must give it protection.

CONCLUSION

These devices will enable operations to continue by night at almost the same intensity as by day. The traditional pause in battle, while both sides replenish stocks, feed troops, recover casualties and gain some rest may now never happen. The side best able to fight continuously over a prolonged period may win, regardless of who has superiority in night fighting equipment.

INFLUENCE OF OBSERVATION AIDS ON TACTICS AND CHANGES IN TACTICAL CONCEPTS

In spite of the aids discussed earlier, it will not be possible to turn night into day. Certain major changes in current tactics can, however, be predicted.

The range surveillance and viewing devices available to a defender will rule out "surprise" night attack. Infiltration will be more easily detected and countered. Target acquisition will be greatly improved and darkness will not prevent engagement at near normal daylight ranges.

An advancing enemy will have to allow for the possibility of a rear guard maintaining passive surveillance on his forward movement, and guard against running into a prepared ambush. Since nights will not prevent observation, a night withdrawal will become more like a day withdrawal, making a clean break difficult.

Night observation devices will give some major advantages to the attacker. He will possess a better reconnaissance capability, easier movement and deployment, better command and control, less preparation and rehearsels. In fact, quick night attacks from an unexpected direction are now possible.

It is clear on the whole, that the development of these night fighting techniques favour the defender. A clear night vision plan must be made and control vested at the highest level. Radars, alarm devices, thermal pointers and image intensifiers must be sited so that information from the detection devices be passed to weapon sites in time to be of use. Gaps between localities must be observed. The inevitable conflict between the best position for surveillance devices and the best ground for defence must be carefully resolved.

In counter insurgency operations the possession of light, manportable detection, viewing and weapon siting devices will help considerably to counter balance the guerilla's normal effectiveness at night.

SPECIAL ASPECTS CONCERNING SUPPORTING ARMS AND SERVICES

ARMOUR

Although tanks undoubtedly are rather blind and vulnerable to short range anti-tank weapons at night and find much more difficult in moving across broken country than they do by day, they are still very effective in the dark. There are a number of simple ways by which the difficulty of night fighting can be overcome. Careful planning and reconnaissance, the use of tracer fire along the axis of advance, star shell, infrared and in particular the use of white light from tank searchlights, all help to a great extent. The modern illuminated gun sight also gives reasonable shooting at prominent targets with only a minimum of moon light.

The main difficulties experienced in the use of tanks are navigation and control, target acquisition and their accurate engagement and liaison with accompanying infantry. In addition, due to the limited range of tank commander's and gunner's vision there is a loss in the effective range for direct firing. Above all, a major impediment to the use of tanks in night operations may be the lack of correct mental attitude and determination in some commanders and crew for the concept itself.

However, it should be expected that even when infrared devices are not provided or their use is not desirable, tanks can move and fight at night. The more important pre-requisites to their success in night operations are given below :—

(a) Intensive training in night operations.

(b) Mental determination.

(c) Intimate cooperation with infantry and other arms.

(d) Thorough preparation including reconnaissance, planning and briefing.

ARTILLERY

The difficulty of artillery support during night operations would be its accuracy as observation would be blinded and correction will be impossible. It would also be difficult to take on opportune targets which disclose itself at the last minute. On targets which have been registered during day light, it would be possible to bring down fire during the hours of darkness.

It would also be time consuming for artillery units to move and again deploy particularly in advance operation of war. While fire will be guaranteed and its effect probably more demoralising than by day, it must be understood that artillery has its limitations at night and to be effective, time must be given during day for planning and registration.

ENGINEERS

Engineer tasks carried out in the face of the enemy will become hazardous because of the enemy's ability to observe and engage targets effectively. The main factor to be considered will be the time taken to complete a task which will have to be borne in mind in planning. However, with training the time taken could be reduced considerably and it would be in our interest to allow the engineers sufficient scope for reconnaissance during day.

SIGNALS

At night communications would be established on very high frequency radio sets as compared to high frequency sets. Though a more expensive equipment, the available ranges remain constant by day and night.

Maintenance of lines will be slow and tedious, and certain amount of delay will have to be accepted in their repair.

SERVICES

Operations will be intensified resulting in a change in daily consumption rates. Operations will also conform to a cyclic pattern as at present the intensity being low at night. Therefore, the services will have to change their pattern of functioning.

METHODS OF NIGHT TRAINING AND THEIR IMPROVEMENT

GENERAL

If we are to succeed in future combat we must be 24 hour fighters who can operate with or without man-made aids. Our objectives must be to beat any potential enemy by opposing him with troops more proficient in this old but under-developed dimension of the battlefield. If we are to succeed, it is important that our training is improved to include mastery in movement, patrolling, defence and attack in absolute darkness.

METHODS OF NIGHT TRAINING AND THEIR IMPROVEMENT

At present our night training normally consists of weekly or monthly maintenance nights, route marches, patrolling or an exercise usually terminating with the reorganisation on a limited objective. In regard to the use of armour during darkness, even a remote suggestion is apt to draw loud protests unless the tanks are fitted with night vision or fighting devices. The fact is that we are lazy to plan in detail and make our night training or exercises interesting or worthwhile.

Training in night combat must not be confined to special units. It is essential that all troops are trained. It is best to begin early in the soldiers service as soon as the basic training cycle has ended, and thereafter include all types of exercises by all sizes of units. Training should include logistical, administrative and headquarter troops as well.

The ideal answer is that units upto Divisional Headquarters should go away for at least a weak at a time to work and train at night. There should be no movement during the hours of daylight. We should devote the fourth week of each month in training in night operations. Certainly such a scheme would dispel our more civilised sensitivity to the physical and psychological factors of night combat, and develop among participants complete confidence in their ability to fight effectively at night. Nothing can equal such practical training, and an incidental by product might well result in improved daylight operations by troops.

Besides tactical training there is a requirement for troops to undergo tests in night vision. Those with very poor night sight should be assigned to arms other than infantry. These tests should also commence as soon as the recruit has completed his basic elementary training. It must be continuous, unhurried, thorough and must include tests in scanning, off centre vision, dark adaptation, and recognition of military objects at night. The young soldiers must be able to recognise the sound of digging wire cutting, the cocking of weapons, removal of bayonets, and the movement of varying numbers of men over different types of ground. Then comes training in night movement, direction keeping, digging and wiring and breaching of obstacles. Emphasis must be placed in sentry duties, patrolling, bayonet fighting and grenade throwing.

Night training and night exercises should be normal, while exercises in daylight the abnormal. Reliance must be placed on stealth and use of the bayonet rather than on scientific aids and on heavy supporting fire of other arms.

CONCLUSION

To be successful night fighters it is essential to plan, train and above all possess a mental attitude that darkness can be exploited to gain advantage. The benefits that accrue are far more than from operations conducted by day and casualties much less owing to the natural blindness.

The modern armies in the world, with the observation aids available, are taking on to night operations by all arms to counter the firepower of modern weapons. As years go by, the importance of such operations and techniques will increase, and it is in our interest to keep pace with the developments in other countries. Though we are not in a position to possess all the aids, there is no excuse not to train ourselves and practice the concepts of night fighting and night training.

MAHARAJA RANJIT SINGH AMONG GREAT CAPTAINS

LIEUT COLONEL GULCHARAN SINGH

RANJIT Singh, when compared with the Great Captains of the world has many qualities in common with them, and excells them in a few others. Take the Great Captains, such as Alexander the Great, Changez Khan, Napoleon, etc., and when we compare him with any of them we will realize the soundness of the statement.

