CADET'S HAND BOOK

SPECIALISED SUBJECT

ARMY

(FOR JD/JW AND SD/SW)

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CHAPTER-I

ARMED FORCES

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SECTION -1

BASIC ORGANISATION OF ARMED FORCES

ARMY

Introduction

1. The present day Indian Army owes its origin to British days. It was then used as an instrument for the expansion and preservation of the British Empire.

2. At the time of independence in 1947, due to partition of the sub-continent, the old Indian Army was also divided. Since then the Army has continued to be re-organised and modernised.

3. The Army since independence has taken part in the following major operations in defence of our borders :-

(a) Kashmir Operations against Pakistan 1947-48.

(b) Sino- Indian Operations in NEFA (Arunanchal) and Laddakh 1962.

(c) Indo-Pak war 1965.

(d) Indo – Pak war 1971.

(e) Kargil conflict 1999.

4. In addition, Army has taken part in peace keeping missions under United Nations in various parts of the world.

5. Services of the Army and Air Force have been extensively utilized in aid of civil authorities during natural calamities like floods, cyclones and earthquakes.

6. The Army today is self–reliant in respect of its requirements of conventional weapons and is fully geared to meet any external aggression on our borders.

Command and Control

7. **Command.** The President of India is the Supreme Commander of all the Armed Forces of the country. The Chief of Army staff is the head of the Indian Army and is responsible for its command, training, operations and administration. He carries out these functions through Army Headquarters (Army HQ).

8. **Command Headquarters.** The whole country is divided into seven commands. These are Northern, Western, Central, Southern, South Western, Eastern and Training Command. The Command HQ exercises operational responsibility. It is commanded by an officer of the rank of Lt General.

9. **Field Formations.** Corps, Divisions and Brigades. These are commanded by an officer of the rank of Lt General, Maj General and Brigadier respectively.

10. **Static Formations.** Area and Sub Area Headquarters. These are commanded by an officer of the rank of Maj General and Brigadier respectively.

Fighting Arms

11. **Armour.** Armour by virtue of its mobility, fire power, protection and shock action is most aptly suited for present day battle field environment. The basic role of armour is to destroy the enemy by relentless, mobile offensive action, both in offensive and defensive operations.

12. **Infantry**. Infantry is essentially an arm of close combat. Its role in attack is to close in with the enemy and destroy or capture him and capture and hold ground. In defence it is to hold ground against all forms of enemy's attack. It is also employed in counter insurgency and counter terrorism operations.

13. **Mechanised Infantry**. It is just like infantry with enhanced mobility and fire power. Mechanised Infantry moves in armoured personnel carrier (APC) which has adequate protection against small arms fire. Their mobility in conjunction with Armour enables own troops to obtain most favourable decision in battle. The emphasis is on mobility, fire power and manoeuvre rather than manpower.

Supporting Arms

14. **Artillery**. Artillery provides heavy volume of fire at long ranges to damage and destroy enemy positions before it can be physically captured and occupied by own ground forces.

15. **Engineers.** The role of Engineers in war is to provide support for offensive and defensive operations in mine warfare, bridging, demolitions, construction of field fortifications and operational roads/tracks.

16. **Army Air Defence**. Army Air Defence is equipped with air defence guns and short and medium range surface to air missile systems. Along with Air Force it provides air defence to Mobile Forces, Vulnerable Areas and Vulnerable Points.

17. **Army Aviation Corps.** The role of Army Aviation Corps is reconnaissance and observation by controlling artillery and infantry mortar fire from air. It provides commanders and staff rapid means for liaison visits. It is ideally suited for evacuation of battle casualties.

18. **Signals**. The role of Signals is to provide radio, radio relay and line communication and establish signal centre during war and peace. It also monitors enemy's communication systems.

Supporting Services

19. These elements provide administrative cover to the Fighting and Supporting Arms thus enabling them to carry out their tasks. The services and the functions of some of them in brief are :-

(a)	Army Service Corps	- Supply of rations, POL and transport.
(b)	Army Medical Corps	- Provision of medical cover.
(c)	Army Ordnance Corps	-Supply of armament, ammunition, vehicles, clothing, tentage and all equipment.
(d)	Corps of Electronics and Mechanical Engineers	- Repair, recovery and maintenance of all vehicles, arms, electrical, electronic and mechanical equipment.
(e)	Remount and Veterinary Corps.	- Maintain and train animals utilized by the army like mules for carrying loads, dogs for tracking and sniffing, horses for equestrian activities
(f)	Army Education Corps	- Impart military and civilian education to troops.
(g)	The Intelligence Corps	- Gather intelligence of the enemy and prevent leakage of own information to the enemy.
(h)	The Corps of Military Police	- Help in maintaining discipline relating to army personnel
(h)	Judge Advocate General Branch	-Deals with legal matters relating to the Armed Forces
(k)	Army Physical Training Corps	-Deals with physical education and sports in the Armed Forces
(l)	The Pioneer Corps	-Deals with provision and looking after manpower for load carriage in the Armed Forces.
(m)	Defence Security Corps	- Provide security to VAs ,VPs and other important installations.

NAVY

Introduction

20. Enveloping the country from almost three sides and stretching over 6000 Kms of our coast line, the sea has always exerted a decisive influence on India's freedom , trade, commerce, and culture.

Constituents of the Navy

21. The Indian Navy is equipped with several ships of different types and naval aircrafts. Shore facilities have been provided at various places in the country to train personnel for the Navy, repair ships and aircrafts, and provide the fleets with logistic support.

Organisation and Administration

22. The Naval Headquarters at New Delhi exercises administrative and operational control over the Navy through various " Administrative Authorities". For this purpose the Navy is divided into three commands. These are:-

(a) Western Naval Command with HQ at Mumbai.

(b) Eastern Naval Command with HQ at Vishakhapatnam.

(c) Southern Naval Command with HQ at Cochin.

23. The Navy has at present two fleets, viz the Western Fleet and the Eastern Fleet, each commanded by Flag Officer of the rank of a Rear Admiral. The Southern Naval Command is basically a Training Command governing the Training Establishments in the Indian Navy. It has under its command an afloat Training Squadron. It is also allotted operational ships or aircraft from time to time as the situation warrants.

24. 04 December 1971 was the finest hour of the Indian Navy when its valiant missile boats daringly attacked Karachi Harbour and caused havoc to Pakistani ships and shore installations.

AIR FORCE

Introduction

25. Indian Air Force is the youngest of the three Services. It was in 1932 that an Act was passed in Indian Legislature for establishing the Indian Air Force on the recommendations of Skeen Committee.

Organisation

26. **Air Headquarters**

(a) Air Headquarters comprises the Chief of the Air Staff and his principal staff officers.

(b) The staff of Air Headquarters consists of three branches, viz the Air Staff, Administrative and Maintenance branches, each being organized into Directorates.

Commands

27. The Air Force is organized into seven commands which are functionally and administratively controlled by Air HQ. Each Command is placed under the command of an Air Officer Commanding-in-Chief. The Commands are :-

(a) Western Air Command.

(b) Central Air Command

(c) Eastern Air Command.

(d) South Western Air Command.

(e) Southern Air Command.

(f) Training Command.

(g) Maintenance Command.

28. These commands have a number of formations under them.

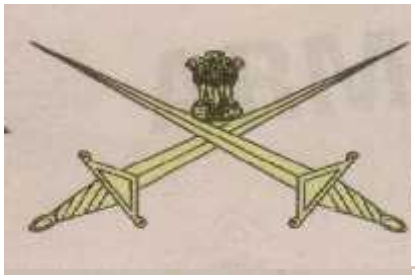
29. Since independence the IAF has taken part in all the major operations in defence of our country's borders e.g. Kashmir operations in 1947-48, Sino-Indian Conflict 1962, Indo Pak War 1965, 1971 and Kargil Conflict 1999.

30. IAF has always been called upon to render assistance to civil authorities in cases of various natural calamities like floods, earthquakes and tsunami.

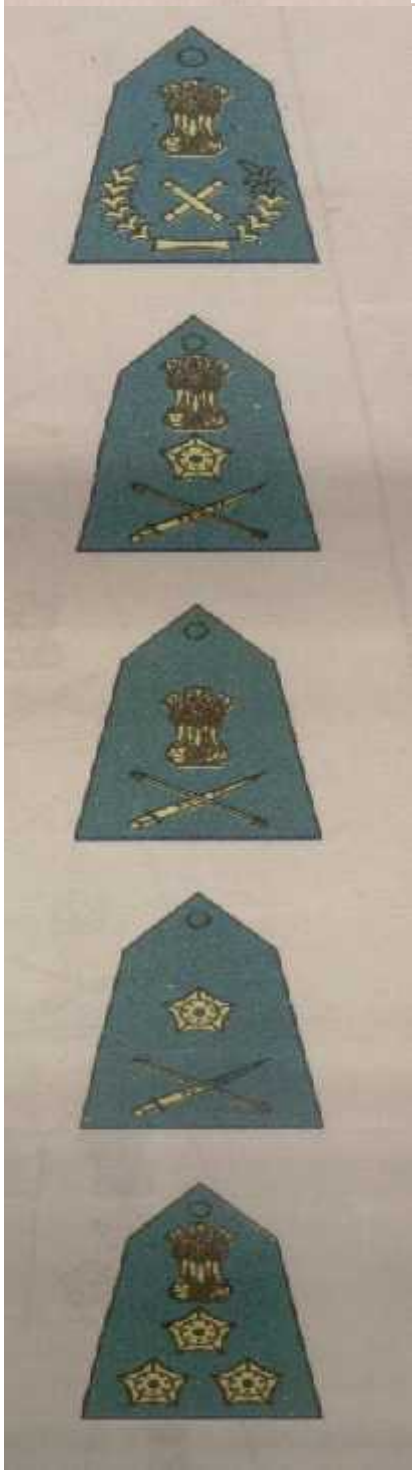
31. IAF contingents have also taken part in the peace keeping missions of United Nations.

SECTION-2

BADGES AND RANKS



ARMY



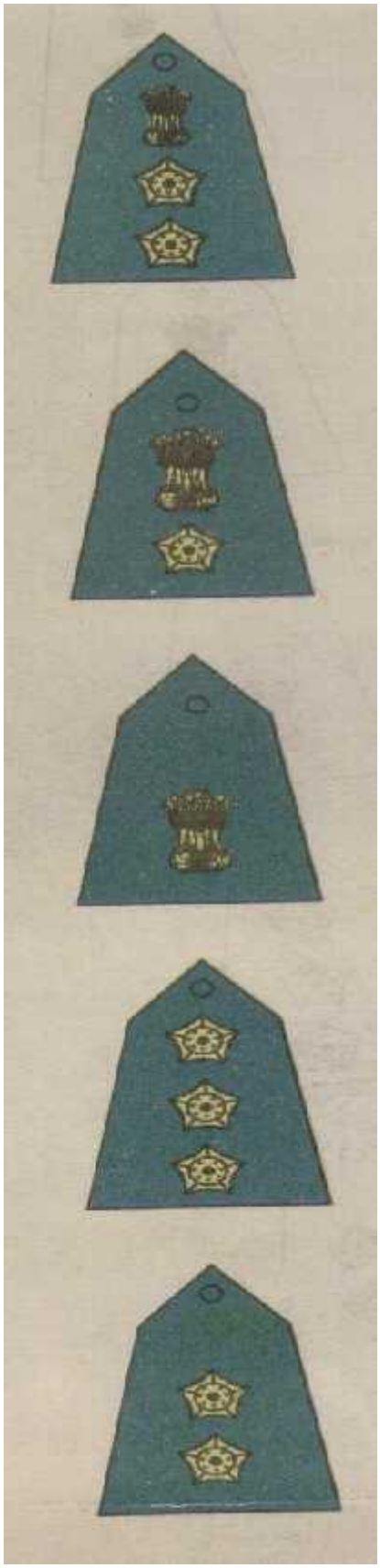
Field Marshal

General

Lieutenant General

Major General

Brigadier



Colonel

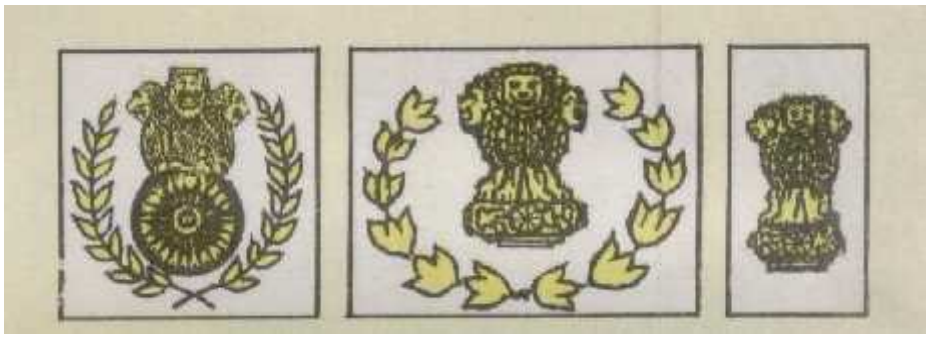
Lieutenant Colonel

Major

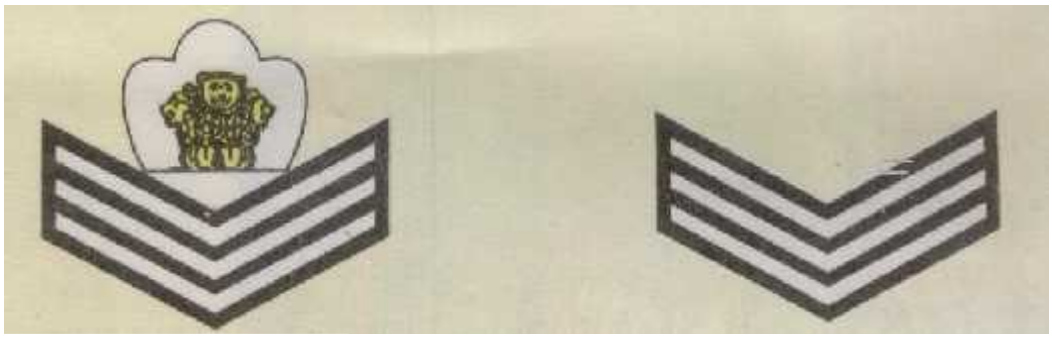
Captain

Lieutenant

Subedar Major **Subedar** **Naib Subedar**
Risaldar Major **Risaldar** **Naib Risaldar**

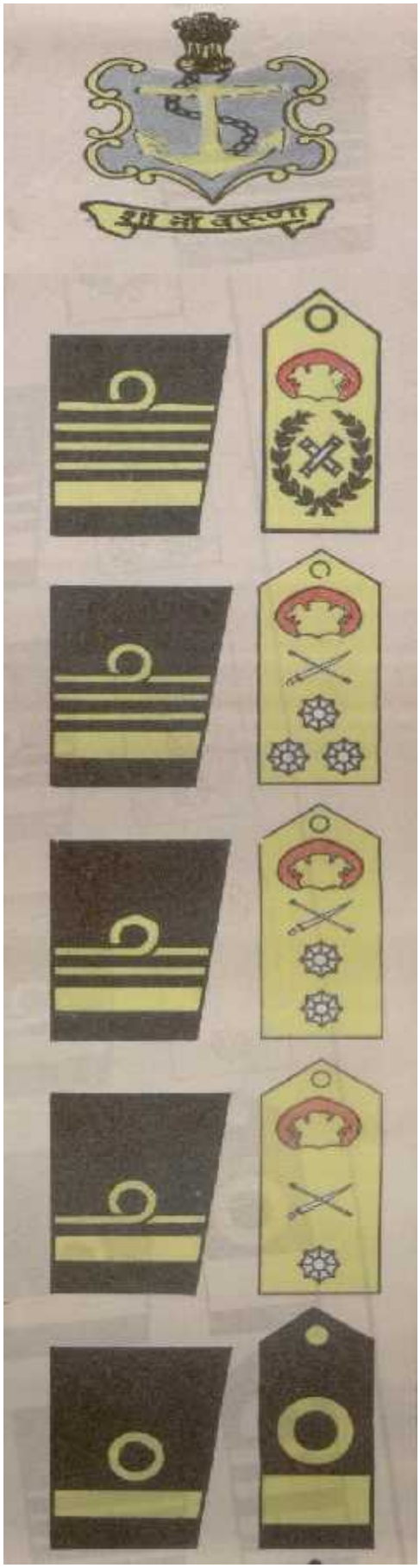


Bn . Hav. Major **Bn . QM. Hav** **Coy. Hav. Major**



Coy. QM. Hav **Havildar**

Naik **Lance Naik**



NAVY

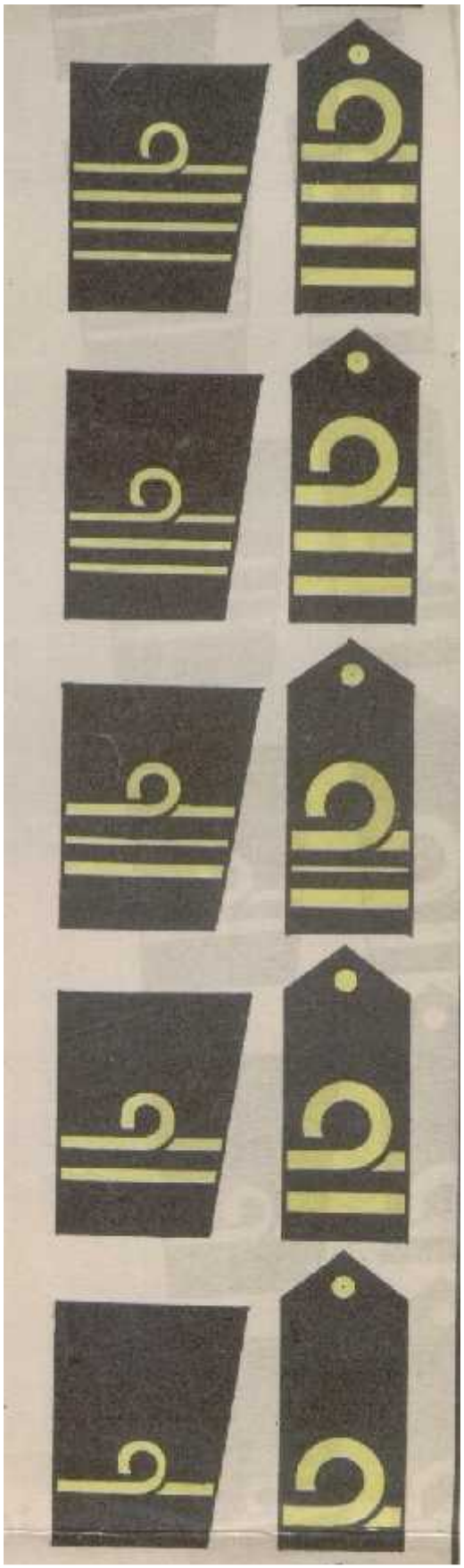
Admiral of the Fleet

Admiral

Vice Admiral

Rear Admiral

Commodore



Captain

Commander

Lieutenant Commander

Lieutenant

Sub Lieutenant

CAP BADGES

Master Chief **Petty Officer** **Other Ranks**

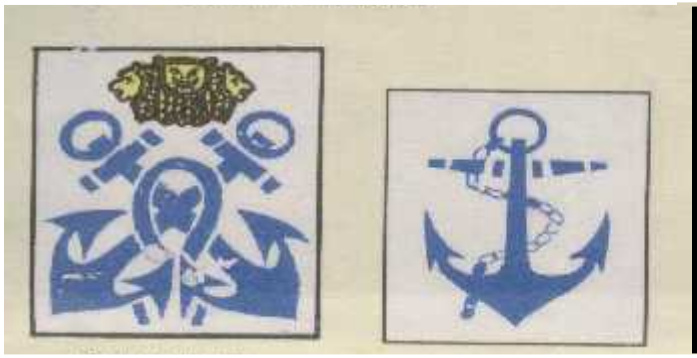
SHOULDER BADGES

Master Chief Petty Officer(i) **Master Chief Petty Officer(ii)** **Chief Petty Officer**

GOOD CONDUCT BADGES

12 Years

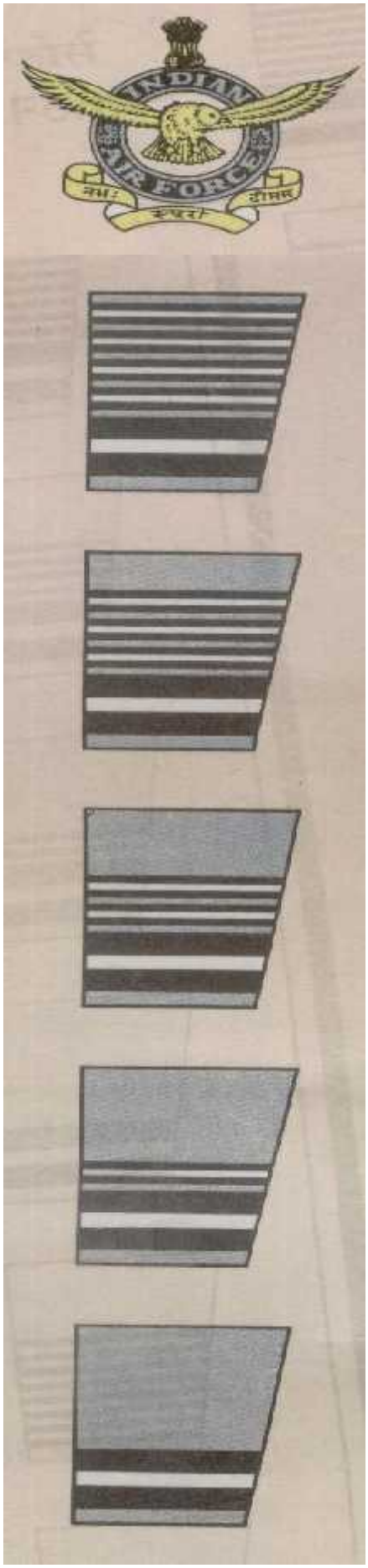
ARM BADGES



Petty Officer **Leading Ranks**

8 Years

4 Years



AIR FORCE

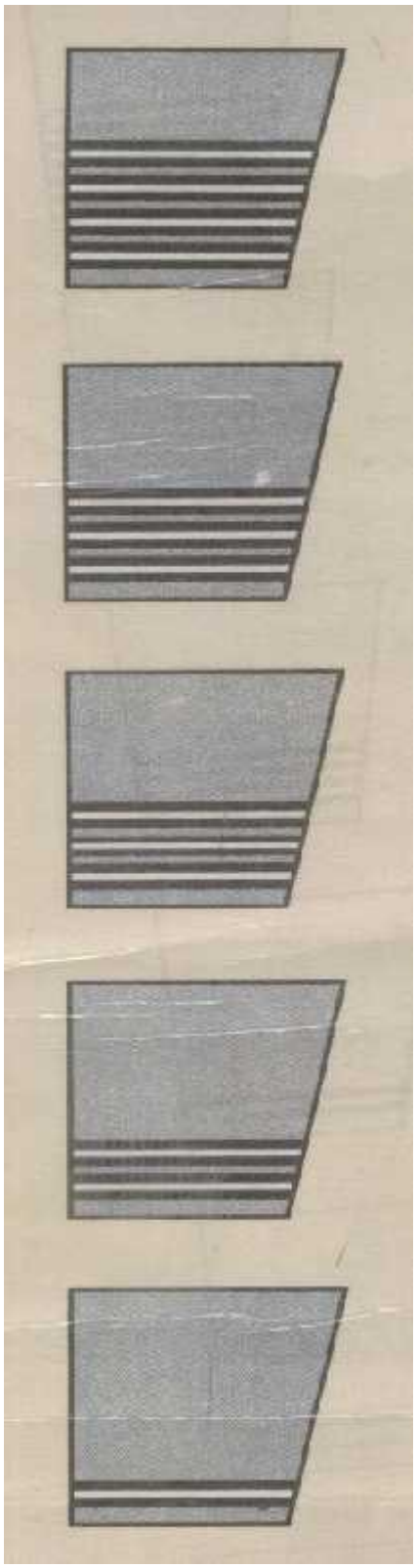
Marshal of the Air Force

Air Chief Marshal

Air Marshal

Air Vice Marshal

Air Commodore



Group Captain

Wing Commander

Squadron Leader

Flight Lieutenant

Flying Officer

Master Warrant Officer

Warrant Officer

Junior Warrant Officer

Sergeant

Corporal

Leading Aircraftman

SECTION-3

HONOURS AND AWARDS

Indian Armed Forces Awards

1. For the purpose of classification, Indian Armed Forces Honours and Awards can be divided in to two categories:-

(a) Gallantry Awards.

(b) Non-Gallantry Awards.

2. **Gallantry Awards**. Gallantry awards are again divided into two categories:-

(a) **Gallantry in the Face of Enemy**

(i) Param Vir Chakra.

(ii) Maha Vir Chakra.

(iii) Vir Chakra.

(iv) Sena, Nao Sena and Vayu Sena Medal.

(v) Mention in Dispatches.

(vi) Chiefs of Staff Commendation Card.

(b) **Gallantry other than in the face of the enemy**

(i) Ashoka Chakra.

(ii) Kirti Chakra.

(iii) Shaurya Chakra.

Note:- These were originally named Ashoka Chakra Class I, Class II, Class III

3. **Non-Gallantry Awards** are as follows:-

(a) Bharat Ratna.

(b) Padma Vibhushan.

(c) Padma Bhushan.

(d) Sarvottam Yudh Seva Medal.

(e) Param Vishisht Seva Medal.

(f) Padma Shri.

(g) Sarvottam Jeevan Raksha Padak.

(h) Uttam Yudh Seva Medal.

(j) Ati Vishisht Seva Medal.

(k) President's Police and Fire Service Medal for Gallantry.

(l) President's Police Medal For Gallantry.

(m) President's Fire Service Medal For Gallantry.

(n) President's Correctional Service Medal For Gallantry.

(o) President's Home Guards and Civil Defence Medal For Gallantry.

(q) Yuddh Seva Medal.

(r) Vishisht Seva medal.

4. Correct '**Order of Precedence**' of wearing of various medals and decoration is given in Appendix.

Conditions of Eligibility and Eligible Categories

5. Conditions of Eligibility and Eligible Categories for some of the awards are given in succeeding paras.

6. **Param Vir Chakra**

(a) **Conditions of Eligibility**. Awarded for most conspicuous bravery or some daring or pre-eminent act of valour or self sacrifice, in the presence of the enemy, whether on land, at sea, or in the air. The decoration may be awarded posthumously.

(b) **Eligible Categories**. Officers, men and women of all ranks of the Army, the Navy and the Air Force, of any of the Reserve Forces, of the Territorial Army, Militia and of any other lawfully constituted Armed Forces. Matrons, Sisters, Nurses and staff of the Nursing Services and other Services pertaining to Hospital and Nursing and Civilians of either sex serving regularly or temporarily under the orders, directions or supervision of any of the above-mentioned Forces.

(c) **Monetary Allowances.** Rs 1500/-pm and each bar to the decoration another Rs 1500/-pm to all recipients.

7. **Ashok Chakra**

(a) **Conditions of Eligibility**. Awarded for most conspicuous bravery, or some act of daring or pre-eminent act of valour or self-sacrifice otherwise than in the face of the enemy. The decoration may be awarded posthumously.

(b) **Eligible Categories**. Officers, men and women of all ranks of the Army, the Navy and the Air Force, of any of the Reserve Forces, Territorial Army, Militia and of any other lawfully constituted Forces. Members of the Nursing Services of the Armed Forces. Civilian citizens of either sex in all walks of life, other than members of Police Force and of recognized Fire Services.

(c) **Monetary Allowances**. Rs 1400/-pm and each bar to the decoration Rs 1400/-pm to all recipients.

8. **Param Vishisht Seva Medal**

(a) **Conditions of Eligibility**. For distinguished service of the most exceptional order.

(b) **Eligible Categories**. All ranks of the Armed Forces including Territorial Army units, Auxiliary and Reserve Forces (when embodied) and other lawfully constituted Armed Forces. Nursing officers and other members of the Nursing Services in the Armed Forces.

9. **Vir Chakra**

(a) **Conditions of Eligibility.** For the acts of gallantry in the presence of enemy, whether on land or at sea or in the air. The decoration may be awarded posthumously.

(b) **Eligible Categories**. Officers, men and women of all ranks of the Army, the Navy and the Air Force, of any of the Reserve Forces, of the Territorial Army, Militia and of any other lawfully constituted Armed Forces. Matrons, Sisters, Nurses and staff of the Nursing Services and other Services pertaining to Hospital and Nursing and Civilians of either sex serving regularly or temporarily under the orders, directions or supervision of any of the above-mentioned Forces.

(c) **Monetary Allowance**. Rs. 850/- pm and each bar to the decoration Rs. 850/- pm to all recipients.

10. **Yuddh Seva Medal**

(a) **Conditions of Eligibility**. Awarded for distinguished service of a high order during war/conflict/hostilities.

(b) **Eligible Categories**. All ranks of the Army, the Navy and the Air Force, including those of Territorial Army units, Auxiliary and Reserve Forces and other lawfully constituted Armed Forces when embodied. Nursing officers and other members of the Nursing Services in the Armed Forces.

11. **Sena Medal**

(a) **Conditions of Eligibility**. Awarded for such individual acts of exceptional devotion to duty or courage as have special significance for the Army, Navy and Air Force. The award may be made posthumously.

(b) **Eligible Categories**. All ranks of the Army, Navy and Air Force.

(c) **Monetary Allowances**. Rs 250/- pm and each bar to the medal Rs 250/- pm to all Sena Medal (Gallantry) awardees.

NCC Awards

12. These awards are given to NCC personnel since 1984. It includes NCC Whole Time Lady Officers (WTLO's), Associate NCC Officers (ANO's), Girls Cadet Instructors (GCI's) and NCC cadets.

13. **Raksha Mantri's Padak**. Raksha Mantri's Padak is awarded to NCC personnel and cadets since 1989 for performance of any exceptional act involving courage, devotion to duty and contribution of lasting value to the NCC. In addition cash award of Rs 10000/- and a running Veer Trophy is also given to the recipient of this award. Every year only one Raksha Mantri's Padak is awarded.

14. **Raksha Mantri's Prashansa Patra**. Raksha Mantri's Commendation Card with Rs.7500/- cash is awarded to NCC personnel and cadets since 1989 for any outstanding act involving leadership, courage or devotion to duty, which enhances the image of the NCC. Every year maximum three Raksha Mantri's Commendation Cards are awarded.

15. **Raksha Sachiv's Prashansa Patra**. The Commendation Card with Rs 5000/- cash, is awarded since 1984 for outstanding act or deed in the field of adventure sports, training or for outstanding contribution in social or cultural activities. Every year maximum ten Raksha Sachiv Commendation Cards are awarded.

16. **Maha Nideshak's Prashansa Patra**. This Commendation Card with Rs 1000/- cash, is awarded since 1984 for outstanding act or deed in the field of adventure sports, training or for outstanding contribution in social or cultural activities. There is no limit to the number for award of Maha Nideshak's Prashansa Patra.

17. **Maha Nideshak's Prashansa Patra To Civilian Personnel**. It is awarded to Central Government civilian officers/staff posted at various levels in the NCC, for displaying outstanding and distinguished service, dedication and devotion to work and outstanding contribution for efficient management of various NCC activities including camps.

Appendix
(Refer Para 4 of
Section-3 Chapter-1)

ORDER OF PRECEDENCE : MEDALS AND DECORATION

1. Bharat Ratna
2. Param Vir Chakra
3. Ashoka Chakra
4. Padma Vibhushan
5. Padma Bhushan
6. Sarvottam Yudh Seva Medal
7. Param Vishisht Seva Medal
8. Maha Vir Chakra
9. Kirti Chakra
10. Padma Shri
11. Sarvottam Jeevan Raksha Padak
12. Uttam Yudh Seva Medal
13. Ati Vishisht Seva Medal
14. Vir Chakra
15. Shaurya Chakra
16. President's Police and Fire Service Medal for Gallantry
17. President's Police Medal for Gallantry
18. President's Fire Service Medal for Gallantry
19. President's Correctional Service Medal for Gallantry
20. President's Home Guards and Civil Defence Medal for Gallantry
21. Yuddh Seva Medal
22. Sena, Nao Sena and Vayu Sena Medal
23. Vishisht Seva Medal
24. Police Medal for Gallantry
25. Fire Service Medal for Gallantry
26. Correctional Service Medal for Gallantry
27. Home Guard and Civil Defence Medal for Gallantry
28. Uttam Jeevan Raksha Padak
29. Parakram Padak
30. General Service Medal-1947
31. Samanya Seva Medal-1965
32. Special Service Medal
33. Samar Seva Star-1965

34. Poorvi Star
35. Paschmi Star
36. Op Vijay Star
37. Siachin Glacier Medal
38. Raksha Medal-1965
39. Sangram Medal
40. Op Vijay Medal
41. Op Parakram Medal
42. Sainya Seva Medal
43. High Attitude Medal
44. Police (Special Duty) Medal-1962
45. Videsh Seva Medal
46. President's Police and Fire Service Medal for Distinguished Service
47. President's Police Medal for Distinguished Service
48. President's Fire Service Medal for Distinguished Service
49. President's Correctional Service Medal for Distinguished Service
50. President's Home Guards and Civil Defence Medal for Distinguished Service
51. Meritorious Service Medal
52. Long Service and Good Conduct Medal
53. Police Medal for Meritorious Service
54. Fire Service Medal for Meritorious Service
55. Correctional Service Medal for Meritorious Service
56. Home Guard and Civil Defence Medal for Meritorious Service
57. Jeevan Raksha Padak
58. Teritorial Army Decoration
59. Teritorial Army Medal
60. Indian Independence Medal-1947
61. Independance Medal-1950
62. 50th Anniversary of Independence Medal
63. 25th Independence Anniversary Medal
64. 30 Years Long Service Medal
65. 20 Years Long Service Medal
66. 9 Years Long Service Medal
67. Commonwealth Awards
68. Other Awards

SECTION-4

CONCEPT OF COMBINED DEFENCE SERVICES

Introduction

1. The nature of modern warfare is characterised by technological complexities that demand that our armed forces fight as a team. A country like India endowed with a geostrategic location in the Asian sub continent must have basic structures and systems to manage its national security. Modern wars have become total, complex and highly specialised requiring suitable organizations to wage wars. The fast changing scenarios have overtaken the present Indian system making it redundant. The times when each Service could fight its own war in isolation and without integration of the other two services is a legacy of the past. Military thinking throughout the world accepts as a truism that modern war must be fought by all three services under a single commander and unless done, the chances of success will be small.