First of all let us take Ranjit Singh and Alexander the Great. Strangely enough, the father of both the Great Captains had remarked on the smallness of the States they were leaving for their illustrious sons to govern. And, both the enterprising young rulers expanded their respective kingdoms with their own efforts, the size of which, of course, depended upon the circumstances prevailing then. Prinsep writes : "And let not those, who are disposed to give to Ranjit Singh the credit due to him as founder of a kingdom and dynasty, take exception at the circumscribed limit of his dominion, as lowering his merit in comparison with others. The circumstances of his position, with the British Government on one side,—fresh risen to a majesty of power, that it would have been madness for him to think of encountering, and with the prejudiced and fanatic Moosulman population of Afghanistan upon every other Frontier, have been barriers against extension, which it was impossible to overcome, and effectually forbad the hope of carrying the Sikh dominion beyond its present limits. The gain that has already been made upon the latter, and the manner in which the brave and bigotted Mohummedans, have, in many instances, been reconciled to the sway of hated, and even despised sect, are amongst the most creditable features of the policy, and career of Ranjit Singh." (1)

Whereas Alexander the Great's education had been carefully arranged under a tutor like Aristotle, Ranjit Singh was devoid of such an advantage; where the Macedonian inherited a trained army, a balanced force of cavalry, infantry and artillery, the Punjabi have had no such force, he had to build one with his own efforts and ingenuity. Unlike Alexander the Great, Ranjit Singh was neither ruthless nor did he resort to massacres and colour his hands with the blood of innocent people. Alexander even killed the defenceless civilians and also resorted to destruction, for example, his treatment with the Thebans. About Ranjit Singh, Lord Lawrence

1. Ranjit Singh, p. 188.

once observed : "True, he slew and conquered as all Orientals do, without the slightest feeling of right. But with him we hear of no after massacres; of no after impalings or floggings, of no pyramids of heads or of men, built into minars to serve as milestones, of all which atrocities he must have had examples before him. He mained but it was to save life and to clear the higways of robbers, but he never took life in cold blood." (2) Both had their fanatic fighters in "Akalis" and "Companions". These shock-troops revelled in stiff fighting campaigns throughout their lives. Although each had a formidable fighting machine it goes to the credit of Ranjit Singh that his army, composed as it was of men of all religions and shades, did not disobey the Maharaja, never rose in mutiny against him. On the other hand, Alexander's Macedonians, at one time, refused to advance and clamoured to return to their homeland.

It is an historical fact that neither of the Great Captains left behind them capable successors, (3) and the incident that followed their death are so similar. Within a few years of Alexander's death, his wives and children were killed, even his mother was not spared. His kingdom was divided among his Generals. Similarly, after the death of the Sher-i-Punjab (Lion of the Punjab) his sons (except one) were assassinated, his kingdom divided between the British and the Dogras, his youngest (minor) son was deported, and his youngest Maharani (Jind Kaur) was badly treated by the British.

Now, let us take Changez Khan who and Ranjit Singh had both succeeded their respective gaddis at the young age of twelve; both were illiterate; both had numerous difficulties to surmount in their advancement; both assumed their royal titles when they were in their early twenties. Quality rather than the quantity was the secret of their success. They did not inherit well organised and trained armies; they had to produce these with their own efforts. Neither of them ever gave the supreme command of any of the campaigns launched by them to their generals; it was always held by the royal princes, although the actual conduct of operations was exercised by the generals. Appointments were made by them on merit and on no other criterion; both were good judges of men. Both were secular in their outlook : where Ranjit Singh had Muslims, Sikhs, Hindus and Christians in his army as well as in the civil administration, Changez Khan had among his councillors, Christians, Pagans, Muslims and Budhists. Ranjit Singh's eastern boundary was secured along the Sutlej which formed the base for his expansion westwards and northwards; similarly, Huang Ho formed a firm base for Changez Khan and he expanded his domains westwards. Both died at the height of their greatness more or less at the

2. Similarly, Caesar, though a genius and a superb commander of troops, "was inordinately brutal : his campaigns were largely massacres and his battles ferocious killings." (Armament and History, Fuller, pp. 52—53.)

3. "It is the misfortune of absolute monarchy that the best rulers can never ensure a worthy successor." Keene.

same age—Ranjit Singh when he was 59 years old, Changez Khan at the age of 65 years.

For "his talents, his sagacity, military skill, and the vast empire which he gained and ably governed" Ranjit Singh has been called the Napoleon of the East. (4) One wonders as to how Jacquemont calls Ranjit Singh "a Bonaparte in miniature." No, he was a greater man. Napoleon was an educated person, a well trained army officer, had inherited a well established government and planned economic and social systems: he had, like Alexander the Great taken over an organised and trained army. But, Ranjit Singh did not have any of these advantages. He himself created a formidable fighting machine and, with his own genius and fortitude carved a huge kingdom. Napoleon had readily available a number of trained generals whereas Ranjit Singh had to train a band of young generals himself. Ranjit Singh was a clever diplomat and a capable strategist; he avoided fighting on more than one front at a time. When he had realised his limitations he abstained from the venture of going for Kabul, although as Hugal says, "a few strides more, and he will succeed extending his kingdom to the deserts of Persia, taking possession of Kabul, Kandhar, and Ghazni....."(5). But Napoleon failed to see the disadvantages of a Russian Campaign, and it ended in disaster.

Ranjit Singh, unlike Napoleon, disgraced none of his generals, nor any of his generals revolted against the Maharaja. As for Napoleon, there were intrigues against him in which even his trusted generals "quarrelsome Marshals" were also included. Napoleon's Marshals "were rather under a cloud in 1811."(6) None of the Ranjit Singh's generals could dare tell him as Nay had told Napoleon that "The Army will not march." Ranjit Singh's generals "dare devils one to all, motley in costume as in character, "yet they were bound to their master by the strongest ties.'

Napoleon met his final defeat at Waterloo, was later imprisoned and he died an ignoble death. Ranjit Singh, on the other hand, ever victorious,(7) was respected by all. Even when during his last days, he could neither move nor talk, his courtiers understood their monarch's signs and acted accordingly. He died as a great-man, a ruler of secular Punjab, a king feared and respected by all. Osborne, giving an account of the Maharaja's funeral, writes in his Journal : "Ranjit Singh is dead, poor fellow : and died as like the old lion as he had lived. He preserved his senses to the last and was (which is unusual with Indian princes) obeyed to the last by all his chiefs....."(8) Moreover, Napoleon was not a national hero of

4. Calcutta Review, 1846.
5. Travels, Hugel, p. 410.
6. Napoleon and his Marshals, A. G. Macdonell, p. 237.
7. "Ranjit Singh is one of those favoured generals, of whom history records but rare instances, who was fortunate enough never to be defeated", (Stupnagel, p. 21)
8. The Court and Camp of Ranjit Singh, p. 80 "It is rather fine, because so unusual in the East, that even to the last moments, his slighted sign, for he had long since lost his speech, were obeyed." (Up the Country, Emly Eden. ii, 136.)

France, he was an alien, he was a Corsican, and in the words of Liddell Hart "a supreme careerist, not a true patriot ; he was unchecked in pursuing his ambitions by any sense of responsibility for the ultimate welfare of his country as apart from himself."(9) But, in Ranjit Singh the Punjab had had her own son of the soil as a hero, who had the good of his country and the welfare of his people, his countrymen, ashis responsibility. Napoleon died a disgraced person ; Ranjit Singh died when at the height of his glory.

Let us take another famous military man who has left his imprint in this field. Gustavus Adolphus had an ideal upbringing : politics, literature, military service and physical development "wisely blended" with education. He had able instructors to teach him. Ranjit Singh had no such guiding hand. He was left at the mercy of environments ; but, he was a practical politician, an artful general. He was himself the brain as well as the soul of the plot. Ranjit Singh had had no councillor as Gustavus had in Axel Oxenstierna who "by his large wisdom, his astuteness and tact, often proved himself the brain of the duality." Like Gustavus, Ranjit Singh came to the scene "as a liberator, to release a multitude of petty states from their mental as well as their physical chains, and to build up a fabric of self-reliant" State.

In common with other great conquerers, Ranjit Singh possessed "a strong and stubborn resistance, slow, sure, and irresistible as the rising tide." Like other Great Captains, he was "indeed one of those master-minded which only require opportunity to change the face of the globe."(10) He possessed "powers of mind rarely met with, either in the eastern or western world"(11) and, as writes Vincent Smith, "would take high rank in any assembly of soldiers and statesmen."(12)

9. Thoughts on War, Liddell Hart, pp. 50—51.
10. Memoirs of Alexander Gardner, Pearse, p. 180.
11. A History of the Sikhs, Macgregor, Vol. I, pp. 225-226.
12. The Oxford History of India, Vincent Smith, p. 447.

ARTILLERY UNDER THE EAST INDIA COMPANY

MAJOR AP GUPTA

FROM the earliest days of British settlement in India, the local affairs and local problems were the concern of the East India Company. To start with, the Company had no need of any large sized regular army except for a small body of guards for its fortified factories*. But by and by the Company got itself involved in the political disputes and it thought necessary to raise troops to dictate its terms and also to eliminate the newly inducted French influence. In 1747 being hard pressed by the French in Madras, the Company appealed to the British Government for assistance, and accordingly a small naval and military force was sent from England. This force returned to England in 1750 but a number of Artillery NCOs, and men transferred to the Company's service remained in India to help raise the first three artillery companies of the East India Company Army which were authorised in 1748.

The Artillery of East India Company developed rapidly from this date. A separate Artillery Corps was formed for each of the three Presidencies of Bengal, Madras, Bombay and though each regiment modified its internal organisation and equipment to suit the local requirements, all those were in general modelled on the Royal Artillery. The Company's artillery included both European and native units and developed its own Horse Artillery and later Mountain Batteries. Artillery of each Presidency was necessarily separate and distinct. Communication by sea or land was long and tedious. Even this being so, forces of the three Presidencies fought side by side in many of the major operations in India as well as ex-India. We shall mainly deal here (for reasons of brevity) with the Bengal Artillery, as the basic character, of the remaining Presidency artilleries was the same ; and the reader shall get an adequate idea of the size, equipment and organisation of the gunners under East India Company.

* Major P.J. Begbie in his book 'Services of the Madras Artillery' records that the earliest mention of the Company's gunners appears in Sep 1628. "The garrison of Armegon at that time consisted of twelve pieces of ordnance and 28 soldiers, though of what arm does not appear. It is probable that they were trained as infantry and to work the guns also in time of need". In 1640 the Armegon factory was removed to Madrasanapatnam where a piece of ground had been purchased from the Naig of that district on which a fortification was raised, termed as Fort St. George. In 1690-91 a company of European artillery and a troop of horse constituted a part of the garrison of Fort St. George and in the same year Fort St. David, near Cuddalore was built.

BENGAL ARTILLERY

The first Company of the regular Artillery was raised in Bengal in 1749. About 45 of these men perished in the Black Hole incident in the aftermath of the fall of Calcutta in Siraj-Ud-Daulah's hands. Remanents of this company joined the Artillery that came from Madras. This detachment comprised of 100 men and 14 guns, mostly 6 pounders under the command of Robert Clive. After getting further reinforcements from Royal and Bombay Artillery, Chander Nagore was attacked. It surrendered after a gallant defence. Most of the casualties were inflicted by the defenders on two ships 'Kent' and 'Tiger' supporting the attack from the river. Out of these two ships 'Kent' being old and damaged was discarded and its sailors took service with the gunners. Thus we find immediately after the capture of Chander Nagore Clive getting ready to meet Siraj-Ud-Daulah at Plassey. Some of the sailors formed part of his gun detachments.

The Artillery element of the Nawab's army comprised of about 53 guns chiefly of large calibre. The method of bringing these pieces (24 and 32 pounders) into action was upon platforms large enough to hold the gun carriage with their details of men, each drawn by forty or fifty pair of oxen, added in difficult places by elephants in rear.

The battle of Plassey, right from the first shot to the last, was almost completely an artillery engagement. Despite the fact that Plassey laid the first foundation of the British rule in India, Bengal Artillery were omitted from the list of corps permitted to reckon it among their regimental decoration !

That the artillery could be decisive in dictating the course of a particular encounter is aptly illustrated from the description of the following two of the many such encounters* :—

1751 AD, Battle of Volconda** : "As the British line advanced a cannonade on both sides ensued, and the only service done was by the Madras Artillery, one of whose shots blew up a French tumbril, killing and wounding some and frightening a hundred more, who with M.D' Antenil at their head, ran into the fort, whence they opened an ill-directed fire upon the British from 14 guns. The European battalion was seized with panic and took to flight in spite of all the efforts of some of the officers present including Lieutenant Clive, to rally them. This was the more disgraceful as the troops of Abdul Wahab Khan and the Caffres stood their ground".

* These descriptions have been taken from 'Services of Madras Artillery'—By Maj P.J. Begbie.

** Volcondah—a strong fort 90 miles inland from Arcot to Trichinopoly. So long had Trichinopoly and its immediate neighbouring countryside been a theatre of war that for miles in every direction scarcely a tree had been left standing and the English detachments had to proceed five or six miles in order to procure fire-wood.

Battle at the Golden Rock—Trichinopoly: "His£ artillery was distributed in front, in rear and in the intervals of his columns. The rear had scarcely cleared the rock when the whole of the enemy's cavalry came thundering down on the column. The artillery waited until they came within range, when the eight guns opened, firing from eight to ten rounds per minute and emptying a vast number of saddles. The whole of the horse drew up thunder, and after a brief pause to recover from their astonishment, went to the right about, returning as speedily as they had advanced, after having lost 600 of their number".

Coming back to the task of tracing the evolution of the Bengal Artillery, we find that the 2nd Company of the Bengal Artillery was raised on the 19th September 1758, and shortly afterwards it participated in many small campaigns in the South. A notable action being against the French strong-hold in Masulipatam. Here amongst other things 120 pieces of ordnance were captured from the French. No details of the type, make and other specifications of these guns are now available. The fact that after suffering heavy casualties the troops of East India Company captured 133 guns at Buxar goes to show as to how much importance was given to this branch of the Army by the Indian rulers.

A 3rd Company was raised on 17 September 1763 and was stationed as a garrison company at Fort William for several years. A fourth was raised on 4 August 1765 and also from that date onwards Artillery became a distinct command; and the gunners accompanied the Company's forces in all its missions. In March 1770 a fifth Company of Artillery was raised at Fort William and in May the companies were grouped into a battalion to which an adjutant was allowed. In September the same year, the lascars were divided into twenty eight companies of which seven (each comprising of two serangs*, two tindals**, and hundred lascars) were attached to each of the three companies, with the Brigades and to the one stationed at Fort William.

The regiment at this time, assuming no change had occurred in the strength of the companies, would have consisted of :—

£ Major Laurence's.

* Serang—Boatswain of lascar crew

** Tindal—a corporal of lascars

	Lieut Col. Commandant	Major	Adjutant	Captains	2nd Captains	1st Lieutenants	2nd Lieutenants	Fire Workers	Sergeants	Corporals	Drummers	Bombardiers	Gunners	Matrosses	LASCARS		
															Serange	Tindals	Privates
By Calculation	1	1	1	5	5	5	5	5	20	20	20	40	120	300	56	56	2800
*By returns of 1772	1	1	—	4	4	16	16	11+	30	20	18	3	40	—	48	200	2350

* with a staff of 1 Surveyor of Stores, 1 Regimental Adjutant, 5 Adjutants and a Quartermaster, and 12 Conductors.

+ Cadets

Lt Col Pearse who succeeded the command of the Regiment in 1769, found that it was a common practice to make any midshipman, who was discontended with the life on board the ship, an officer of Artillery, from a strange idea that a knowled ;e of navigation would perfect an officer of that Corps in the knowledge of Artillery. We also find that Navy was also directed to 'render such assistance as the fleet could spare' during the initial period of the raising of the Regiment.

The discipline and training of the officers was not in any way commendable. There was a mutiny in the officer rank of the army in 1761. An extract from the letter written by Lt Col Pearse gives an adequate picture of an officer of those days.