Concept

2. The concept of three dimensional warfare or combined operations wherein the three wings of the armed forces i.e. Army, Navy and Air Force, have to operate as a single cohesive force against the enemy is the norm of the day.

3. Efforts have been made in this direction in our country also. Exchange of officers among the three services during various training course, sand model discussion and exercises at various levels is very useful in understanding the working ethos of other services. It ultimately leads to cohesiveness at ground level. A very good example of inter services co-operation is Indo Pak war 1971 and recently Kargil war 1999 where in Army and Air Force worked in unison achieved remarkable results.

4. Currently Integrated Command having all the three services under its wing is established at Port Blair to institutionalize the concept of three dimensional warfare and same is working very efficiently.

Conclusion

5. National defence is not a concern of either military forces or the national government but of the nation as a whole. A nation's security rests on many resources: human, economic, natural, technological, political to name but a few. The national aim during any war would be to win, for which all the national resources will be employed. The defence services are the most important tool available with the government to achieve its aim. However, individually no single service on its own can achieve this aim. Therefore there is a need to adopt a joint/common approach towards attainment of the national aim and this is only possible when the three services work and operate together, both during peace and war.

CHAPTER-II

MAP READING

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SECTION-3	Topographical Forms and Technical Terms	√	√
SECTION-4	The Grid System	√	√
SECTION-5	Relief Contours and Gradients	√	√
SECTION-6	Cardinal Points and Finding North	-	√
SECTION-7	Type of Bearings and use of Service Protractor	√	√
SECTION-8	Prismatic Compass, Its Use and Introduction to GPS	√	√
SECTION-9	Setting a Map, Finding Own Position and North	√	√
SECTION-10	Map to Ground	-	√
SECTION-11	Ground to Map	-	√
SECTION-12	Point to Point March	-	√

SECTION-1

INTRODUCTION TO MAP AND CONVENTIONAL SIGNS

Introduction

1. A map is representation of selected natural and man made features of the whole or part of the earth's surface on a flat sheet of paper on a definite scale and in their correct relative geographic positions and elevations. Symbols, colour differentiations and contours help to show the physical features- mountains , valleys and plains- in their true relationship to the land and man made features. In a way they are an inventory of the physical features of and on the surface of earth and a blue print for Commanders for planning campaigns. Map reading thus helps a peron to get a clear and accurate picture of the ground without actually seeing it. A map however has the following limitations:-

(a) It is seldom, if ever, upto date.

(b) It cannot show every thing that exists on the ground.

Information

3. Every map carries a variety of information printed on its margin and since these pieces of information usually appear in approximately the same position, it is useful to know where to look for them. Fig 1 shows the information which is given in the margins of the 1 inch Survey of India Map in a diagrammatic form.

Conventional Signs

4. Conventional signs are symbols used to represent certain artificial or natural features/objects on the map. They are seldom drawn to scale.

5. The exact position of the object represented is the centre of the symbol if it is drawn in plan or the centre of the base of the symbol in elevation.

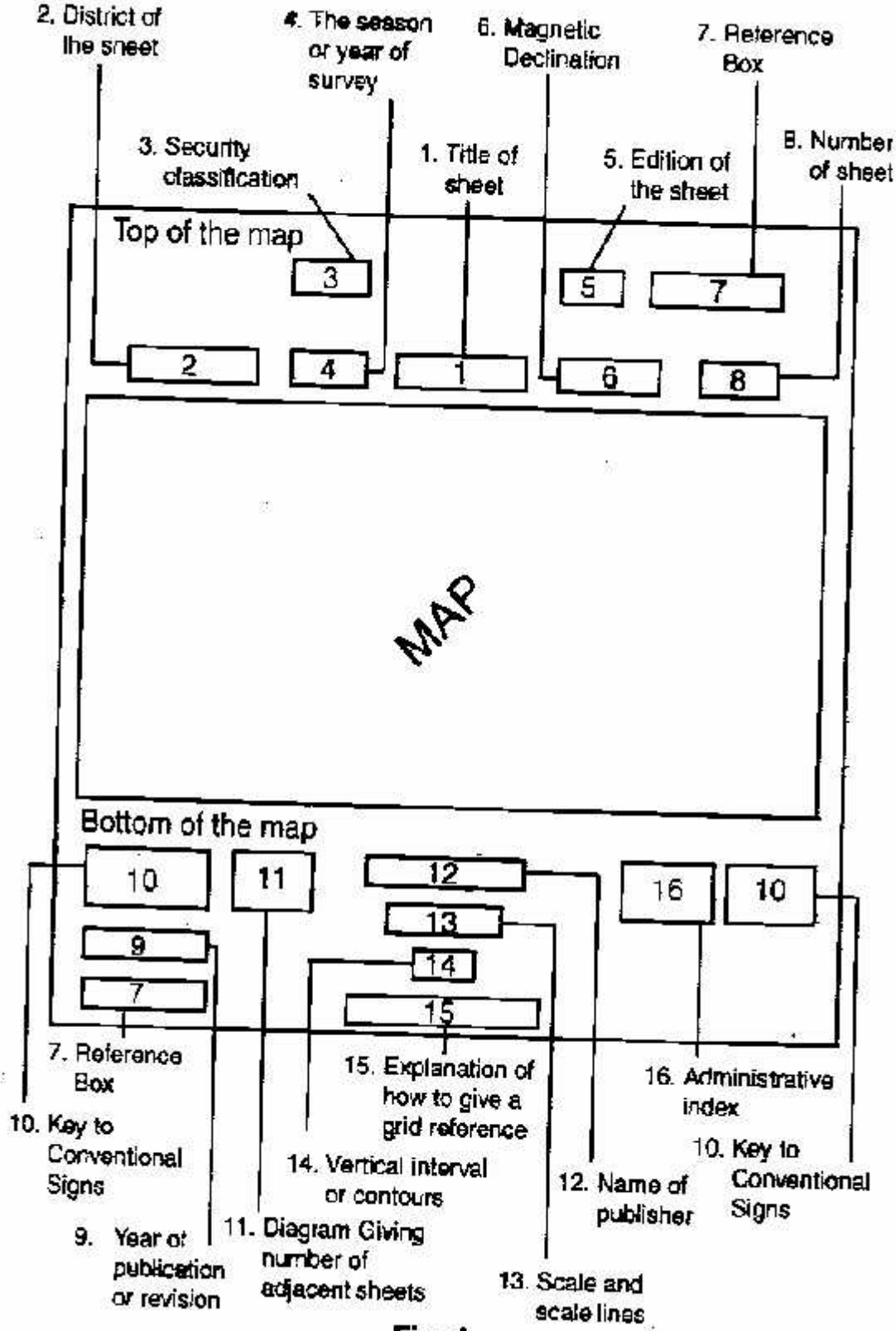

2. District of the sheet
4. The season or year of survey
6. Magnetic Declination
7. Reference Box
3. Security classification
1. Title of sheet
5. Edition of the sheet
8. Number of sheet
Top of the map
3
5
7
2
4
1
6
8
MAP
Bottom of the map
10
11
12
16
10
13
9
14
7
15
7. Reference Box
10. Key to Conventional Signs
15. Explanation of how to give a grid reference
16. Administrative index
14. Vertical interval or contours
12. Name of publisher
10. Key to Conventional Signs
9. Year of publication or revision
11. Diagram Giving number of adjacent sheets
13. Scale and scale lines

Fig. 1

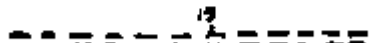
Common Types

6. A selection of the more common conventional signs is given as below.

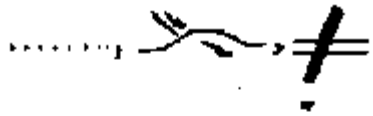
Common Types

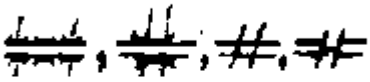
6. A selection of the more common conventional signs is given at Appendix.

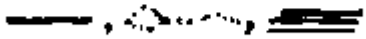
Roads-metalled with mile-stone. 

Roads-unmetalled with mile-stone. 

Cart track, camel track, mule path.

Foot path, Road in bed of stvearn, Level crossing. 

Bridges with piers and without-causeway, Ford. 

Stream-Approx water course canal. 

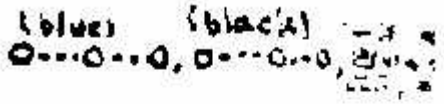
River banks, shelving, steep 10 to 20 feet over 20 feet. 

River beds-dry, with stream, with island and rocks. 

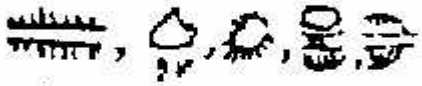
Tidal river-shoal-sub merged rocks. 

wells-lined and unlined, spring, Tanks-perennial and dry. 

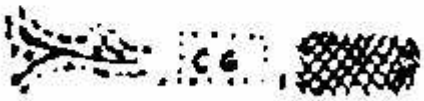
Karez-in, flow and dry, swamp, Reeds.



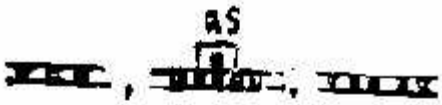
Embankments, road or rail, tank, cutting tunnel.



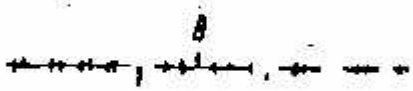
Broken ground, camping ground, vine on trellis.



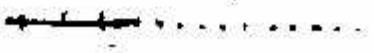
Railways, broad gauge, double, single (station), under construction.



Railways other Gauges, double, Single (milestone) and under construction.



Light railway or tram way Telegraph line.



Circuit house, Dak, Travellers bungalow, Rest house.

CH, DB, TB, RH

Inspection bungalow, Police station, Buddhist Kyaung.

IB (canal), PS, Kg

Post office, Telegraph office, combind office

PO, TG, PTO

forest-reserved, state and protected.

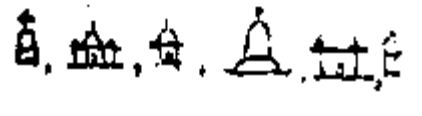
RF, SF, PF,

Spaced names, Administrative, Locality, tribal.

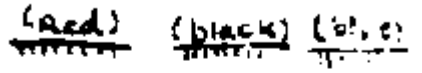
Villeges : open, walled, ruined, deserted antiquities.

Huts, permanent and temporary, Fort, Tower chhatvi.

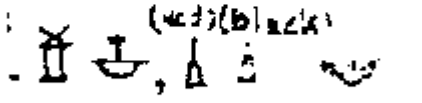
Church, Mosque, Temple pagoda, Idgah-Tomb.



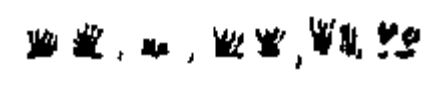
Dams, masonary and earth work-weir(anicut in madras)



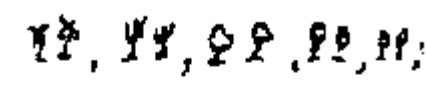
Lighthouse-Lightship-Buoys : lighted and unlighted An-chorage.



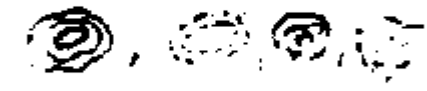
Grass high and low cane, Bamboo-plantation.



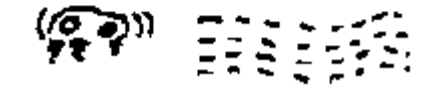
Palms, Areca, palmyra, other conifer, other trees, scrub.



Contours, Formlines, Rocky slopes.



Cliffs-sand features.



(a) Glacier (b) Moraine
(c) Crevasses (d) Scree.
(e) Perpetual Snow.

Boundary demarcated; international

Boundary demarcated, province or state.

Boundary undermarcated, international, province or state.

Boundary dinstrict or Tribal.

Boundary Sub Division tahsil taluk or township forest.

Boundary pillars, surveyed, not found.

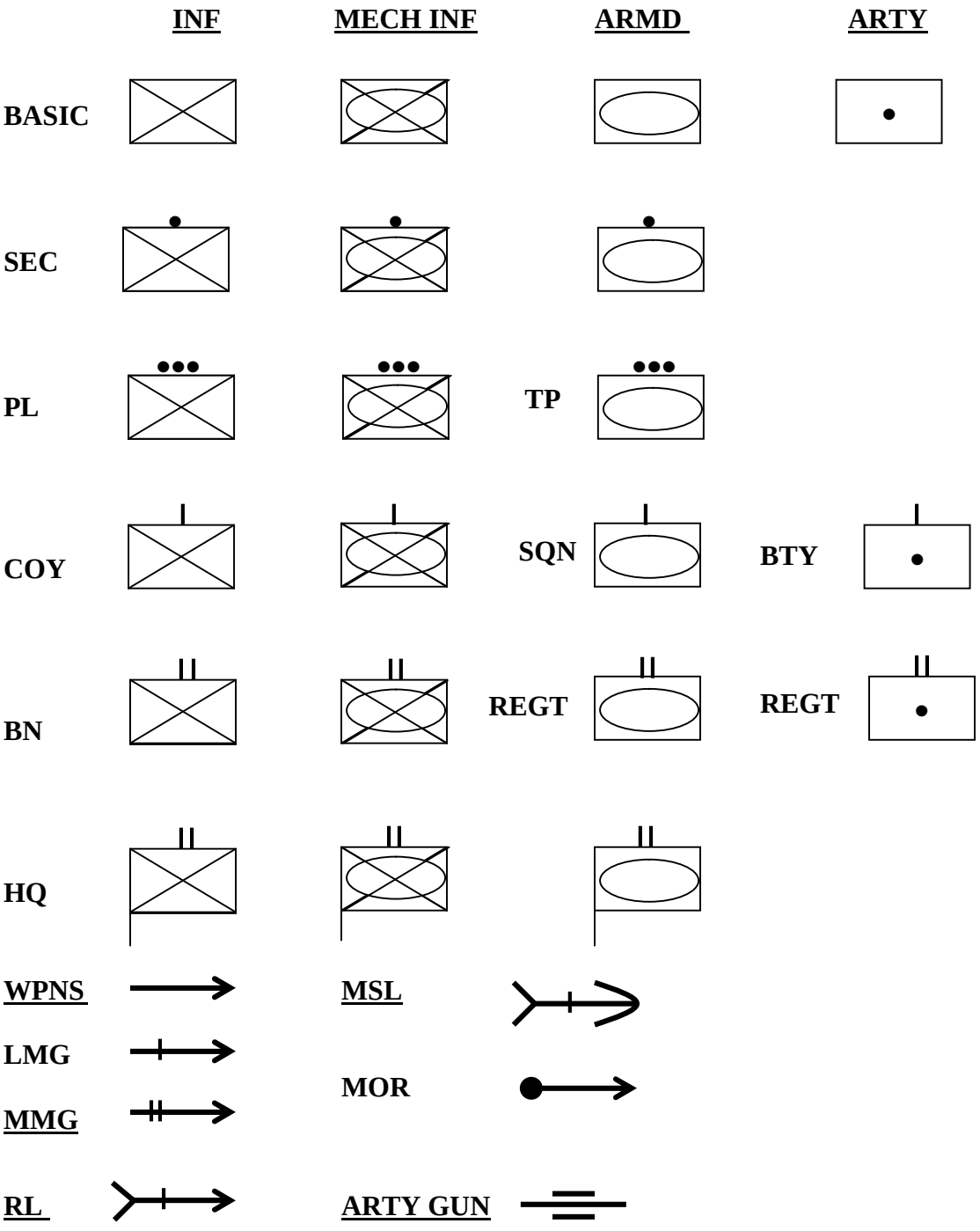
Graves oil wells, Mine-Battle field with year.

Heights, traingulated, Bench Mark. A-200; BM 100, 200, 20(

7. The conventional signs shown are those of the Survey of India 1 inch Map.

8. The signs may vary a little with different scale maps and with different editions but not to any great degree and even on foreign maps the conventional signs are sufficiently similar to be easily recognisable.

MILITARY SYMBOLS



SECTION-2

SCALES

Definition

1. By scale it means the proportion which the distance between two points on the map bears to the distance between the same two points on the ground. It is obvious that it would be impossible to make a map the same size as the country which it represents. Everything on the map must be reduced and the extent to which the size is reduced constitutes the scale of the map. The essence of a map is that it is a drawing to scale and it bears a definite ratio to the size of the actual country which it portrays. If you imagine two maps, each measuring 3 feet x 2 feet, one might show the whole of Bihar and Orissa, while the other might show only a small district. The scale of these two maps are obviously not the same.

Methods

2. There are two methods of expressing a scale:-

(a) **In Words.** 1 inch to 1 mile, it means that 1 inch on the map represents 1 mile on the ground. If your were to measure on a map of this scale the distance from your house to the nearest railway station and you found that it was two inches you would know that the distance in actual fact was 2 miles.

(b) **As a Representative Fraction (RF)**. This is the scale expressed in the form of a fraction, if the scale of a map is given as 1/100000 this means that one unit of the map represents 100000 of the same unit on the ground. It could mean that one centimeter on the map represents 100000 on the ground. Thus 1/63360 means that 1 inch on the map represents 63360 inches on the ground and that is the number of inch in one mile. This is the representative fraction for a scale of 1 inch to 1 mile. The advantage of expressing a scale as a RF is that it can be applied to any type of map of whatever nationality. The scale is always written in the centre of the bottom margin of the map.