"To be a gentleman you must learn to drink by all means, a man is honoured in proportion to the number of bottles he can drink; keep a dozen dogs, but in particular if you have not the least use for any of them and hate hunting and shooting. Four horses may barely suffice; but if you have eight, and seven of them are too vicious for the syce to feed, it will be much better."

"By no means let the horses be paid for and have a palanquin covered with silver trappings; get 10,000 rupees in debt, but 20,000 would make you an honester man, especially if you are convinced that you will never have the power to pay. Endeavour to forget whatever you have learnt, ridicule learning of all sorts despise all military knowledge, call duty a bore, encourage your men to laugh at orders, obey such as you like, make a joke of your commanding officer for giving those orders you do not like and if you obey them, let it be seen that it is merely to serve yourself."

"These few rules will make you an officer and a gentleman, and

they are the first lessons, which young men take when they arrive in this country."

The lascars were employed in dragging the guns and in assisting the Europeans in working them. Since each infantry regiment had two 6-pounder guns as a part of their equipment, a detail of lascars was also attached to this gun detachment. These lascars were in some ways "Native Artillery men". The subsequent changes from the lascars to Golandaz and back again were often rather in name and increase and decrease of pay than of men themselves.

"They were a most efficient and useful body of men, a class on whom perhaps, more of the hard work of the service and fewer of its rewards have fallen than any other of the native army. They always accompanied the European Artillery and participated in every campaign whether in India or ex-India. On land and when abroad a ship, hard service had been their lot; and all who have been brought into contact with them join in testifying to the willingness, courage, and patience they always exhibited."*

The material and equipment was in many ways un-satisfactory. We find Lt Col Pearse complaining that, "The fuzes burnt from nineteen to forty eight seconds, though of the same nature; the portfires were continuously going out, the tubes would not burn; the powder was infamous; the cartridges were made conical, and when necessary to prime with loose powder, a great quantity was required to fill the vacant cavity round the cartridges; the carriages flew to pieces with common firing in a week." The contractor who furnished the carriages, and the laboratory in which the fuzes were made, appear to have been beyond his control, "I have no more to do with it than his Holiness at Rome" are his words. The iron guns were all very indifferent; two 12 pounders burst on the ramparts in 1770 in firing the evening and morning gun, and one 12 pounder on a rejoicing day, in firing salutes.

By his vigorous efforts he brought about many improvements in the Regiment.

In 1775 a Board of Ordnance was formed and magazines were established at the principal fixed stations of the Army. The general control of stores for the army was vested in this Board.

All returns, indents, and vouchers and also all proposals for new works were to be sent to the Board and no stores were to be issued from the magazines without an order from the Board. It is interesting to note that the certificate which had to be signed at the end of each indent which ran thus, "I do hereby, certify, in pursuance of General Orders, that the articles specified in this indent appear to me indispensably necessary for

* Memoirs of Service in Bengal Artillery by Byckle.

the service of the battalion, according to the best of my knowledge and belief after the most careful examination", was still in use at the end of the last century with the substitution of the words 'on my honour' for 'in pursuance of General Orders' and with the inclusion of the word 'personal before examination. Brig General H.A.Young in his book "The East India Company's Arsenals and Manufactories" records; that "In 1895 I was expected to sign such a certificate on an indent made out in triplicate for a few annas' worth of oil for a guard room lamp". It seems that this sort of 'red tape' was not restricted to peace time procedures alone. We find Col Pearse complaining of the absurdity of the Board of Ordnance expecting regular and detailed returns of all articles expended in a train while on service with the same punctuality as when in a settled cantonment. He suggested that all stores issued to a train on service should be struck off the Board's books, and an account rendered when the service was over.

At this time the headquarters of the regiment were quartered in Fort William, moving out during the cold months to a practice ground at Sulkeah nearly opposite the Western mouth of the circular Canal; the powder works were between the Canal and Cossipore. The dress of the regiment consisted of a blue coat, faced with scarlet, and cut away in the fashion of the time; white waist-coat and breaches with buckles at the knee, red leather belt, black silk stockings, buff gloves and a regimental hat.

At this conclusion of the year 1775 three companies of Artillery to be commanded by European officers were ordered to be raised for the Nawab of Oudh and attached to the Brigade of disciplined troops raised for his service. Whether the companies were ever raised seems doubtful. In the following year, they were directed to be formed into a battalion, and then to be transferred to the regular army and the fresh ones raised of native Artillery in August 1777. If the companies first ordered had been European it is difficult to say what became of them; because the sixth, seventh and eighth companies were raised by Minutes of the Council dated July 13th and 24th 1778. The former two may have been raised from the men of the Oudh companies.

The formation of the native or Golandaz companies for the Oudh service was most probably recommended by Col Pearse and the experience answered so well that in August 1778, a new organisation of the Artillery was ordered in which the Artillery was grouped into an independent brigade comprising of one European Regiment and three native battalions of Golandaz. The lascars were all reduced. A native battalion consisted of eight companies each.

From representations grounded in error and party-view alarm had been taken by the Directors of the East India Company and the British Government at the supposed danger of teaching Indians the use of Artil-

lery and accordingly the Golandaz were ordered to be disbanded. Col Pearse made repeated representations, for according to him there was no corps better disciplined than the Golandaz battalions. And he very rightly thought that the Golandaz were good Artillery-men and the name and the service was held highest in repute among the natives and they would not, even if the pay were equal, enter the ranks of lascars; so that raw and ignorant men must be enlisted for that class who would require elaborate training and till they were trained, the Presidency would be almost destitute of Artillery. His appeal for retention of Golandaz battalions proved ineffective. The Court of Directors had in an earlier warrant (issued when the East India Company was authorised Artillery) had directed that "No Indian, black, or person of mixed breed..... shall on any pretence, be admitted to set foot in the laboratory, or any of the military magazines either out of curiosity or to be employed in them nor to come near them, so as to see what is doing or contained therein". Again in 1770 in a military letter (6 Apr 1770) to Bombay we find that the theme is the same. It reads, "It is very essential that the natives should be kept as ignorant as possible both of the theory and practice of the Artillery branch of Art of War; we esteem it a very pernicious practice to employ the people of the country in working the guns; and if such practice is in use with you, we direct that in future you attach European Artillery-men to the service of the Guns which may belong to Sipahi corps and that no native be trusted with any part of this important service unless absolute necessity should require it".

Buckle informs us that it was the policy of the Government to keep the native powers dependent on the British for Ordnance and to keep them in ignorance of the methods of its manufacture. But he does not tell us how this could be done so long as the French remained in India.

Those who apprehended the possibility of native powers training up their own Artillery-men by procuring the deserters from the British service failed to consider that in many cases the large parks of the Artillery maintained by the native powers proved to be their own undoing. Firstly the many impoverished Indian rulers could hardly bear the continued heavy expense required to keep it in a proper state of trim and in pitched battles a large infantry effort was diverted to protect their guns. And in any case European adventurers, as already mentioned in the previous chapter were always available to the native rulers to train and organise their gunner element. In this regard Colonel Hector Munro speaking of the period 1763-1772 observed that Indian rulers got their artillery from England, Holland and France. "There is hardly a ship that comes to India that does not sell them cannons and small arms; the most of the gun powder they make themselves. They cast 'shots' in abundance but there is no black prince that casts cannons but the king of Travelcore (Travancore). The cannon and military stores are smuggled into the country".

Perhaps by their directives the Court of Directors, wanted to rule out the remotest possibility of any sabotage or subversion. The golandaz considered themselves belonging to the most honourable branch of the army and were unwilling to enter an inferior service and the difference of pay being another factor we find that out of 2438 Golandaz 1783 took their discharge.