Scale Line

3. Underneath this is the scale line which is drawn in two ways and by means of this, distance on the map can be measured. On the 1 inch to 1 mile map one shows miles along its length, and is similarly divided into yards, with sub divisions in the left hand section.

4. The large divisions on these scale lines are called primaries and the small divisions on the left secondaries. An example of the scale lines for a scale 1 inch to 1 mile is at Fig.1

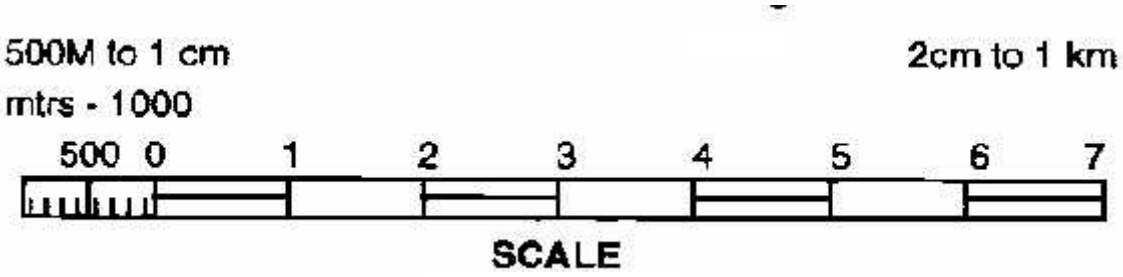


Fig-1

Common Scales

5. The following is a short list of the more common scales used on Survey of India Maps:-

(a)	16 inches to 1 Mile	1/3960
(b)	4 inches to 1 mile	1/15840
(c)	2.53 inches to 1 mile	1/25000
(d)	1 inch to 1 mile	1/63360
(e)	½ inch to 1 mile	1/126720
(f)	¼ inch to 1 mile	1/253440
(g)	16 miles to 1 inch (Approx)	1/1000000
(h)	32 miles to 1 inch (Approx)	1/2000000

6. The 16 inches and 4 inches maps are called large scale maps or “Plans” and they show a very great amount of detail.

7. The most common scale of military maps is 1 inch to 1 mile, which shows most of the detail on the ground and is the scale normally used for the tactical purposes. The ¼ inch to 1 mile being more of an out-line map and one which shows a large area of country on one sheet is more commonly used by mechanized troops and transport columns. A scale which may sometimes be required for small tactical exercises is the 1/25000 (approx 2.5 inches to 1 mile). This shows a great amount of detail. The 1/M (million) map and ½ M map are purely routine maps normally used by the Air Force.

8. Abroad, scale are referred to purely by their representative fraction and the French army uses three main scales, which are given below with their English equivalent:-

(i)	1/20000	:	3.16 miles to 1 inch (approx)
(j)	1/80000	:	0.8 inches to 1 mile (approx)
(k)	1/50000	:	1.27 inches to 1 mile (approx)
(l)	1/25000	:	2.25 inches to 1 mile (approx)

9. The first is used for strategic purposes, the last is an artillery and French map.

10. The 1/50000 map which is used over considerable portions of France has not been completed, therefore old topographical maps of the scale 1/80000 are still being employed commonly.

11. In our army we employ mostly the 1:50000 maps and 1:250000 maps. The Air Force uses the 'million map' since pilots have to overfly vast area and need continuous update from much larger landmarks, than used by the ground forces.

SECTION 3

TOPOGRAPHICAL FORMS AND TECHNICAL TERMS

General

1. The following list of technical terms and topographical forms is by no means exhaustive and is meant to include only those which are more commonly used. Topographical forms is a name used to describe geographical features which occur on the ground.

Technical Terms

2. (a) **Bearing** - The angle formed by a line joining two points and the North and South line. Bearings are always measured clockwise.

(b) **Bench Mark** - A permanent mark usually cut into a wall recording exact height for future reference, marked BM with the height on Ordnance Survey Maps.

(c) **Contours** - A line drawn on the map joining up all points of equal height above sea level.

(d) **Detail** - All the Topographical information on a map.

(e) **Gradient** - The slope of a hill expressed as a fraction.

(f) **Grid Lines** - Lines running parallel to and at right angles to a North and South line through approximately the centre of the area covered by the grid system.

(g) **Grid North** - Except through the origin, grid lines do not lie true North and South or East and West, Grid North is the direction of the North South grid lines on a map.

(h) **Horizontal Equivalent (HE)** - The distance measured on the map between adjacent contour lines. It varies according to the nature of the relief.

(j) **Magnetic Variation** - The difference between true North & Magnetic North.

(k) **Setting** - Placing a map so that North on the map points toward the North so that the objects on the map are placed in relationship to the same objects on the ground.

(l) **Spot Height** - A point on a map whose height has been determined by Survey methods. This height is printed alongside the point.

(m) **Trig Point** - A point fixed during the triangulation at the beginning of a survey, marked on Ordance Survey Maps by a small triangle with the height.

(n) **True North** - The direction of the North Pole from the point.

(o) **Vertical Interval (VI)** - Successive controur lines. The VI is generally the same for any given scale.

Topographical Forms

3. (a) **Basin** - An area of fairly level ground surrounded by hills or the area drained by a river and its distributaries.

(b) **Col or Saddle** - A narrow ridge of high land joining up to higher hills.

(c) **Crest** - The highest part of a hill or mountain range. It is that line on a range of hills or mountains from which the ground slopes down in opposite directions.

(d) **Dead Ground** - Ground which by reason of undulations or hills is not visible to the observer.

(e) **Defile** - Any feature whether natural or artificial which could cause a body of troops to contract its front. An example of a natural defile is mountain pass while a bridge is an example of an artificial defile.

(f) **Escarpment** - The steep hill side formed by a sudden drop in the general ground level usually from a plateau.

(g) **Knoll** - A small isolated hill.

(h) **Plateau** - A table land, an elevated region of considerable extent generally fairly level.

(j) **Ravine** - A long deep valley closed at one end separating two spurs.

(k) **Ridge** - The line along a hill or range of hills or mountains from which water flows in opposite directions, a divide,sometimes the crest of a line of hills as it appears along the horizon.

(l) **Spur** - A piece of high ground jutting out from a range of hills into lower ground.

(m) **Watershed** - The line separating the water flowing into two different river systems, the edge of a river basin.

SECTION-4

THE GRID SYSTEM

Definition of Grid

1. A map is covered with a net work of purple lines, some running North and South and other West and East. These form a series of small squares all over the map. These lines are known as "Grid Lines".

Purpose

2. The purpose of grid lines is to make possible giving and reading grid references and to facilitate measurement of bearings. They make no difference to the construction of the map and if they are removed, the accuracy of the map would not be affected. These lines are super-imposed in order that it may be possible to give a reference to a desired point.

Division

3. The whole country is divided into large lettered square each measuring 1000000 yards squares. The lettered squares are subdivided into 100 similar squares each measuring 10000 yards squares.The side of 10,000 yards are thickened and they are further divided into smaller square/measuring 1000 yards squares. A 1,000,000 yards lettered square is much larger than the whole of a normal one inch map sheet and for practical purposes they are ignored. You use these letters when giving reference on smaller maps (e.g. Quarter inch).

Need for Reference

4. It is difficult to describe an exact position without pointing it out on the map which is not always possible and to describe the position in ordinary terms is lengthy and ambiguous. The key-note of a reference is that the method should be accurate, quick and simple. In the army maps, we make use of the Grid system to achieve this.

Method of Grid Reference

5. In giving a grid reference, there are four rules to remember:-

(a) A reference must always contain an even number of figures. In the normal method, it will contain six figures.

(b) Always count along the EASTING lines first from WEST to EAST and then from SOUTH to NORTH, along NORTHINGS.

(c) For the six figures reference, the third and the sixth figure represent the divisions of 1000 yards square to the nearest 10^{th} part, so they have to be estimated and for these figures a slight latitude is allowed.

(d) If a general grid reference is to be given or there is only one such object in one square e.g. bridge, temple, road, junction, then a four figure grid reference would suffice.

SECTION 5

RELIEF CONTOURS AND GRADIENTS

General

1. The word relief is a name used to describe the rise and fall of the ground or in other words the hills and valleys. The most common way in army to do so is by contour lines. These are thus lines drawn on the map (usually drawn) each line joining up points of equal heights above sea level. Against these lines is written the height.

Slopes

2. The closer together the contour lines are, the steeper is the slope of the hill which they show, where they are far apart, the slope down is gradual. Remembering this, it is possible to see at a glance where the steeper hills are.

Type of Slopes

3. There are two type of slopes, convex and concave. A convex slope is the one which bulges outwards and concave slope is the one which curves inwards.

Vertical Interval(VI)

4. The rise between successive contour lines is known as the vertical interval. On map scale 1 inch to 1 mile, the VI of each contour line is 50 feet while on the ¼ inch to a mile it is 250 feet.

Horizontal Equivalent

5. The distance measured flat on the map between adjacent contour lines is horizontal equivalent (HE).

Gradient

6. A gradient is a slope expressed as a fraction. If we say that a slope has a gradient of 1 inch to 7 we mean for every 7 feet of horizontal distance the slope rises or falls 1 foot vertically. Simple Formula is VI/HE = Gradient.

7. The horizontal equivalent is obtained by measuring on the map and vertical interval by subtracting the contour heights.

SECTION 6

CARDINAL POINTS AND FINDING NORTH

General

1. This figure shows the main points of compass. North, South, East and West are known as the cardinal points.

2. If the North point is taken as 0 Degrees the angle which East forms with it is 90 degrees, or a right angle. The angle formed by the South point, being twice as large, is 180 degrees, and the West point forms an angle of 270 degrees. If the angle is measured all the way round the circle back again to North, it will be found to be 360 degrees.

Types of North

3. There are three type of North points:-

(a) **True North** - The direction of North pole from the observer.

(b) **Magnetic North**- It is the point to which an accurate compass needle points, when freely suspended.

(c) **Grid North** - It is the direction to which the North South grid lines on a map point.

Magnetic Variation

4. **True North is Constant** Magnetic North is the point to which the compass needle points. The needle does not point directly to True North, but a little West or East of True North. The point towards which the needle swings is known as Magnetic North

and the difference between True North and Magnetic North is called magnetic variation. The amount of the magnetic variation depends upon two factors, time and place. See Fig.3

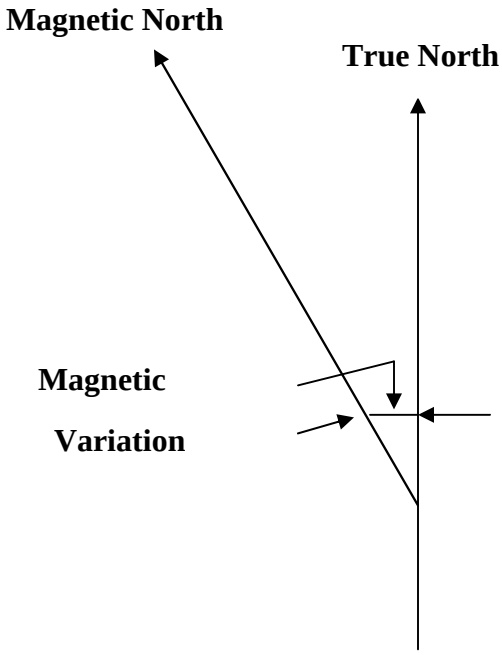


Fig.3 Magnetic Variation

5. **Time**. The Variation is not constant but is, gradually changing and even the change each year is not constant but the difference being negligible it is taken to be constant. On the top margin of a map will be found a statement giving the magnetic variation. To bring this up-to-date, the year of issue of the map must be noted and for every year that has passed since then the applicable change annually subtracted or added from the figure given as applicable.

6. **Place**. The amount of the magnetic variation also changes in different parts of the world and indeed in different parts of the country.

Grid Convergence

7. The angular difference between Grid and True NORTH is called the 'Angle of Convergence or the grid convergence'.

SECTION-7

TYPE OF BEARINGS AND USE OF SERVICE PROTRACTOR

1. The clock wise angle formed by a straight line joining two points and direction of NORTH, is called the bearing between the two points. A bearing is always measured clockwise. They are of three types as given below:-

(a) **Grid Bearing**. Measured on the map from the Grid North by the help of a protractor.

(b) **Magnetic Bearing**. Measured from Magnetic North by the compass.

(c) **True Bearing.** Calculated by finding out the relation of true NORTH and Grid NORTH or Magnetic NORTH.

Conversion of Bearings

2. The methods are explained in the succeeding paras.

To Convert a Magnetic Bearing to a True Bearing

3. Suppose the bearing of a certain point P is measured with a compass and is found to be 160 Degrees. To convert this magnetic bearing to a true bearing, draw a diagram as given in Fig.4.

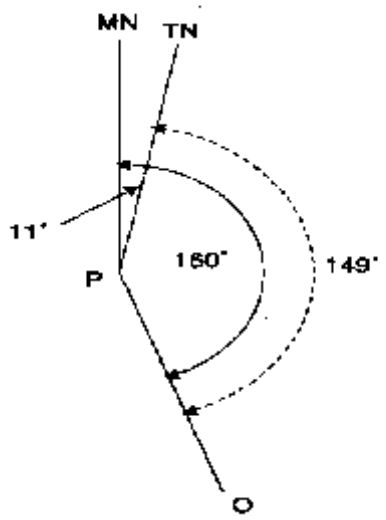


Fig. 4

4. First draw a vertical line to represent Magnetic North (because it is a magnetic bearing which is being considered). Next draw a line to P at an angle of 160 degrees. It is only a rough diagram, and the angle can be judged by eye. Thirdly, draw in the true North line approximately 11 degrees East of Magnetic North, with this diagram it becomes clear that true bearing (marked with a dotted line) is smaller by 11 degrees. Therefore, the true bearing of P is 149 degrees.

To Convert Grid Bearing to Magnetic Bearing

5. Measuring with a protractor on the map, the bearing of a Wind Mill at Y from a Church at X is found to be 120 degrees. To convert this grid bearing to a magnetic bearing, draw a diagram as before this time starting with the Grid North line. The magnetic bearing is larger than the grid bearing by 11 degrees and is therefore, 131 degrees.

6. In converting bearing it is always wise to draw a diagram in order to see whether the magnetic variation should be added or sustracted and this is an easier way than remembering sets of rules.

Back Bearing

7. It is the bearing taken from the observation point back on to the original position. In practice it is not necessary to move to the observation point as it can be calculated. The rule is that if the bearing is large enough to have 180 degrees substracted from it this should be done. If it is smaller this figure should be added.

Use of Service Protractor

8. **General** The service protractors "A" Mark IV is an instrument used for plotting and measuring bearing on the map. It is the essential link between the compass and the map, for it is by means of the protractor that magnetic bearings have been converted to grid bearing and transferred to the map.

Desrcription

9. The protractor is made of cardboard or ivorine and it measures 6 inches long by 2 inches wide.

10. The front face of the protractor has 360^0 of a circle marked around the edges of the three sides. The degrees are marked in a clockwise direction starting from the left hand bottom corner in two tiers, outer set of figures shows gradration from zero degrees to 180^0 and the inner set from 180^0 to 360^0. The zero is denoted by a small arrow at the centre of the fourth side of the protactor (Fig-5).

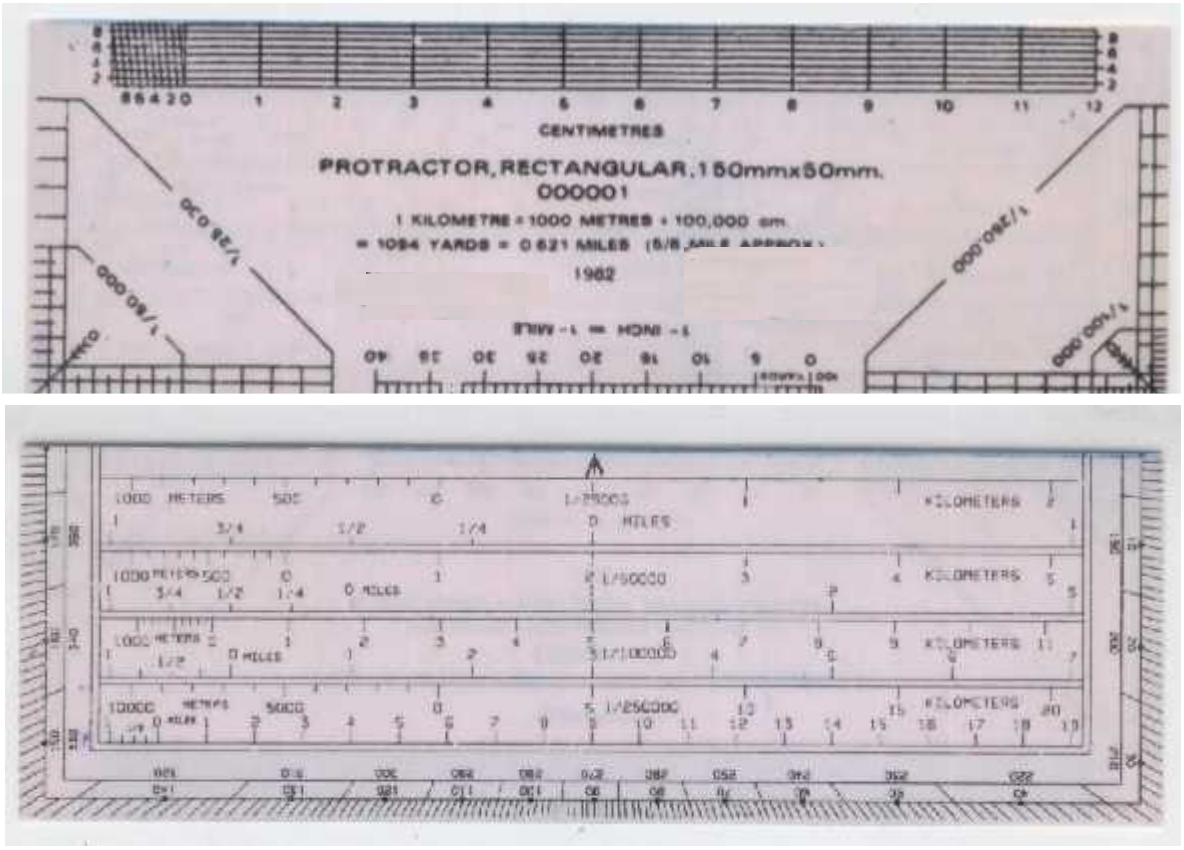


Fig-5

Scale of Protractors

11. The main purpose of the protractor is to measure angles and bearings as described in the preceding paragraphs.

12. The protractor also shows on both its faces a number of the more common map scales. The respective scale lines are drawn out and divided into primary and secondary divisions in exactly the same way as at the bottom of the map. Six different scales are shown on the faces each with a variety of sub-divisions so that there is unlikely to be a map on which distance cannot be measured by means of the service protractor.