In the new organisation of the Artillery now ordered, it was formed into two European battalions of five companies each and to each company was attached a battalion of lascars. This battalion consisted of six companies of lascars. The lascars were to perform the whole duty dependant on the Corps of Artillery, and were also to be instructed in the usual service of Artillery, with the exception of pointing and loading guns and mortars. They were dressed in uniform, and armed with a light pike, so constructed as to form a Cheval-de-frise*.

There being an acute shortage of trained artillery personnel it was decided in 1798 to include two NCOs, two gunners and four matrosses per company, and a detail of Golandaz of one Jemadar, three Havildars, three Naiks and forty privates to each of eleven companies in Bengal (four companies of which being then at Ceylon and Madras) thus enrolling a total of about 900 men. These men were enrolled from amongst the lascars who were willing to embark on board a ship whenever it was so required of them. Though they were well trained and well disciplined. This combination of Indians and Europeans could not, however, work smoothly and had to be discarded. John Horsford analyses the fiasco in the following words :—

"The European saw native made a constituent part of their detail of the gun, of which he was one; he viewed this native with jealousy and diffident of his ability (perhaps without reason) to serve the vent or manage the port fire, he positively refused to stand between the wheels as either sponge-man or loader, urging, inspite of reasoning on that matter, that it was hard to be blown away by a black fellow". The Golandaz on the other hand perceiving the European hostile to him, and suspicious of mischief, was reluctant in his turn to take the sponge-staff or to be a server; apprehending that he might be "blown away by the design or carelessness of the European."

The task of reconstructing the history of the gunners of this period is like 'constructing an animal from some old fossils'. This task of reconstruction is further handicapped by the fact that these 'fossils' inadequate and insufficient as they are, were left mainly "to recount the names and deeds of those who have added luster to the Corps, so that their sons may know that their services are not forgotton". Thus the deeds and actions which may add lustre to the armies of the land which defended

* Cheval-de-frise—a spiky defensive structure used especially to stop the cavalry.

themselves against the British have not been available. But it seems indubitable that the standard of gunnery then prevailing amongst the defending forces was in no way less than that of gunners of the East India Company. In this regard a report made by a British Officer then serving with the Bengal Artillery reads: "The defenders had the usual apparatus of artillery service, port fire, tubes, chains, and quilted grape as good or just as good as those produced by the Company's laboratories" A force comprising of a detachment of Bengal Artillery and European and native infantry sent against Raja Chet Singh of Benaras was so thoroughly and decisively routed by the defenders that Warren Hastings was compelled to take flight and seek safety in Chunar. The frustration of the Company's forces in this encounter was attributed partly to inexperience and partly on impetuousnous of the commander who decided to risk a battle against opponents superior in number.

It was this defeat and consequent flight of the attackers that gave rise to the famous couplet :—

"Ghora per Howdah, Hathee per Zin
Juldee Bhag Gaya Warren Hastin"*

In Hyder Ali and Tippoo the British met their rival from whom the colonial adventurers could learn a thing or two. It was not until after the subjugation of Mysore in 1799, when the establishment of draught bullocks belonging to Tippoo, of the excellent breed indigenous to that part of the country, was taken over to be maintained as a breeding stud for the public service. Before this no attempt was made in Madras to keep up a permanent supply for Government purposes.

In June 1782 Tippoo so thoroughly surprised a force under Sir Eyre Coote, whose intention was to vanquish French and Mysore for the East India Company, that the force had to retreat to Madras leaving behind all their guns, 166 men and 54 horses. Next year an attack on the fort of Cuddalore, held by the French assisted by the Tippoo's forces, proved costly for the Company's troops. In the second assault a Company of the European troops broke and fled. Their retreat was then very commendably covered by the sepoys who later retired in an orderly manner. Col Pearse explains the cause of this type of conduct in a British Regiment : "How could they do better ? Jails emptied had furnished the men". Also he attributes this failure to the inexperienced officers who were not fit for command.

* "With howdahs on horses, saddles on elephants,
Quickly away did Warren Hastings fly"
"The same verses were afterwards by the substitution of 'Colonel Mansin' for Warren Hasting applied to the retreat in 1804 connected with the name of Monson. Probably the composition of some singing girl, and sung at many a 'nach', where the company were more gratified by hearing of the disasters than the successes of the British arms"—See History of the Bengal Artillery By Stubbs Vol I p. 65.

In September 1790 once again Tippoo struck so fast the British forces (pooled from all the three Presidencies) which had come to give him battle, that for sometime confusion prevailed in the British ranks. The casualties in the British forces were very high. Half of the gun bullocks were killed and bullocks without the drivers created great confusion. Their ordnance suffered proportionately and one six pounder could only be saved by the retreating force.

A typical case of display of grit and plucky defence put up against overwhelming odds that may briefly be mentioned here is that of the defence of the Jhansi Fort* during the first war of Independence of 1857. The fort was heavily besieged and the odds greatly weighed against the defenders; yet they "fought with great determination, and their guns were well-served until most of their trained gunners were killed or wounded". So stubborn was the defence that even "women carried ammunition to the batteries, one of which displayed the black flag of the Fakirs. In the cool of the evening the Begum and her ladies brilliantly dressed could be seen on the battlements amongst the men serving the guns. The defence was conducted with great spirit....." It is no surprise then that we find that despite the depletion in strength of men and material, the defenders repulsed the successive attacks which were put in with most devoted courage. Eventually when the fort was evacuated 9 guns were found inside it and the defenders had 'lost about 500 killed'.

In March 1791, during the siege of Bangalore we find rockets being used by Tippoo against the attackers. Rockets have been known to have been used before but perhaps this is the first time that we hear of their being put to effective offensive use. Lieut Wittit says of them in his diary "These rockets are newly invented, being made to burst, which they do with an explosion like a great gun. But I by no means look upon this as an improvement for they neither go so true nor so far as the old ones, and as to the bursting it is no use whatever (except, indeed that the noise may frighten horses, when thrown among them) for being made of beat iron, they only rip and never fly in pieces, as cast iron would do". Couple of days afterwards in the same campaign (seige of Bangalore) when the attacking troops were held up by a closed gate, the same officer records, "During the interval of our first getting to the gate and its being blown open (about thirty minutes) the enemy kept up an incessant fire of rockets and matchlocks, and a continual shower of stones and powder-bags, all of which from the crowd and narrowness of place could not miss taking effect." Here it seems that the importance of rockets

* See 'History of Royal and Indian Artillery in Mutiny of 1857" by Col J.R.J. Jocelyn---p. 308.

had not been fully appreciated by Lieut Wittet*. No doubt there must have been shortcomings e.g., inaccuracy and comparatively shorter range but its potentialities were great as are being realised today. It could have been used with advantage, in those days, where the guns could not have been used with profit. Besides its demoralising effect upon the enemy must have been quite appreciable. The fact that the British realised its true importance is apparent from the fact that a rocket troop was subsequently introduced in the organisation of each Battalion of Artillery and in Royal Artillery as well. Tippoo had come to grasp fully the capabilities of the artillery arm and this is substantiated by the fact that after a bitter struggle (in which he himself was killed at the fort of Seringapatnam—Third Mysore War) in which the fort fell to the British, there were found 929 ordnance pieces out of which 287 guns were mounted on the ramparts. On the guns was engraved one of the Tippoo's titles "Asad Ullah Al Ghalib"—meaning the conquering lion of God. Some of these guns were sent to England as Trophy Guns from Meerut in 1867.

In 1782 a force was sent to Ceylon to reduce the Dutch possessions in the Island. During the siege of Trinco-malee, a body of Malays in the Dutch service infiltrated into one of the batteries stealthily and spiked many guns and killed several of the Artillery-men. After the capture of Trinco-malee two battalions of the Bengal Artillery were left on the Island and rest of the artillery returned to join the main force concentrated against Tippoo at Seringapatnam.

In 1801 a force from India was despatched to Egypt. The object was to demonstrate to European powers and particularly to the Turks the degree of awareness and also the state of preparedness to counter any of their possible moves. And the sight of sepoy regiments manoeuvering in brigade with the British and as steadily, created the right impression on all those who witnessed the troops parade for long hours every morning. Sepoy Regiments could always be trained to drill with perfect steadiness. The distinctive feature of this force was that Horse Artillery, which had then been introduced (around 1794-5) in the British Army as a distinct arm was now for the first time to be tried with an Indian Force and

* Major P.J. Begbie records in his book 'The Services of Madras Artillery", "Pursuing its march from Neddingal to Wandiwash (14 Feb. 1783) the army of the Madras Presidency, especially the rear guard suffered severely from the enemy's horse and rocketmen, the loss in killed and wounded by these weapons on that day being 200 men". We also learn from the memoirs of a Hanoverian officer (Briefeauf einer Reise von stadt nach Madras in Ostindien) that General Stuart, the force commander, "offered a reward of 5 pagodas for every rocketman captured and he further tells us an anecdote that reflects deeply on the British as connected with these men. "The light cavalry having captured one of them, brought him in, bound hand and foot sitting backwards in a cart, and having his crime painted in large white letters in English and Tamil characters upon a black board hung around his neck. He was thus led through the camp at noon to the gallows where he was to be hanged, when he obtained the special favour of having his sentence commuted into 400 lashes and deprivation of his ears and nose; after which act of barbarity the poor man was hunted out of the camp. English authors are silent on this gross violation of the rules of Civilised Warfare"—ibid.

though it was not actually engaged the experience gained proved of use in latter actions. Bengal Artillery rejoined their companies on return from Egypt in August 1802.

A general order published by the Governor General on this occasion reads, "Under a grateful impression of the important aid derived to the common cause of our country by the able and successful conduct of the expedition from India to Egypt, his Excellency is pleased to order that honorary medals be conferred upon all the native commissioned and non-commissioned officers, troops and sepoys and gun lascars who have been employed on service in Egypt".

About the same time some elements of Bengal Artillery were sent to Macao in China to combat the Portugese. Detachments of Presidency artilleries including the Golandaz also served in Mauritius and later in Java.

From the large number of guns that were sited in Forts of these times it seems apparent that artillery was given its due importance. We find that at the Fort of Aligarh ordnance comprised of the following :—

Brass Guns, 20 pounders and under	...	33
Iron guns various calibres	...	60
Brass Howitzers 6-inch	...	4
Brass Mortars 11 and 9⅘ inch	...	2
Iron wall-pieces	...	182
	Total	281

About these guns Col Horsford of Bengal Artillery says in a report that "The iron guns were of European, the brass of native manufacture but built on French models. Thirteen 4 pounders had iron bores formed of four longitudinal pieces welded (remarkably closely) together, over which the brass was cast. All were furnished with well made elevating screws, some of the latest French improvements, and constructed in the howitzers and mortars to give them a high elevation and render them capable of being used in either capacity; the tumbrils were of the clumsy shape in use twenty years before, some with the modern draft-chaise, some with the primaeval trace of green hide."

The ordnance at the Agra Fort comprised of a miscellaneous description. On 18 Oct. 1803 after the Fort was captured by the British, pieces of the following description were found :—

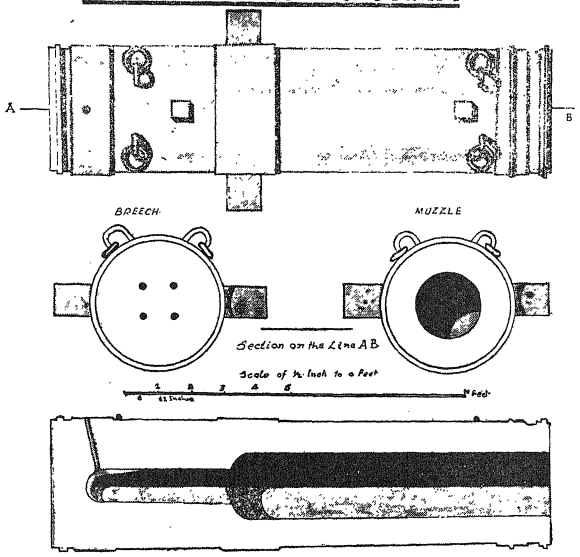
Weight of projectile	*BRONZE*					*IRON*	
	Guns	*Gallopers*	*Carronades*	*Howitzers*	*Mortars*	*Guns*	*Gallopers*
1500	1	...	...	...	...	...	...
72	1	...	...	...	...	...	...
32	...	...	...	...	...	1	...
24	...	...	...	...	...	1	...
20	1	...	2	...	...	...	...
18	...	...	2	...	...	1	...
16	...	...	1	...	...	...	...
12	...	...	...	...	1	4	...
10	1	...	...	...	...	1	...
9	5	...	...	...	...	...	...
8	1	...	1	...	1	1	...
6	10	...	...	1	...	6	...
$5\frac{1}{2}$	...	...	...	1	...	...	...
5	6	...	...	...	...	4	...
4·2/5	...	...	...	1	...	...	...
4	7	...	...	...	...	6	...
3	2	1	...	...	...	6	...
2	2	2	...	...	...	6	11
$1\frac{1}{2}$	...	1	...	...	...	...	4
1	5	3	...	...	...	4	4
Wall piece	9	...	...	...	...	26	...
Total	60	7	4	3	2	67	19

The monster bronze gun taken here and called the Great Gun of Agra was also captured here. It was proposed to send this gun to Calcutta. But the attempts to transport it failed and as mentioned in the previous chapter, it lay upon the banks of Jamuna until twenty years after it was eventually broken up and sold without any consideration for the fact that it might be desirable to preserve such a unique piece of ordnance. Size and the specifications of the gun were as under :—

Description of the Great Gun taken at Agra, October 18th 1803

Weight	*Calibre*	*Chamber*	*Trunnions*	*Brass Ring*	*Muzzle*	*Bore including chamber*	*Chamber*	*Total extent*	*Exterior width with the trunnions*	*Length centre of trunnions to base ring*	*Exterior width without the trunnions*
cwt qrs lbs	ft in	ft in	ft in	ft in	ft in	ft in	ft in	ft in	ft in	ft in	ft in
1049 1 4	1 $11\frac{1}{8}$	—$10\frac{1}{5}$	11 1/3	4 $5\frac{1}{7}$	=	13 2	4 3	14 $2\frac{1}{8}$	4 $2\frac{1}{7}$	6 2	5 7

THE GREAT GUN AT AGRA



Inscription, "In the reign of Akbar Shah, made by Sital Parshad, Weight 1469 Maunds

	Sonat(Sanwat)	*Rupees*
Value of the gun as old brass at the Company's price	...	53,400
Gun if serviceable ...	...	160,200
Weight of shot if of iron ...	...	1497 lbs
Weight of shot if of marble ...	...	567 lbs

The power of marching and manoeuring in compact formations, and of concentrating fire and the use of well served guns enabled small bodies of Company's forces to overcome the loosely arranged hordes of their adversaries. Sindhia's army which had been assisted in training by De Boigne was perhaps the only army as well disciplined, well trained, and well equipped as the Company's army. And it might have assumed still more formidable dimensions had Mahadji Sindhia lived longer.

On the eve of the great Sepoy uprising (1857) the strength of artillery of each of the Presidency was as under :

Presidency	*British*	*Indian*
1. Bengal	3065	4734
2. Bombay	2128	2407
3. Madras	1578	1997
4. Local forces and Contigents	...	2118
Total	6769	112556

*Including Company's European troops.

After the supression of the uprising the rule of East India Company lapsed and the Queen assumed sovereignty over India on 1st November 1958. Native artillery was abolished and the European units of the three Presidency artilleries were absorbed in the Royal Regiment of Artillery. It was laid down "Resolved hence-forward, with such few exceptions as may be rendered necessary by local considerations, there shall be no native artillery." These exceptions were the two batteries of Bombay native artillery (which afterwards became No. 1 and No. 2 Bombay (Mountain Batteries), five batteries of the Punjab Frontier Force and four batteries of the Hyderabad Contingent.