Measuring a Bearing

13. The angle can be measured by drawing a line from the gradation to the point zero on the protractor. The required angle will be the gap between this line and the line joining the zero (Fig – 5A).

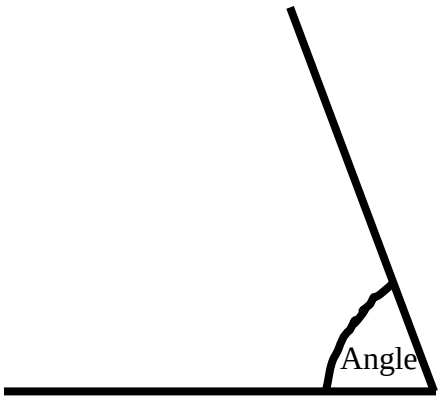


Fig-5A

Usage of Protractors

14. The service protractor is an essential item of equipment. With its help one can:-

(a) Plot and measure bearing on paper or on a map. For bearing between 0 and 180 degrees their Zero edge must be on the LEFT and for 180 degrees -360 degrees it must be on the RIGHT.

(b) Measure distance in inches correct upto $1/100^{th}$.

(c) Measure distance in yards, metres or miles on a map by using the appropriate scale.

(d) For using the diagonal scale one must use an intermediate agent. Mark off the distance to be measured on the straight edge of a paper or by means of a divider and then put the paper or divider on the diagonal scale and measure.

SECTION-8

PRISMATIC COMPASS , ITS USE AND INTRODUCTION TO GPS

1. **General**. The magnetic compass has been and is being used extensively in ships, aircraft and the various branches of the army to find and maintain direction. The prismatic compass is an accurate and reliable instrument of great value except during a "magnetic storm" or when subject to strong local magnetic field e.g. in polar regions. With the prismatic compass one can measure magnetic bearing on the ground.

Types

2. There are two types of prismatic compass, the dry and liquid type. Liquid type is easier to use though it is less sensitive.

Description

3. The names of various parts are shown in figure 6 and 7.

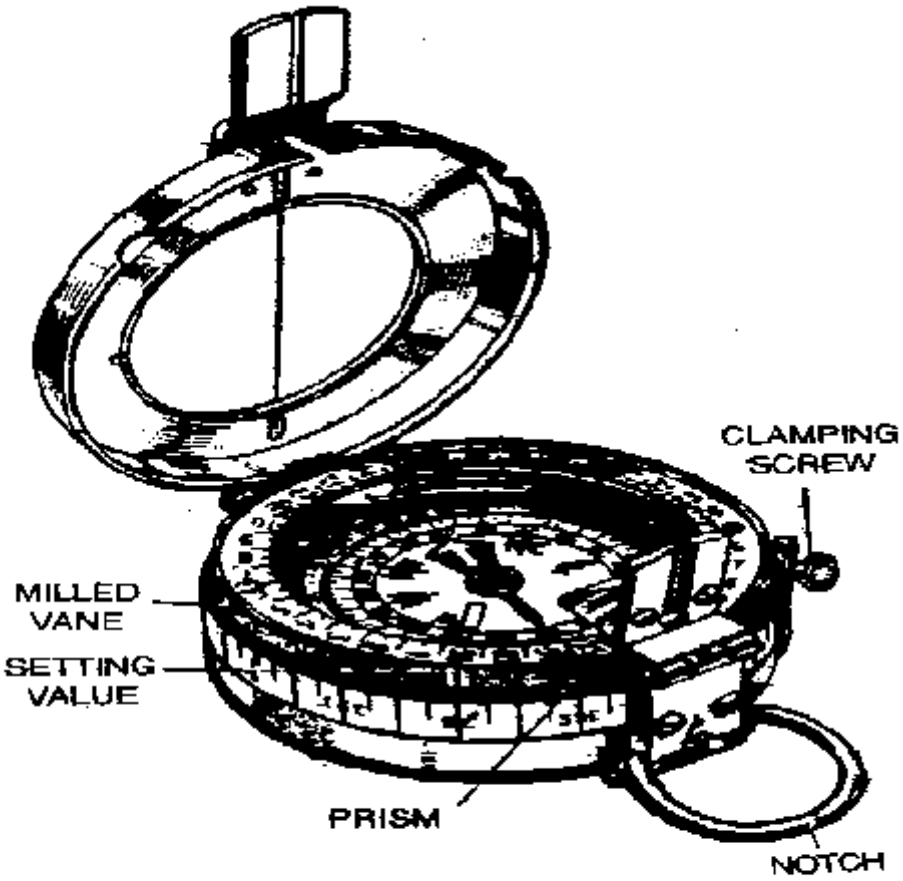


Fig- 6

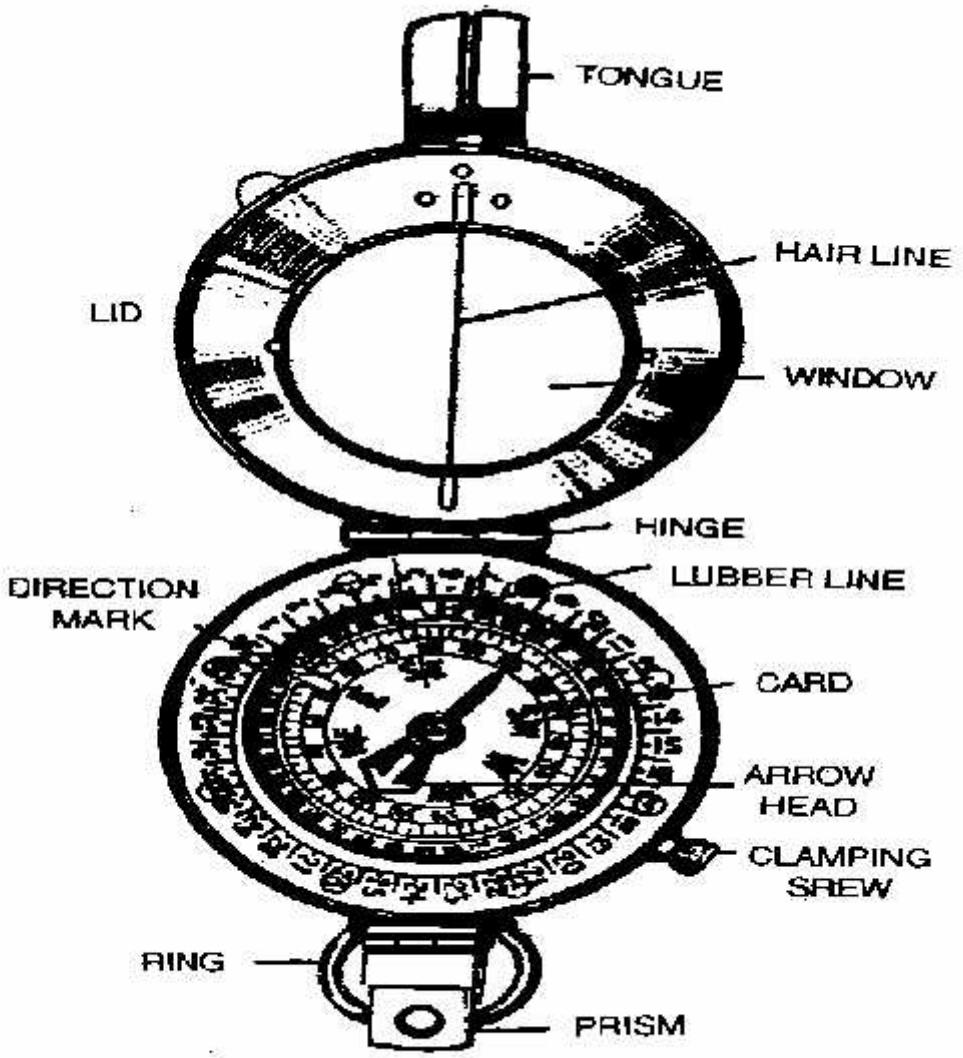


Fig. 7

How to Take a Bearing

4. Open the lid so that it is roughly at right angle to the body of the compass.

5. Turn the prism casing over so that it lies flat on the face of the compass. Put your thumb through the ring and your forefinger underneath the compass and hold it so that it attains horizontal level.

6. Bring the prism upto the eye and you will see two things:-

(a) Above the prism, through the slot on the case, the hair line on the window.

(b) Through the prism itself, a set of figures.

7. The compass must be held so that the hair line is vertical and so that it cuts the object on to which the bearing is being taken. The reading is determined by noting where the bottom of the hair line cuts the set of figures beneath it.

Compass Error

8. Sometimes due to the presence of impurities in the material of which a compass is made or other reasons, the magnetic needle may not point toward the magnetic NORTH but a little to the EAST or WEST of it. This deviation of the magnetic needle in the compass from the magnetic NORTH is termed compass error:-

(a) The compass error is said to be 2 degrees EAST if the compass needle points 2 degrees EAST of magnetic NORTH. The compass error is 5 degrees WEST if the compass needle points 5 degrees WEST of magnetic NORTH.

(b) Always draw a rough diagram showing the magnetic NORTH and the compass NORTH with the error, you will then see whether you have to subtract or add when converting compass bearing into magnetic bearing and vice versa.

Global Positioning System

9. Global Positioning System (GPS) refers to a system of satellites and receivers that allows people and devices to pin point their precise location on the earth. The normal GPS operational constellation consists of 24 satellites that orbit the earth in 12 hours. The satellite orbits repeat almost the same ground track each day. The orbit altitude is such that the satellites repeat the same track and configuration over any point. There are six orbital planes with four space vehicles in each, equally spaced 60 degree apart and inclined about 55 degree with respect to equatorial plane. The constellation provides the user with 5-8 space vehicles visible from any point on the earth. Devices that are equipped with GPS equipment receive transmission from at least a few of the satellites and are able to discern very precise positioning data.

10. The first GPS satellite was launched in1974 and the 24th was launched in1994. The new satellites are periodically launched to replace the ageing ones. GPS in funded by and controlled by the United States, Department of Defence.

11. The application of GPS is very broad and number of users is increasing dramatically. With improved technology, small portable GPS receivers have become very handy and accuracy is remarkable. These devices are used by fishermen and hikers to navigate. Today, many vehicles are equipped with GPS to help the drivers to navigate. In the Armed Forces, GPS has made navigation very easy. All aircraft, ships and specialist vehicles are equipped with GPS. In the Army, GPS is commonly used in battle fields and insurgency-affected areas. It assists troops to navigate in thick jungles, mountains and deserts. GPS is also used to guide missiles to pre specified targets.

SECTION-9

SETTING A MAP, FINDING OWN POSITION AND NORTH

Definition

1. A map is said to be set or oriented when it is placed such that it corresponds directly with the ground i.e. when true NORTH on the map points to true NORTH on the

ground. Obviously it is easier to read a map when the objects on it are pointing in the same direction as the objects on the ground.

Methods of Setting

2. There are two methods of setting a map - By compass and by objects on the ground.

3. **Setting by Compass** Draw a line showing magnetic NORTH from a point on a grid line. Open the compass and lay it flat on the map over the above drawn diagram which will show the magnetic variation so that the hair line on the window lies along the magnetic NORTH line on the diagram. Then turn both the map and the compass till the needle points along the hair line. The map is now set, since the magnetic NORTH line on the map is pointing in the direction of magnetic NORTH as indicated by the compass needle.

4. (a) **Without a Compass when Own Position is Known**

(i) Using a straight edge, for instance railway line.

(ii) Recognise one object on the ground and on the map and join own position to that object. Hold the map so that when looking along the line you see the object on the ground in the same straight line.

(b) **Without a Compass when Own Position is not Known**

(i) **Parallel Method**. Select two landmarks such as road, railway line and so on which are easily recognizable on the map. If continuous landmarks are not visible, choose two objects and imagine a line joining them. With each landmark, make the corresponding landmark on the map parallel and the map will roughly be set.

(ii) **On Near Line Joining Two Points.** Identify two nearby objects on the map and the ground. Stand on an imaginary line joining them and set the map.

Finding North

5. **Without Compass**. The position of NORTH can be discovered by one of the following methods:-

(a) **Watch Method**. Point the hour hand of your watch toward the sun. A line bisecting the angle between the hour hand and the direction of the 12 O'clock will then point due SOUTH. It must be ensured the the angle bisected must always be that which is less than 180 degrees. It is a rough method and applies only in the northern hemisphere.

(b) **Equal Altitude Method**

(i) Take a fairly large piece of paper or card board and spread it flat on the ground. In the centre fix a pencil or piece of wood perpendicular to the ground. It can be done with the help of a coin fixed at the base of pencil or wood with sealing wax or by directly pushing it in the ground.

(ii) The pencil will throw on the paper a shadow as shown by the dotted line AB of Fig 8. Where the shadow ends make a mark B, and then from the base of the pencil draw a circle of radius AB.

(ii) Wait till after mid day until the sun has moved around sufficiently to throw another shadow as indicated by the dotted line AD i.e. of the same length as the original shadow AB.

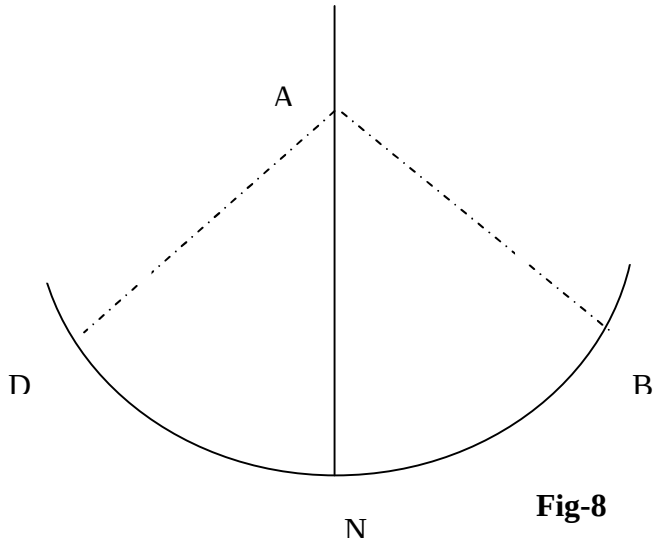
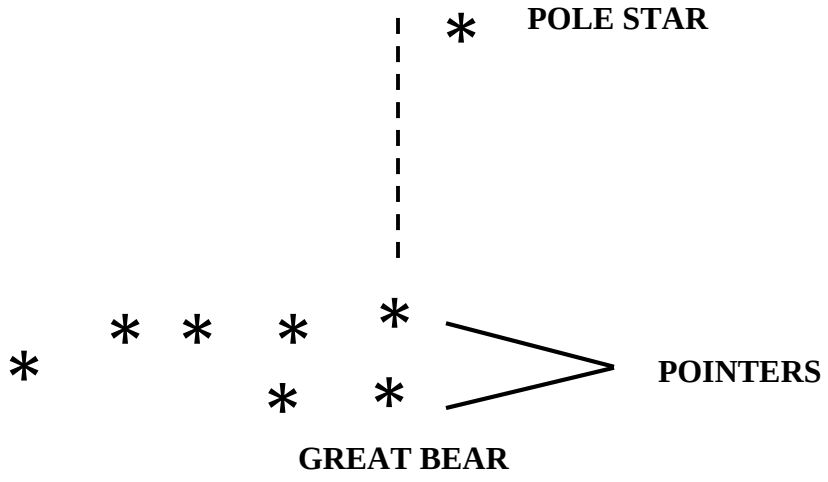


Fig-8

(iv) When this is so, draw a line A N bisecting the angle formed by the two shadow lines. This will point to TRUE NORTH.

(v) This is extremely accurate way of finding north but it is of no use on cloudy or dull day. It is also a very time consuming process as the work should start earlier than mid day.

(c) **<u>By Stars</u>**. In the Northern hemisphere, the Pole star indicates the position of True North to within 2 degree. It is a bright star and it can be found by protruding a line from Great Bear. The pole star will be found slightly off this line on the side remote from the remaining stars of the Great Bear.



SECTION-10

MAP TO GROUND

Introduction

1. To find out the details of map on ground is known as map to ground. Following methods are used to identify objects from map to ground:-

(a) **Bearing and Distance Method.** With the help of bearing and distance, find out own position. Find out the distance of the object to be identified on ground with the help of a scale on the map. Using service protractor, find out the bearing of the object and convert it into magnetic bearing. Set the magnetic bearing on compass and look for the object in the given bearing. Estimating the distance on ground, the object will be identified.

(b) **Direction and Distance Method.** Draw a line on the map between own position and object to be identified. Calculate its distance and using any of the following methods find the direction of the object:-

(i) With the help of a sight rule find the ground direction of the object.

(ii) With the help of two points on the map estimate the ground direction.

(iii) Place a foot ruler /pencil at own position and align it with line of the map.

(iv) Place a pin each at own position and at the object on the map. Align both pins and find general direction.

(c) **By Estimation Method**. In this method measuring bearing, distance and direction, object is identified with the help of other details in the proximity of the object.

SECTION-11

GROUND TO MAP

1. To find out an object indicated on ground on the map is called ground to map. Method used to identify objects from ground to map arediscussed in succeeding paras.

2. **Simple Method**

(a) **Using Bearing**. Find out the distance and the magnetic bearing of the object. Translate magnetic bearing to grid bearing. Set the map and find own position. From own position draw a line at the given grid bearing. Measure

distance with service protractor and mark the given distance on the line. The object will be in the proximity of the given mark.

(b) **Intersection Method**. To find out the objects which are at a larger distance or in hilly terrain, intersection method is used. In this method help of minimum two prominent objects are taken which can be easily identified on the ground. Lines are drawn from the prominent objects to the object to be identified on map. This method is used when we cannot estimate exact distance. Intersection is done in two ways:-

(i) **By Compass Bearing.** Take the bearing of the object from two known prominent objects. Draw the lines on the map. The object will be in the proximity of the intersection of the two lines. Magnetic bearing is found by two methods:-

(aa) **By Compass.** Take the forward bearing from known object.

(ab) **By Back Bearing**. In war, in case we intercept the enemy's transmission, with the help of the fall of the shot we can find out the location by working out back bearing.

(c) **By Direction Method**. In this method set the map and mark own position. With the help of any of the following methods find the direction of object on the map. Draw a line from own position in that direction. Put a mark on the line at the estimated distance of the object. The object will be in the proximity of the marked point:-

(i) Place a foot ruler /pencil at own position and align it in the direction of the object.

(ii) Place a pin at own position on the map. Place the second pin in the direction of the object.

(iii) With the help of details around the object, find direction and mark the object on the map.

(iv) With the help of sight rule find exact direction of the object.

(d) **By Estimation Method.** By knowing the bearing and distance of the object on ground it can be identified on map by estimation.

SECTION-12

POINT TO POINT MARCH

Day Time

1. **Methods used during Day March**

(a) **With Map Only**. In this method set the map and find your own position. Then, find out the position of the object. Note important landmarks in the vicinity of the object. Also find out the distance of the object. Finally find out the best route to reach the object. While marching, keep comparing the major landmarks enroute. Distance can be measured with the help of steps. 100 meter corresponds to 120 steps approximately. On reaching the object, confirm its correctness with help of other details in the proximity.

(b) **Marching without Map**. There are two methods of marching without map:-

(i) **With Compass**.

(aa) **First Method**. If you know the bearing and distance of the object, take a compass and select two important landmarks in one line where you can march easily. If there is difficulty in selecting landmarks at a large distance due to forest cover or undulating land, then closer landmarks can be selected. This could be repeated till you reach the object. If there is a major obstacle like river or nala which require deviation from the given bearing, one must come to the same line after crossing the obstacle and move on initial bearing.

(ab) **Second Method**. This method is used when bearing and distance of important landmarks enroute are given. Set the bearing of the first landmark from start point and repeat this after reaching every intermediate landmark till you reach the object. In this method one is more confident while marching.

(ii) **Without Compass**. In this method you are required to march based on your memory power. Points to be kept in mind are:-

(aa) Before marching, recognize the object carefully and take note of other landmarks in the proximity.

(ab) Choose best route to the object and convert distance into steps / paces.

(ac) Take note of all the intermediate landmarks and their distances.

(ad) Enroute, ensure you are marching correctly.

(ae) Be careful while measuring distance in steps.

(af) If you deviate while crossing an obstacle, choose a mark across the obstacle. After crossing the obstacle come in line of the mark and recommence marching.

(ag) If you reach a wrong place, come back to the start point.

Night March

2. When a navigation party moves at night with the help of compass and night march chart, this is called night march.

(a) **During Moonlit Night**. If you have a compass, you can select two important land marks on the given bearing in a line and march on the same bearing and line. Repeat this till you reach the object.

(b) **Starlit Night**. Select a prominent star at 30 degree on the horizon on the given bearing. Select a landmark in line of the star. March in line of the star and the land mark for approximately 15 minutes. Then select another star in the same bearing and repeat till you reach the object.

(c) **Cloudy Night**. Make a person march on the given bearing to a distance where he can be seen. Then the person holding compass marches, measuring the distance. First person is made to march again in the given bearing and the process is repeated till he reaches the object.

3. **Items Required by Navigation Party**

(a) Set compass as per bounds.

(b) Luminous stick.

(c) White cloth.

(d) Marching chart.

(e) White lime/ chalk.

(f) Stone pebbles for measuring steps.

(g) Frosted torch.

4. **Composition of Navigation Party**

(a) **Guide**. He carries a luminous stick and a compass set to a given bearing.

(b) **Assistant Guide**. He has a white piece of cloth at his back for identification and a stick to measure depth of nala / pits.

(c) **Recorder**. He carries additional compass already set on given bearing, night march chart and stone pebbles. He measures the distance.

(d) **Scouts**. Number of scouts could be from 2 to 4 depending upon the route and tasks.

5. **Night March Parade**

(a) **Assistant Guide**. He moves in front between left and right scouts. He walks for 20 steps and stops. Guide moves up to him and then indicates him to march ahead. Following actions will be taken while crossing an obstacle.

(i) Assistant guide and scouts will negotiate the obstacle from left / right. Guide and balance party will keep waiting. After crossing the obstacle assistant guide and scouts will come in the line of march.

(ii) Then guide and balance party will cross the obstacle and move behind assistant guide.

(b) **Guide**. Guide marches behind assistant guide so that required instructions can be given to him. He also carries a compass with set bearing so that he can correct the line of march of assistant guide.

(c) **Recorder**. Recorder marches behind the guide and measures the distance by steps / measuring tape.

5. **Points to be Kept in Mind**

(a) While marching do not cough, talk or make any noise.

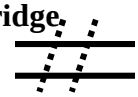
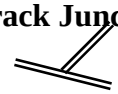
(b) While marching keep inter person distance in mind.

(c) Party must ensure safety and security.

(d) Smoking / using any kind of light is strictly prohibited.

(e) To read night march chart use frosted torch.

NIGHT MARCH CHART

(Object)	Distance	Degree
Temple 		
	450 M	
Well 		**50^0**
	200 M	
Bridge 		**40^0**
	350 M	
Track Junction 		**20^0**
	300 M	
Start Point (Survey Tree) 		**70^0**

CHAPTER-III

FIELD ENGINEERING

INDEX			
CHAPTER-III FIELD ENGINEERING		**JD/JW**	**SD/SW**
SECTION-1	Introduction to Field Engineering	✓	✓
SECTION-2	Knots and Lashings	✓	✓
SECTION-3	Types of Mines	✓	✓
SECTION-4	Types of Obstacles	✓	-
SECTION-5	Method of Water Crossing	✓	-
SECTION-6	Use of Explosives and Improvised Explosive Device (IED)	✓	-
SECTION-7	Camouflage and Concealment	-	✓
SECTION-8	Types of Mine Fields	-	✓
SECTION-9	Field Defence	-	✓

SECTION-1

INTRODUCTION TO FIELD ENGINEERING

1. **Field Engineering**. Field engineering is the study of field fortification, obstacle planning including minefields, mine warfare, and stores and equipment relating to the same.

2. **Task Performed by Field Engineers**

(a) Laying of mine fields.

(b) Breaching of mine fields.

(c) Construction of field defences.

(d) Construction of tracks in mountains.

(e) Construction / maintenance of border roads.

(f) Water supply to troops in the field, especially in deserts.

(g) Construction of Helipads where-ever required.

(h) In Counter Insurgency Operation:-

(i) Detection, neutralisation and removal of IEDs and explosives.

(ii) Road opening etc for all type of traffic.

(j) Maintenance of essential services.

3. **Equipment Used in Field Engineering**. The following types of equipment is used for various tasks:-

(a) **Laying & Breaching of Mine Fields**.

(i) Explosive ie gunpowder TNT slabs, PEK , Plastic Explosive.

(ii) Various type of charges like cutting, breaching, pressure charge etc.

(iii) Mechanical Mine layers.

(b) **Construction of Field Defences**. Angle Iron pickets, CGI sheets, Binding wire, Ballies, Nails, Barbed wire, Bags, Jar canes, Shovels, Pick axes, Cement, Steel sheets, Bitumen, Paints etc.

(c) **Construction of Tracks**. Duckboards, bulldozers, earthmovers machines etc.

(d) **Construction of Helipads**. Duckboards, Helipad membranes.

(e) **Watermanship**. Life Jacket, Bridging equipment.

Commonly Used Tools

4. Some commonly used tools are given below:-

(a) **Axe Pick GS**. It is used for digging earth; chisel-side for soft ground and pick-side for hard ground.

(b) **Shovels GS**. It is used for lifting the earth and carrying it. Can be used for digging soft earth like sand.

(c) **Entrenching Tool**. It is part of the personal equipment carried by an infantry soldier. It is miniature combination of pick and shovel used for the purpose of digging defences.

(d) **Hammer Sledge**. Used for driving iron pickets into the ground and for breaking big stones/boulders.

(e) **Bar Crow**. Used for pulling out spikes from wood, for removing heavy stones/boulders and logs by making use of the leverage effect.

SECTION-2

KNOTS AND LASHINGS

1. Knots, bends and hitches are used to join two lashings together, to form a loop in a lashing, to make a stop on a lashing or to secure a lashing to a spar, or to make a hook. Therefore, it is important that cadets are proficient in tying knots. The most useful knots and lashings for general work in the field are classified in the succeeding paragraph.

2. **Characteristics of Knots**

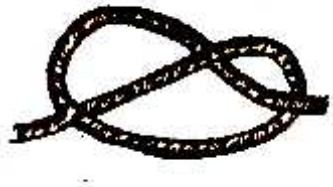
(a) Knot should be strong so that it does not open due to pull and pressure.

(b) Knot should be in conformity to work and simple to use.

(c) Knots should be opened easily.

3. **Types of Knots**

(a) **Thumb Knot**. This knot is used to secure the ends of rope from fraying or opening through a block.



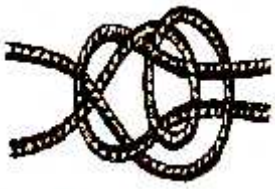
Thumb Knot

Reef Knot

(b) **Reef Knot**. This knot is used for joining two dry ropes of similar types.

(c) **Figure of Eight Knot**. This is like thumb knot but easier to untie.

Figure of Eight Knot



Double Sheet Bend

(d) **Double Sheet Bend**. This knot is used for joining two ropes very securely or two wet ropes of different size strongly.

(e) **Bow Line**. This knot is used to avoid slipping of rope and is used to load or unload heavy materials e.g. rescue a person from a well or from a building on fire.

Bow Line

Timber Hitch

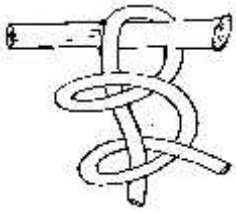
(f) **Timber Hitch**. This knot remains intact only till the time rope is kept taut. The moment rope is left loose, knot automatically become loose. Knot is used to hold timber and securing of logs and planks.

(g) **Clove Hitch**. This knot is used to secure a rope to a spar etc. e.g., tying animals and securing tents etc. To tie this knot force is required.

Clove Hitch

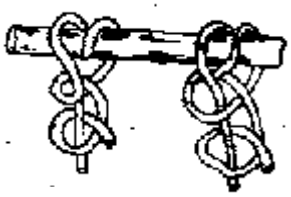
Clove Hitch

(h) **Two Half Hitch**. This knot is used to secure the running end of rope to its standing part.



Two Half Hitch

(j) **Round Turn and Two Half Hitches**. To make fast a rope to anchorage so that strain on the rope shall not jam the hitches.

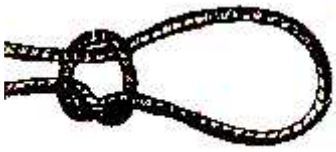


Round Turn & Two Half Hitches

Fisher Man Bend

(k) **Fisherman Bend**. This knot is used to make fast a rope when there is a give-and-take motion, e.g. anchor cable.

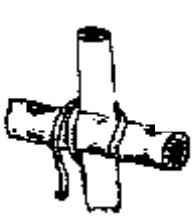
(l) **Running Knot**. This knot is used to form a loop that will draw a taut knot around the object.



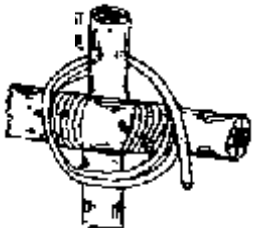
Running Knot

4. **Types of Lashes**

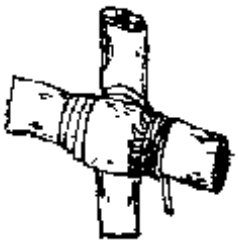
(a) **Square Lashes**. This lashing is used to lash one spar at right angle to another. For this put clove hitch on first log then put another log on it and wind the rope 4 – 6 times in one direction only and again close the knot with clove hitch.



Start with a clove Hitch underneath a Transom or above a Ledger



Two trapping turn shown loose for clearness these to be pulled up tight and beaten in



4 complete turn of the lashing and on extra turn round this spar to bring commencement of trapping turn to the right place.

(b) **Diagonal Lashes**. This is also called multiple knot. This is used to strengthen the square lashes. In this logs are diagonal to each other.

(c) **Parallel Lashes**. This is used for joining two poles/logs to make it longer.

SECTION-3

TYPES OF MINES

1. **What is Mine.** A mine is a weapon to be used with cunning and with the constant aim of catching the enemy unawares. At the same time it is a weapon which does not distinguish between friend and foe and therefore has to be used with caution.

2. **Types of Mines** . Live mines may be classified according to case, content. purpose. method of firing and ease or difficulty in detection as follows:-

(a) **Case**. Metallic, ceramic, glass, plastic, wood or paper.

(b) **Content**. Explosive, flame, toxic-chemical.

(c) **Use**

(i) **Anti Tank Mines**. Mines designed primarily against tanks are called anti tank mines.

(ii) **Anti Personnel Mines**. Mines designed primarily against personnel are called anti personnel mines. They are further classified as follows:-

(aa) Blast type.

(ab) Fragmentation type.

(iii) **Toxic Chemical Mines.** Mines used to contaminate areas. The toxic agent of each mine is dispersed by burster charges.

(d) **Method of Firing**

(i) **Contact Mines**. Mines which are fired by direct contact with the target.

(ii) **Command Operated Mines**. Mines which are fired by an observer when the target is over or near the mines.

(iii) **Influence Mines**. Mines which are activated by magnetic impulse, vibration or sound waves.

(e) **Ease or Difficulty in Detection**. Mines with metallic cases are easily detected with metal detectors. Mines with glass, plastic, wood, cardboard or other non–metallic cases minimize detection by these metal detectors.

3. Apart from live mines there could be dummy mines drill or practice mines and improvised mines.

Anti Tank Mines

4. **Anti Tank Mines**. The anti tank mine contains a large explosive charge weighing from 3-13 kilograms. It is set off by a pressure between 70 to 330 kilograms. The function of an anti tank mine is to disable a tank so that it can be easily and certainly destroyed by the fire of anti tank weapons. An anti tank mine will not be initiated by an armed man stepping over it, but any wheel load in the field will activate it.

Anti Personnel Mines

5. **Anti Personnel Mines**. The function of an anti personnel mine is to cause casualties to personnel.

(a) **The Blast Type**. It is small in size and contains just enough explosive to disable one person stepping on it. It can be set off by a pressure upto 18 Kilograms.

(b) **The Fragmentation Type**. This has comparatively more explosive encased in a metal container and has multiple means of actuation ie, pressure and pull. Fragmentation mines are of two types, the air burst and the ground burst. The air burst when actuated throws an explosive shell into the air, which explodes scattering lethal fragments all around. In the ground burst the explosive shell explodes at ground level. The air burst type is more dangerous having a lethal area upto 50 meters radius.

SECTION-4

TYPES OF OBSTACLES

General

1. The purpose of laying obstacles is to impose certain conditions on the enemy's move, which will put him at a disadvantage and assist us in his destruction by:-

(a) Delaying and disorganizing him under fire.