Manufacture of Gun Powder, Guns and Gun Carriages under the British India

The East India Company did not possess any ammunition factory as such, but the forts in their settlements had laboratories in which ammunition was prepared for use. In 1718 there existed one such laboratory in old Fort William. During 1742, we find on record an order to the Gunner at Fort William "to employ as many people he could to make gunpowder for service, with all kinds of ammunition necessary." In 1748, however, when the court of Directors ordered the formation of a regular company of Artillery at each of the three Presidencies they sent out a Captain-Lieutenant who was designated the Director of the Laboratory and was to make and to instruct in making all military "fire works". He has been referred to as the Ordnance Commissary of his time, but this is hardly a correct assertion. It is difficult to trace the history of these laboratories till late in the middle of the nineteenth century, when the one at Bengal became the ammunition factory.

From the year 1618 to 1757 we find that Guns were either purchased by the East India Company from European traders or Gun Foundries in India which were worked under the direct supervision of Europeans as was the case in pre-East India Company's days. Hedges in his diary says that "in this year (1618) he saw fine large brass guns at Lahore, all taken from Portuguese at Ormuz." It was only in 1769 that a temporary

gun-factory was established at Patna by Capt. du Gloss. As the foundry was successful the officer was ordered to the Presidency for the purpose of erecting a foundry in the new Fort. Accordingly a new brass-gun foundry was erected and commenced work as a branch of the arsenal at Fort William in 1770. In 1801, however, it was found that the Arsenal, the Gun Foundry and the Gun Carriage Agency all situated within narrow limits of Fort William, left hardly any room for further expansion. Consequently 20 biggas of land were purchased at Cossipore at a cost of Rs. 250/- per bigga and to this site the Gun Carriage Agency was transferred from Fort William. In 1811 a new unforseen and one might say quite unexpected difficulty arose in that the Court objected to the continuance of the foundry on the grounds that the Ordnance Cast in Fort William was inferior to that cast in Europe and asked for the foundry to be closed down. But the Military Board disagreed with this view and said that cannon equal to the best and cheaper in price than that obtainable in Europe had been made in the foundry. Several specimens of the product of the foundry were sent to England for comparison and examination. The product of the factory so sent was branded as excellent and the objection to the continuance of the foundry was withdrawn. As the old foundry was not of sufficient capacity to meet the requirements a new brass-foundry was erected. In 1818, Lord Hastings ordered several pieces of Indian made ordnance to be sent to Woolwich, where they were examined by a committee of Artillery officers who, it is said, pronounced the workmanship and finish to be superior to those of the Royal Arsenal.

As considerable new equipment had been ordered from Europe to enlarge the old foundry and as the space available at Fort William was insufficient, it was decided in 1830, to transfer the Gun-carriage Agency from Cossipore to Fatehgarh and to establish a Gun Foundry to cater for the needs of British troops throughout India. The work on the new foundry was completed in 1834, at a cost of Rs. 1,10,447/-. The foundry at Fort William had been solely a brass foundry but the new one raised was also equipped with cupolas for casting iron. The setting up of this new Gun Foundry was not effected without some difficulties, but these were overcome and it is worth mentioning "that Cossipore made guns did excellent service in the Afghan, Sindh and Sikh Campaigns" and later in the great National uprising of 1857. During the period 1840-50 the following items of foundry manufacture may be of interest :—

Iron Guns —12 pdr., 18 pdr., and 32 pdr.
Brass Guns — 3 pdr., 6 pdr., and 9 pdr.
Iron Howitzers — 8 in. 4 lbs., 8 in. 5 lbs., and 10 inch.
Brass Howitzers—12 pdr. mountain train, 12 pdr., and 24 pdr.

The manufacture of shot and shell was equally diversified and it is of interest to note that an incendiary shell was in use filled with stars of

"Valenciennes composition". In 1850's various non-official 'inventions were reported on. One such invention submitted in 1853 suggested "a field piece on the principle of Adam's revolver for 4 or 5 rounds, the' barrel of brass, cylinder of wrought iron and breech of brass". This proved too much for the foundry. Another proposal though rejected on submission related to the introduction of a "breech loading 3 pounder gun with an elongated projectile, the base being hollowed to seal the windage". In 1864 the factory also undertook the task of making projectiles for rifled ordnance. More land was acquired and further buildings erected. Various forms of rifling had been under trial in England and after a lot of delibration it was decided to import a complete plant for rifling the bronze smooth bore guns then in service. This was done but the attempt to utilize the smooth bore ordnance was a failure, the brass being too soft to withstand the working pressures used with rifled guns.

At this juncture the introduction of iron and steel rifled ordnance in England constituted such a sweeping revolution in the art of manufacture of ordnance that new gun manufacture in India was temporarily suspended and all further requirements of guns were met by importing them from England. It was only in 1905 that a plant was installed at Cossipore for the manufacture of the "Quick firing" guns for Horse and Field Artillery which had then been introduced in England. In 1913, manufacture of 4·5 inch howitzer and in 1920 manufacture of 3·7 inch howitzer was undertaken. In 1933 manufacture of the 18 pdr, Mark VI and the jacket and breech machanism of the 3 inch 20 cwt gun was started.

Gun and shell factory as it is now known, it meets most of the requirements of the ordnance by the Indian Army.

Gun Carriages

Although it was not till 1801 that the East India Company had a regular gun-carriage factory yet there is plenty of evidence to show that gun-carriages of a crude form were being made long before this time.

In all four Gun Carriage Manufactories were established under the East India Company*. Their location and the time of establishment is shown below :—

Cossipore (Bengal)	—	1801
Seringapatam (Madras)	—	1802
Bombay	—	1810
Fatehgarh	—	1816

In 1640 for the defence of Fort St. George in Madras, guns were necessary and were at first supplied with carriages and stores from the ships. Soon it was found possible and economical to make the carriages

* In 1910, it was decided to close these manufactories and erect a Central Gun Carriage Factory at Jabalpur. This Gun Carriage factory was to cater for the needs of the Army in India.

locally, importing from home only such iron work as was necessary. Not much information on the subject of indigenous manufacture of Gun Carriages is available except that in April 1672 Madras Council noted that timber was required for about 40 to 50 carriages. In Sep. 1744 one Mr. Joseph Smith, the Gunner and Engineer, at Madras reported that all guns were mounted on ships carriages, which were very inconvenient and some required 10 to 12 men to work them, as against the authorised establishment of one man per gun. He recommended the provision of field carriages but as there was no timber in the town suitable he asked for a supply from the Malabar Coast. The Council agreed to this and ordered timber from Tellicherry. By 1756 we find that Gun Carriages were being made in Bombay as well. The quality of these carriages, was it seems poor for in 1770, Broome, referring to the supply of gun carriages generally throughout India, said 'Carriages, ammunition and stores generally were of exceedingly inferior quality, supplied by contractors who, having interest to obtain the contracts, had also sufficient influence to force their wretched produce into the service and to cover themselves from loss or exposure, by getting all power of choice or rejection taken from the hands of Artillery Officers' Broom, however, omits to mention that Artillery officers were sometimes themselves the contractors.

As already mentioned in 1801 the Cossipore Gun Carriage Factory was established. In 1804, however, on account of the Second Mahratha War, it was found necessary to establish a temporary factory at Kidderpore (Calcutta). It was then, hoped that by the efforts of both the establishments to complete 235 carriages by the end of March 1805. Whether this target was fulfilled or not remains unknown.

SECRETARY'S NOTES

MEMBERS' ADDRESSES

Copies of the Journal posted to members are sometimes returned undelivered by the Post Office with remarks such as 'the addressee has been transferred', etc. This appears to be on the increase and the only way to rectify it is for members to drop a line to the Secretary whenever their addresses change due to promotion, transfer, etc. It is of the utmost importance that the Institution should have the up-to-date addresses of all its members.