(b) Restricting his power of manoeuvre thereby canalizing him into a pre-selected killing ground.

(c) Disorganizing his plan of attack.

(d) Making him waste time, labour and equipment in forcing a passage.

(e) Denying him the opportunity of achieving surprise.

(f) Lowering his morale.

Essential Characteristics

2. In order to achieve their aim the obstacles must be; strong and of sufficient depth to impose maximum delay; sited to fit in with a coordinated plan; covered by fire; concealed as far as possible so as to assist in achieving a surprise and constructed outside the handgrenade range.

3. Obstacles must not; obscure the fire or observation of the defender, afford cover to enemy , reveal the exact position of the defence, hinder the mobility of the defender and permit the enemy reconnaissance without interference by the defender.

Planning.

4. Obstacle belts may be created by construction or destruction. Their creation by means of construction is normally much more expensive in resources than it is by means of destruction of existing crossing facilities on natural obstacles or other means of movement. Two good examples of the above are minefields (construction) and demolition of bridges over a river (destruction).

Classification.

5. Obstacles can be classified in various ways: artificial or natural. Anti-personnel or anti-vehicles, and such other modes. Let us confine ourselves to two main type of obstacles. They are as follows:-

(a) Infantry obstacles.

(b) Vehicle and anti-tank obstacles.

Infantry Obstacles

6. Infantry obstacles can be classified as under :-

(a) **Artificial Obstacles**.

(i) Wire obstacles.

(ii) Anti-personnel minefields.

(iii) Thorn fences.

(iv) Panji fields.

(v) Walls.

(vi) Ditches with or without water.

(b) **Natural Obstacles**.

(i) Marshes.

(ii) Rivers, nullahs and canals.

(iii) Unscalabe cliffs, escarpments and steep slopes.

(iv) Dense growth like tea or rhodendrous bushes.

Vehicle and Anti-tank Obstacles

7. These are of the following types:-

(a) **Anti-tank Minefields**. These are dealt with in details in section dealing with 'Types and Laying of Minefields'.

(b) **Physical Obstacles**.

(i) **Steep Slopes**. Slopes of 50 degrees can stop tanks under normal conditions. If the slopes are of loose slippery surface, even lesser angel is sufficient. However the slops must be of sufficient length.

(ii) **Vertical Steps**. A vertical step of 6 feet can be an effective obstacle against all types of tanks.

(iii) **Ditches**. A ditch, which is sufficiently wide and deep to make the nose of the tank tilt down so much that it loses hold on the ground, is an effective obstacle.

(iv) **Water**. For a river or canal to be an obstacle against tanks it must have depth more than tanks heights and length more than ¾ of tanks length.

(v) **Projection**. Projections which raise the fronts of tanks, may be used reducing the grip of the tracks and causing it to turn over. Steel rails or concrete blocks can be utilised.

(c) **Special, Steel and Concrete Obstacles**. These are either prefabricated or constructed on the spot. They consist of individual structures laid on or fixed into the ground in a suitable pattern and to a suitable depth.

(d) **Craters**. These are blown across a road. A crater is normally 10 feet deep and 30 to 40 feet in diameter. A crater by itself is an obstacle only to vehicles. To convert it into a tank obstacle it can be mined or flooded.

SECTION-5

METHOD OF WATER CROSSING

General

1. River and canals are very formidable obstacles which require a great deal of preparation to be crossed over. Standard boats and other engineering equipment help in crossing large bodies of men and loads across these obstacles. Improvised methods, however help smaller number of personnel to go across without getting detected.

Improvised Equipment

2. **Groundsheet Water Belt**. It consists of a bundle of grass rolled up tightly inside a ground sheet and supports one man.

3. **Tin Float**. Two jerricans are lashed in a bamboo framework, and support one man.

4. **Two Men's Equipment and Groundsheet**. All the outer clothing and equipment of two men are wrapped, firstly in caps waterproof, and then in groundsheets and carefully lashed up. This support two men.

5. **Bamboo Pole**. A plain bamboo pole 15 feet in length and 3 inches in diameter is grasped firmly between the feet and the knees and the man propels himself with his hands.

6. **Chattis Water Wings**. The mouths of two chattis (earthen vessels) are sealed with mud and covered with cloth to the necks of the water chattis and then tied together with thick string. This support one man.

7. **Water Bottle Belt.** A number of water bottles are snake lashed together to form a belt, leaving plenty of strap at the end of the lashing to tie the belt round the waist. It supports one man.

8. **Drum Rafts**. A drum raft consists of an improvised deck supported on bearers carried on two sets (Piers) of drums slung between the piers, the raft can support a jeep and a crew of four.

9. **Bundle of Logs**. Several logs lashed together securely make a crude but efficient one man swimming aid.

10. **Bamboo Mat Raft**. The floor consists of a bamboo mat, and walls of sandbags filled with hay; the whole is covered with a tarpaulin; this can carry 30 men.

11. **Hay Bundle Raft**. An ordinary tarpaulin filled with hay and carefully lashed can support four men.

12. **Charpoy Raft**. A charpoy wrapped in tarpaulin makes a good raft for 4 fully armed men.

SECTION-6

USE OF EXPLOSIVES AND IMPROVISED EXPLOSIVE DEVICE (IED)

1. **Introduction to IED and Main Components**. An explosive generally used by Anti National Elements in order to kill a VIP, civil population and security forces or cause damage to national property, using items of daily use is called an IED.

2. **Main Components of IED**

   (a) Explosive.

   (b) Detonator.

   (c) Initiating Mechanism.

   (d) Power Source.

3. **Explosive**. Explosive is the main charge in an IED which on explosion causes maximum damage to the target. The mixture made by combining different chemicals in a particular ratio are called Improvised Explosives.

4. **Detonator**. The agent which is used to give a blast effect in an IED is called a detonator.

5. **Initiating Mechanism**. Initiating mechanism is used to hold the continuity between detonator and power source for sometime and to complete the continuity at a later stage.

6. **Power Source**. The AC or DC current utilised to trigger the detonator is called power source.

7. **Where the IEDs can be Planted**

(a) Public areas (railway stations, bus stands and airports).

(b) Public Transport **(**bus, train, aero plane and ship).

(c) Public Utilities (library, offices and Industries).

(d) Military Installations (ammunition dump, fuel oil and lubrication dump and supply depot).

(e) VIP vehicle.

(f) Along road / tracks, where VIP / security forces are likely to move.

(g) Places where large congregations are likely to take place.

(h) Places of religious worship.

(j) Important buildings e.g. schools, colleges, hospitals and business centre, government offices etc.

(k) Important bridges.

(l) Historical monuments.

8. **Indications for IEDs**

(a) Any unattended item.

(b) Unclaimed attractive items like cell phones, transistor, tape recorder etc.

(c) Any object out of place.

(d) Loose electric wire.

(e) Any antenna wire.

(f) Freshly dug earth.

(g) Dry grass / leaves, cow dung / garbage etc for camouflage.

(h) Broken road or freshly repaired road.

(j) Fresh plaster or painting.

9. **Do's and Don'ts with IEDs**. IEDs can be found at many places. On detection and identification of IED it should not be handled by untrained personnel.

10. **Do's**

(a) Remain away from suspected object.

(b) Be aware of booby traps.

(c) Warn the people about the suspected objects.

(d) Inform police / bomb disposal squad.

(e) Help police in crowd management and traffic control.

(f) Evacuate local population to a safe place.

11. **Don'ts**

(a) Do not believe unattended object to be safe.

(b) Do not handle suspected object.

(c) Do not panic on detection of IED.

(d) Do not think only one IED has been placed.

(e) Do not immerse suspected object in water.

(f) Do not spread rumours.

(g) Do not bunch up near the suspected object.

(h) Do not cut any wire.

(j) Do not make loud sounds near the IED.

(k) Do not light a fire near IED.

(l) Do not be in a hurry and try to become a dead hero.

SECTION-7

CAMOUFLAGE AND CONCEALMENT

Introduction

1. Man has five senses of perception-vision, hearing, smell, speech and touch. Of these, the sense of vision is the most useful in carrying out observation because of its longer range as compared to other senses. It is for this reason that camouflage aims at concealment of man and equipment from enemy's direct and indirect observation.

Direct and Indirect Observation

2. Whenever the observer looks directly at the object either by the naked eye or through binocular or telescope from the ground or from air, it is called direct observation.

3. When the observer looks at the image of the object rather than the object itself through radar, TV or electro optical devices, it is called indirect observation.

Revealing Signs

4. Recognition of an object is determined through its appearance, behavior or movement. Concealment aims at preventing recognition. Factor which aid recognition are:-

(a) **Shape**. Many objects are instantly recognizable by reasons of their distinctive shape particularly if they contrast with their surroundings. The smooth round out line of the top of a steel helmet or the straight of its brim and square outline of the pack are shapes which contrast with the natural surrounding. Therefore, if an object is to remain concealed its shape must be disguised and its outline broken.

(b) **Shadow**. The shadow cast by an object in bright sun can reveal its presence. Therefore, a solider whenever possible should keep in the shade, not only because shade in itself affords cover but also by doing so he avoids casting a shadow which is distinctive and conspicuous.

(c) **Silhouette**. Objects silhouette against a contrasting background such as water and worst of all the skyline, is a dangerous background. A soldier should always try to put himself against a rough and uneven background such as a hedge, a bush, a wood or broken ground.

(d) **Surface**. If the colour and the texture of the surface of any object, human or otherwise, contrast with that of the surroundings, that object will be conspicuous. Any object with smooth and light reflecting surface such as shiny helmet, metal parts of equipment and white skin provide a violent contrast to the normal background and must, therefore, be disguised.

(e) **Spacing**. In nature nothing is very regular spaced. Regular spacing of objects such as vehicles, tents or men however, well camouflaged will draw attention to the fact that something other than a natural object is present.

(f) **Movement**. Nothing catches the eye quicker than sudden or violent movement. The best concealed man will give away his position as soon as he makes a sudden movement.

(g) **Shine**. A position however well concealed will be located from the air by reason of the various tracks leading to it. The surface of a road or track contrasts with surroundings and can be easily recognized from the air. Track discipline is, therefore, of vital importance.

(h) **Position**. By position it means the relation of an object to its surrounding.

(j) **Contrast**. An object stands out in its background if it is of a different colours or tone.

(k) **Noise, Sound and Activity**. Certain sounds are associated with certain objects. Tank noise, firing of rifles and sound of vehicles indicate an observer the presence of such object.

Methods of Camouflage

5. Three fundamental ways of concealing activities are hiding, blending and deceiving:-

(a) **Hiding**. It is complete concealment of an object by placing a screen between the object and the observers.

(b) **Blending**. It is the arrangement of camouflage materials on, over and around the object so that it appears to be part of the surroundings. The aim is to prevent detection of the object by a change in natural appearance of the position.

(c) **Deceiving**. Deceiving simulates an object or disguises it so that it appears to be different.

Aids to Camouflage

6. **Natural Camouflage Materials**. These are locally available materials like foliage, grass, debris and earth which can be used for purpose of camouflage.

7. **Artificial Camouflage Materials**. Artificial camouflage materials are manufactured specially for the purpose of camouflage. This includes colours and paints.

Individual Camouflage

8. Individual camouflage is personal concealment that a soldier uses during war to surprise and deceive the enemy. A soldier modifies his dress and weapons to blend with surroundings. Aspects of individual camouflage are :-

(a) **Toning Down of Skin**. The skin on face and hands of a man show off against a natural background due to shine and difference in tone. The areas which shine are forehead, nose, cheek bones, chin and hands. These should be toned down using charcoal, blanco or mud applied in uneven smudges. Camouflage cream and camouflage sticks can also be used for this purpose.

(b) **Helmet**. Helmet is made of metal which shines. Camouflage of helmet therefore involves breaking its outline and removing shine by using paint, foliage, garnish and hesin cloth.

(c) **Web Equipment**. The straight line and shines of the web equipment must be done away with by using blanco, foliage, cloth and mud. All equipment must be properly fitted to avoid sound during movement.

(d) **Clothing**. Uniform must be worn conforming the terrain.

(e) **Position**. Position must be selected to afford maximum concealment without changing natural surroundings. While selecting position silhouette and shadow be kept in mind.

(f) **Silhouette**. A silhouette is formed when a man is seen against the background of the sky and light . In this face is not distinguished but outline is clearly visible.

(g) **Shadow**. An object standing under the sun, throws on the ground or a near by wall a shadow which attracts attention.

(h) **Personal Weapon**. Rifle can be recognized by virtue of their typical out line and the shine from metallic and wooden parts. This can be camouflaged by garnish, hesin cloth and blanco.

9 Besides individual camouflage by a soldier, vehicles, weapons of different types, obstacles, defence installations and buildings near the border, petroleum dumps and air fields are camouflaged to prevent and deceive enemy from aerial, direct and indirect observations.

SECTION-8

TYPES OF MINE FIELDS

General

1. Minefields provide an artificial obstacle and may be composed of anti tank or anti personnel mines or a combination of the two. They have an advantage over natural obstacles in that they can be laid to suit own plan and can be shifted if required. Minefields may be laid along a route of advance or covering the frontage of a defended position. Minefields, like other obstacles, are not impassable barriers but have the merit of causing casualties.

Function of Minefields

2. Minefields can have one or more of the following functions:-

(a) Delay and disorganize enemy attack and discourage his entering into our defended positions.

(b) Force the attacker to select certain approaches or routes thereby luring him into a place where he can be killed.

(c) Separate infantry from tanks.

(d) Deny close observation of main defences.

Technical Classifications

3. By technical consideration minefields may be classified as under:-

(a) **Anti Personnel**. Containing only anti personnel mines and providing protection only against an infantry attack.

(b) **Anti Tank**. Containing only anti tank mines and providing protection only against an armoured attack.

(c) **Mixed**. Containing both anti tank and anti personnel mines and providing protection against both infantry and armoured attack.

Tactical Classification

4. Tactically minefields can be classified into :-

(a) Protective.

(b) Defensive.

(c) Tactical.

(e) Nuisance.

(f) Dummy.

Laying of Mine Fields

5. Mines may be laid mechanically or by hand. Hand laying is slow but extremely flexible. It can be employed in any type of terrain and can achieve very good concealment.

6. A particular pattern accepted in any army is known as its standard pattern. One of the standard pattern is the strip method, which envisages laying mines by hand.

The Strip Method

7. **General**. The strip method of mine laying consists of mines laid on both sides of a centre line at prescribed distances. Any number of strips may be laid to achieve desired density and depth. The unit of measure in mine laying is the step. One step is 30 inchs.

8. **Type of Strips**. A mine strip consists of two or more parallel mine rows laid simultaneously on both sides of the centre line. Mine strips are of three types:-

(a) Anti personnel strip.

(b) Anti tank strip.

(c) Mixed strip.

9. **Anti Personnel Strip**. This consists of anti personnel mines, blast type, laid alternately on either side of the centre line at intervals of one meter, at a distance of 2 steps from the centre line. The distance between two blast type anti personnel

mines on the same side is 2 meter. The first mine is laid at 3 meter from the start strip marker, towards the enemy side.

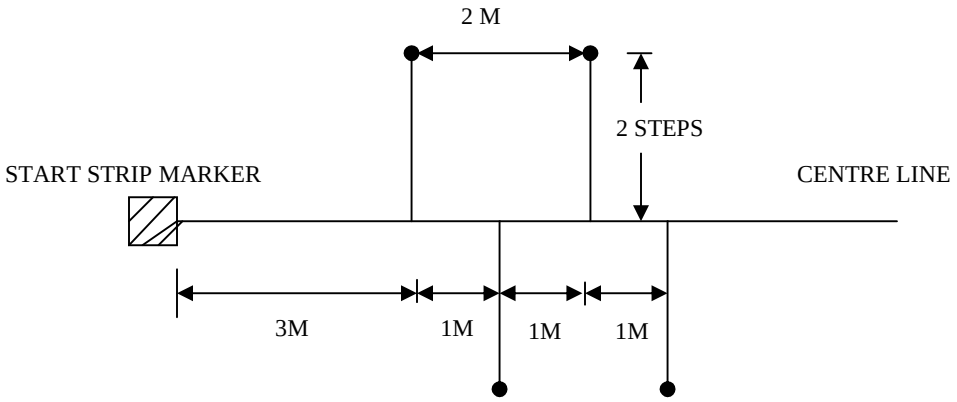


Fig. 1 – Anti Personnel Strip

10. A**nti Tank Strip**. This consists of anti tank mines laid alternately on either side of the centre line at intervals of 3 meters at a distance of 4 steps from the centre line. The distance between two anti tank mines on the same side is 6 meter The first mine is laid 6 meters from the start strip marker, towards the enemy side.