ANNUAL SUBSCRIPTION

Although the Institute's year 1976 is now six months old, I regret to say that there are still many members who have not yet paid their subscription which was due on 1st January. Could I therefore request all members who have not yet paid their subscription for the current year, to let me have their remittance by return of post.

NEW MEMBERS

From 1 April 1976 to 30 June 1976, the following new members joined the Institution :—

ACHUTHAN, Maj K.
ADARSH KAPOOR, Capt
AHMED, Sqn Ldr S.
AJIT SINGH, Capt
ALTAF ALI, Capt S.
AMARNATH, Capt B.K
AMARNATH, Brig C.
ANAND, Capt A.K.
ANAND, Capt A.K.
ANAND, Capt M.B.
ANAND KUMAR JAIN, Lt
ARORA, Capt J.L.
ARUN DRAVID, Lt
ARYA, Capt P.S.
ASHOK NAIR, A/Capt
ASHTAKAR, Capt A.G.
ATRI, Capt S.B.
AWASTHI, Maj K.M.
BAGATI, Maj T.K.
BAHIA, Capt A.S.
BAJWA, Capt T.S.
BALBIR SINGH, Capt
BAKSHI, Flt Lt P.
BAKSHI, Maj T.S.
BAL, Capt J.S.
BALBIR SINGH, Capt
BALI, Sqn Ldr K.D.S.
BALI, Capt S.C.
BANERJEE, Flt-Lt A.
BANERJEE, Flt Lt RAMESH
BANERJEE, Maj T.K.
BANERJI DAVID, Capt.
BARGE, Capt JAI SINGH RAJARAM
BAXI, Capt J.S.
BEDI, Flt Lt C.L.
BEDI, Flt Lt R.L.
BHAGWAN SINGH, Capt
BHANOT, Capt R.K.

BHARDWAJ, Maj J.K.
BHASKAR, Maj K.P.
BHATIA, Capt P.S.
BHATIA, Flt Lt S.C.
BHATTACHARYA, Sqn Ldr M.
BHAYANA, Capt D.K.
BHIDE, Capt V.G.
BHULLAR, Capt M.P.S.
BHUTANI, Capt H.V.
BILDIKAR, Maj S.R.
BINDRA, Maj P.P.S.
BISHT, Capt R.S.
BRAR, Capt R.S.S.
CHADHA, Maj M.S.
CHANDA, Flt Lt D.K.
CHANDEL, Capt K.K.
CHANDER PAL, Capt
CHANDOKE, Capt G.S.
CHANDRASEKHARAN, Capt T.M.
CHAUHAN, Capt N.K.
CHAWLA, Capt J.S.
CHERIYAN, Maj A.
CHOPRA, 2 Lt MUKESH
CHOPRA, Capt M.K.
CHOPRA, Capt VINOD
CHHABRA, Capt G.K.
CHHABRA, Capt S.C.
CHOUDHARY, Capt P.S.
CHOUDHRY, Capt P.K.
CHOUDHRY, Capt R.S.
CHOUDHRY, Flt Lt S.
CHOUDHURI, Flt Lt T.
CHOWDHARY, Maj K.S.
CHUNI, Flt Lt S.C.
DAHIYA, Capt Y.P.S.
DALAL, Capt C.S.
DALJIT SINGH, Maj
DALJIT SINGH AHUJA, Capt
DANIELS, Capt N.M.
DANNIEL, Maj DHARNI
DAS, Capt P.B.
DAS GUPTA, Flt Lt A.K.
DATTA, Capt V.K.
DAVID, Lt P.V,
DAVID, Capt SUNIL
DESHMUKH, Flt Lt A.G.
DESWAL, Capt D.S.
DEVGON, Lt Y.P.
DEVI, Sqn Ldr P.N.
DEVINDER SINGH, Maj
DHALIWAL, Capt B.S.
DHARAM VIR, Maj
DHILLON, Capt H.S.
DHINGRA, Flt Lt N.L.
DILEEP BEORE, Capt
DOGRA, Capt A.S.
DUA, Capt A.K.
DUTTA, Capt P.
FOGAT, Maj B.S.
GAJALA RAMESH, Capt
GAJ RAJ, Capt
GANGULY, Lt S.K.
GARG, Flt Lt S.N.
GAUTAM, Capt S.K.
GHAI, Maj T.L.
GHOSH, Capt
GHOSH, Flt Lt P.K.
GHOSH, Lt R.R.
GHUMAN, Capt B.S.
GHUMAN, Maj HARJEET SINGH
GHUMMAN, Plt Offr J.S.
GILL, Capt H.M.P.S.
GILL, Capt S.S.
GOPAL PATEL, Capt
GOSWAMI SANJIVE, Capt
GOUR, Sqn Ldr RAJENDRA
GREWAL, Capt D.S.
GREWAL, Capt M.S.
GROVER, Capt P.K.
GULIA, Capt V.S.
GUPTA, Sqn Ldr ASHOK KUMAR
GUPTA, Lt A.K.
GUPTA, Capt N.L.
GURINDERJIT SINGH, Capt
GURNAM SINGH, Capt
GURPAL SINGH, Capt
GYANI, Capt H.S.
HALBE, Plt Offr S.

HANDRA, Capt VIVOD
HARNEK SINGH, Capt
HARPAL SINGH, Capt
HEKIYE SEMA, Capt
HIMALYAN, Capt H.C.
HONAVAR, Capt V.
HUKKU, Maj A.K.
IQBAL SINGH, Capt
IQBAL SINGH, Capt
ITHIKKAT, Sqn Ldr K.U.
JAFRI, Capt S.J.
JAGANATHAN, Maj A.N.
JAIN, Flt Lt F.C.
JAMDAR, Sqn Ldr R.R.
JANAK RAJ, Maj
JAMWAL, Capt R.S.
JAMWAL, Capt S.S.
JHINGON, Lt Col B.K.
JIWWN SINGH, Capt
JOSEPH, Capt C.T.
JOSEPH PETER, Capt
JOSHI, Flt Lt G.P.
KAKAR, Capt J.S.S.
KAKAR, Maj R.K.
KAMAL SAGAR, Capt
KANAL, Lt R.H.
KANWAR, Maj D.K.
KANWAR, Capt H.S.
KANWAR, Flt Lt J.
KANWAR, Capt YADU KUMAR
KAPILA, Sqn Ldr VINAY
KAPOOR, Capt D.K.
KAPOOR, Capt SUSHIL OM (Life)
KARAM JIT SINGH, Capt
KARAM SINGH, Capt
KASHYAP, Maj D.S.
KATARIA, Sqn Ldr C.S.
KAUL, CAPT R.L.
KHAJORIA, Capt H.L.
KHANSODE, Capt K.K.
KHARE, Capt R.
KHATRI, Lt A.B.
KHATRI, Flt Lt R.
KHER, Maj S.K.
KHETRAPAL, Capt R.P.S.
KHOSLA, Shri DALIP
KHOSLA, Capt VINOD KUMAR
KHUSHWANT SINGH, Capt
KRISHNA KUMAR, Capt
KRISHNA MOORTHY, Maj K.
KRISHNA SINGH, Capt
KULKARNI, Maj J.S.
KUMAR, Capt K.V.
KUNNETH, Lt Col BALACHANDRAN
KURIAN, Lt THOMAS P.
KURUVILLA, Flt Lt K.C. VrC
LAKHWINDER SINGH, Capt
LIDDER, Maj J.S.
LUTHRA, Capt J.S.
LUTHRA, Capt J.S.
LYALL, Capt H.S.
MADHAVAN, Flt Lt PALKOTE
MAGO, Capt H.S.
MAHAJAN, Maj A.K.
MAHAJAN, Maj R.N.
MAHESH KUMAR, Capt
MALHOTRA, Capt ARUN
MALHOTRA, Maj A.S.
MALHOTRA, Capt D.
MALHOTRA, Capt P.S.
MALHOTRA, Capt V.K.
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