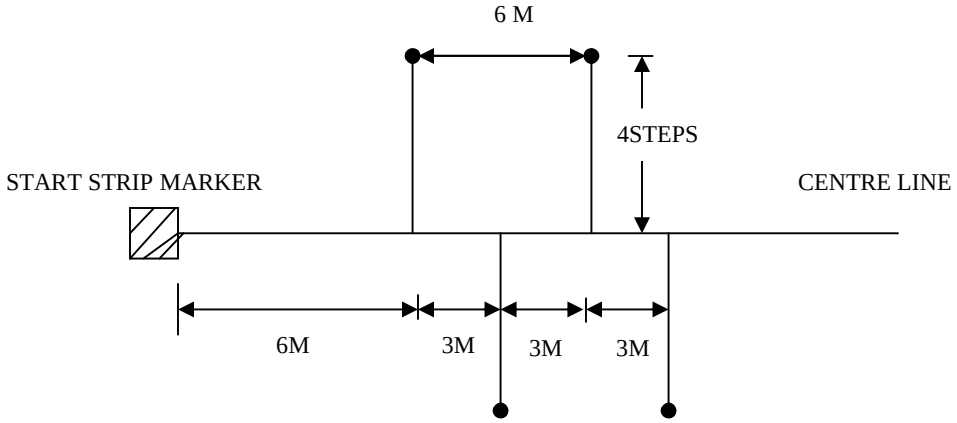


Fig. 2 – Anti Tank Strip

11. **Mixed Strip**. A mixed strip is obtained by the super imposition of an anti tank strip over an anti personnel strip .

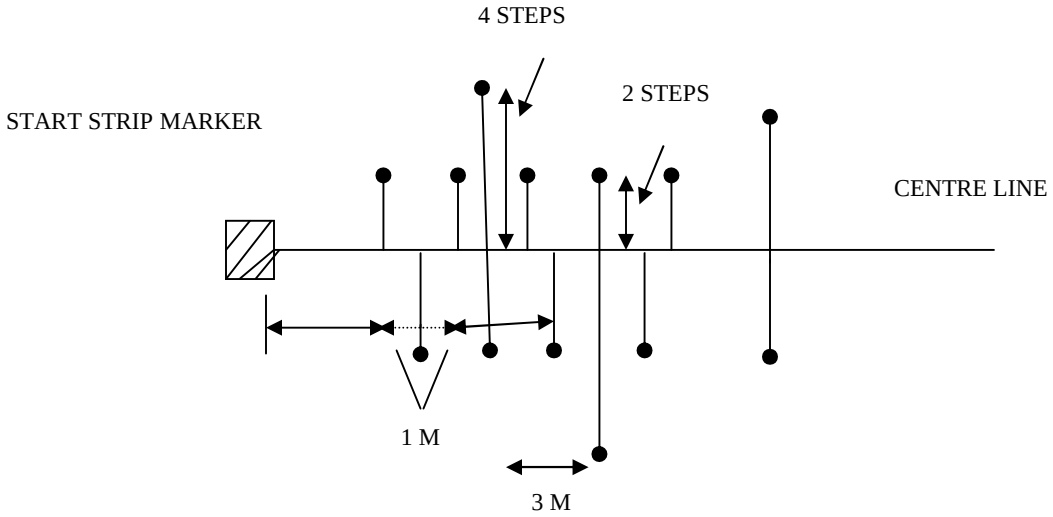


Fig 3 - Mixed Strip

12. **Laying Fragmentation Type Anti Personnel Mines**. Fragmentation type anti personnel mines may be superimposed on anti personnel, anti tank or mixed strips. These mines are trip wired and laid at 12 meters intervals on the enemy side of the strip only. They are laid at a distance of 6 steps from the centre line. The first mine is laid at a distance of 9 meter from the start strip marker .

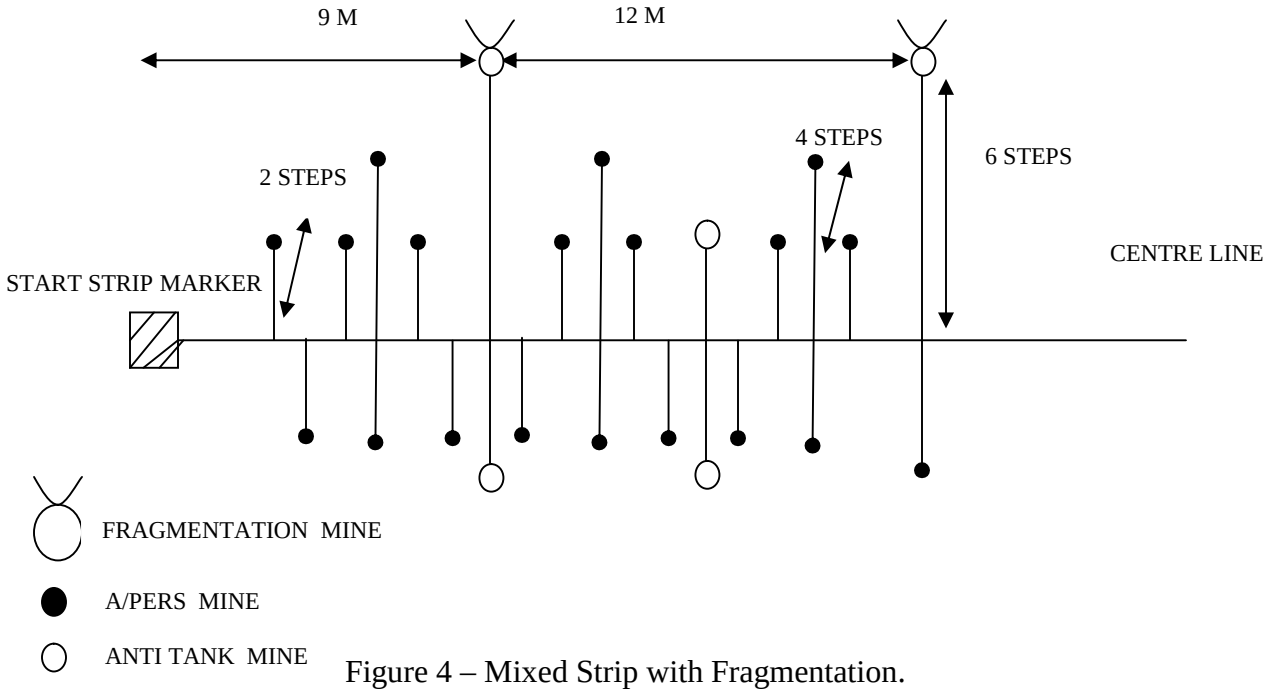


Figure 4 – Mixed Strip with Fragmentation.

13. Each fragmentation mine is trip wired with two trip wires of 6 meters length with an angle of approximately 45 degree between them. The spacing of 12 meters

therefore ensures that the entire frontage of a strip is practically covered by trip wires.

14. When fragmentation mines are laid alone, they may be considered to constitute a strip. Their pattern of laying will remain the same.

Minefield Lanes/Gaps

15. For own troops and heavy equipment like guns etc to move ahead of minefield to carryout various duties, certain lanes/gaps are left in the minefields where no mines are laid. This is to facilitate easy movement of tanks, guns and other weapons ahead of minefield and then back to own side of minefield. For foot infantry 2 feet wide lane and for vehicles 20 feet wide lane is left. For tank & bigger vehicle gap of approximately 100 meters is left.

SECTION-9

FIELD DEFENCE

General

1. **Field Defences.** The following points on the sitting and construction of fire trenches should be noted :-

(a) Fire trenches should be close enough for the section commanders orders to be heard during battle.

(b) Reverse slopes are a great aid to concealment and surprise, provided the field of fire is sufficient.

(c) With the increasing efficiency of airburst missiles overhead protection is important but needs good concealment and sound construction.

(d) In open country, crawl trenches may have to be dug to allow movement between fire trenches.

Field Fortification

2. (a) **Bunker**. A bunker is a well-concealed and dug-in position provided with overhead protection against splinters of mortar bombs and shells. It is also provided with narrow loopholes to enable the occupants to observe and make use of their weapons. A bunker is connected by a narrow communication trench to other dug-outs.

(b) **Communication Trench**. Trench used by men for crawling from one dug out to another dug out is known as a communication trench.

(c) **Fire Trench**. A field work dug below the normal level of ground to a depth of 4 ½ ft and designed to enable one or more soldiers to use their individual weapons effectively from cover.

(d) **Pill Box**. A small low fortification, usually made of concrete, steel or filled sand bags, which houses weapons such as machine guns and anti tank weapons, and may be designed to withstand the direct hit of a particular shell.

(e) **Shelter Trench**. A trench, designed to give protection from splinter of a near miss and variable time or other bursts. It must be sited in the immediate vicinity of the fire trench or weapon pit.

(f) **Slit Trench**. A field work dug below the ground level, designed to provide protection during short halts or against an air threat, when fire trenches on weapon pits are not necessary.

(g) **Weapon Pit**. A field work dug below the ground level, designed to hold any weapon other than the personal weapon and light machine gun and from which the weapon can bring fire to be bear on the targets allotted to it.

Priority of Works

3. **Assumption**

(a) Troops are adequately trained.

(b) No enemy interference.

(c) Time required for marking is not included.

Ser No	Type of work	Troops required	Time
1.	Three men fire trench (less shelter trench and revetment).	3	4
2.	2" Mortar pit	2	2
3.	81 mm Mortar pit including shelter and ammunition bay	6	12
4.	MMG pit including shelter and ammunition bay	6	12
5.	Crawl trench (1 ½ feet deep and 5 yard long)	1	5
6.	Shelter trench 6'x3'x4' and 18" over head protection	3	5
7.	Revetment one 4 ½ feet deep and 6 feet long wall		
	(a) Steel sheets	3	1 ½
	(b) Wooden planks	3	2
	(c) Brush wood	3	4
8.	84mm RL pit less shelter	2	10

Note :- In moonlit night add 25% time and for dark night 50% . The timings given above are for day light hours.

CHAPTER-IV

FIELD CRAFT AND BATTLE CRAFT

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CHAPTER-IV FIELD CRAFT AND BATTLE CRAFT		**JD/JW**	**SD/SW**
SECTION-1	Introduction	✓	✓
	FIELD CRAFT		
SECTION-2	Description of Ground	✓	✓
SECTION-3	Observation and Concealment	✓	✓
SECTION-4	Judging Distance	✓	✓
SECTION-5	Recognition, Description and Indication of Targets	-	✓
SECTION-6	Movement With & Without Arms	-	**(Only for SW)**
	BATTLE CRAFT		
SECTION-7	Field Signal	✓	✓
SECTION-8	Section Formation	✓	✓
SECTION-9	Fire and Movement	✓	✓
SECTION-10	Section Battle Drill	✓	✓
SECTION-11	Fire Control Orders	-	✓
SECTION-12	Types and Conduct of Patrols	-	**(Only for SD)**

SECTION-1

INTRODUCTION TO FIELD CRAFT AND BATTLE CRAFT

Field Craft

1. Filed Craft is an important aspect of military training as it relates to the conduct of a soldier in face of the enemy. Field Craft is an art of using the ground and the weapon available to the best of one's own advantages.

2. Field Craft includes the following subjects:-

   (a) Description of Ground.

   (b) Observation and concealment.

   (c) Judging distance.

   (d) Recognition and description of targets.

   (e) Movement with and without Arms

Battle Craft

3. Battle drill are very useful in tackling minor tactical problems. They save time, ensure rapid action and avoid confusion. Knowledge of field signals and section and platoon formations, however, is essential in the execution of battle drill.

4. Battle Craft includes the following subjects:-

   (a) Field signals.

   (b) Section formation

   (c) Fire control orders.

   (d) Fire and movements.

   (e) Section battle drill.

5. Each of the above subjects have been discussed at length in subsequent sections.

FIELD CRAFT

SECTION-2

DESCRIPTION OF GROUND

General

1. A standard, quick and accurate procedure is necessary to enable commander to describe an area to his men quickly and the men to understand it correctly and vice versa.

Definition

2. Broadly speaking there are four types of ground:-

(a) **Broken Ground.** It is uneven and is generally interspersed with nullahs, bumps and field in the ground. It is suitable for move of infantry and hinders observation of activities.

(b) **Flat and Open Ground**. It is even ground with little cover e.g. bushes, hedges and similar foliage. It is not suitable for move of Infantry by day.

(c) High Ground. Ground far above the general level of the area e.g. hill. It facilitates domination of area around it by observation or fire or both.

(d) **Dead Ground**. Ground that is hidden from an observer's view. It can not be covered by flat trajectory weapons.

Important Points

3. The following points should be remembered about various types of ground:-

(a) Though an open ground is easy to travel, it is dangerous to do so in the vicinity of the enemy. Whether moving or taking fire position in an open area one is vulnerable to enemy from view and fire.

(b) Broken ground when correctly used affords protection from flat trajectory weapons. It does not afford cover from air or protection from high trajectory weapons.

(c) Dead ground does not afford cover from high trajectory weapons.

Procedure of Description

4. The normal method of scanning and describing ground is by dividing it as follows:-

(a) Fore Ground Up to 300 yards

(b) Middle Distance From 300 yards to 500 yards

(c) Distance Beyond 500 yards

5. For indication give the following:-

(a) **General Line of Direction**. Start by giving the general line of direction by pointing out a centrally located, if possible, prominent land mark, e.g. No 1 section 500 RED HOUSE,

(b) **Boundaries**. After giving general line of direction give LEFT and RIGHT boundaries of your area e.g.

(i) No. 1 section – Aadha baen 600 PILI JHONPRI nam JHONPRI section ke baen wale jawan se JHONPRI tak ki line baen had.

(ii) Similarly indicate right boundary.

(iii) Dived the ground into fore ground, middle and distance. Having done so start from LEFT to RIGHT systematically and describe.

(iv) In attack describe the ground nearest to you first i.e. foreground, then middle and then distance, in defence reverse the procedure.

Sequence

6. While describing the ground bounded by particular arc after giving the boundaries start from LEFT to RIGHT. If the ground all around is to be described start after general line of direction to the right and finish at general line of direction by completing the indication all around.

Conclusion

7. A cadet should have an eye for the ground. He should keep on observing and judging the ground even while advancing and section commander should keep on explaining continuously while on move.

SECTION-3

OBSERVATION AND CONCEALMENT

General

1. To observe is to penetrate the concealment of the enemy's observation. Visual training, is training in observation and concealment, which are two aspects of the same subject.

Importance of Observation and Concealment.

2. Observation and concealment are important in battle because:-

(a) A soldier who is trained in both can locate and kill his enemy without being seen himself.

(b) Ground observation of enemy provides one of the most valuable sources of information on which the plans of higher commanders are based.

(c) In defence good concealment enables a defender to mystify and deceive the enemy and in the event of an attack repel the enemy by producing fire at close range from an unexpected quarter.

3. Normally men look at, observe or watch some actions being performed and only get a very general picture but a great deal of detail is missed out. This is due to the fact that in normal life detailed observation is rarely necessary and so the habit is not acquired.

4. Proficiency in observation comes more from mental training and mental attitude than from good eye sight. A good observer is the man who had been training to notice all the details of what he is watching, to make the correct deductions from what he sees and to understand the meaning of what he sees.

Personal Camouflage and Concealment

5. The real test of field craft is the soldier's ability to kill the enemy without getting killed himself. To avoid being killed, a soldier must detect enemy's observation. Concealment is the use of artificial and natural aids to mystify and deceive the enemy and defeat his observation. The successful achievement depends on the correct use of natural cover and skilful use of artificial aids to obtain concealment.

6. To understand the principles of concealment fully it is essential to first know what factors make objects visible. These factors are explained earlier in para 4 of section -7 of chapter Field Engineering.

Correct Use of Cover

7. The use of various types of ground and natural cover is very essential to achieve concealment. A cadet however, skillfully camouflaged, not making correct use of cover is likely to be detected. Certain fundamentals for correct use of cover are as follows:-

(a) Whenever possible look through the cover and not over it.

(b) If it is not possible to look through the cover, look round it rather than over it.

(c) It is necessary to look over the cover, avoid breaking straight line.

(d) The sky-line is the worst background you could choose, but if you can not avoid observing over the cover and against the sky line, use something to break your silhouette.

(e) When firing from inside a building keep well back making use of the shadow.

(f) A rough, dark and irregular background which matches your clothing, provides considerable cover from view.

(g) Isolated cover is dangerous because it will attract attention of the enemy and can be easily indicated in a fire order.

(h) Avoid sky line.

(j) Avoid regular spacing.

(k) Avoid gaps for fire position.

(l) Cross gaps as a body and at irregular interval at the double.

Conclusion

8. Concealment is an aid to tactical deception and misinforms the enemy as to our intentions and strength. Cover is mother earth's gifts to a solider which changes into a grave for those who do not use the gift properly and correctly. The art of camouflage and concealment reduces the different varieties of soldiers into two main varieties i.e. 'the good and the dead'.

SECTION 4

JUDGING DISTANCE

General

1. Accurate fire with any weapon depends on the correct judging of distance. Although a cadet is not normally required to open fire at range over 100 yards, he must be able to judge distance up to about 1000 yards, so that he:-

(a) Knows when to open fire.

(b) Can indicate targets to supporting arms or to men in a sub-unit.

(c) Can pass back information accurately when acting as an observer.

Method of Judging Distance

2. The following are the six methods of judging distance.

(a) Unit of measure.

(b) Appearance method.

(c) Section average.

(d) Key ranges.

(e) Halving.

(f) Bracketing.

How to use these Methods

3. **Unit of Measure**. This method is also termed as the 100 yards method. The unit of measure chosen is normally 100 yards and therefore one should form a good idea of 100 yards distance on the ground. The length of a hockey field is the best yard stick for this purpose.

4. The distance of a given object will be a multiple of the imaginary unit of 100 yards, as placed between the observer and the object.

5. This method is not accurate above 100 yards and is of little use if there is dead ground between the observer and the object.

Appearance Method

6. The distance can be judged by noting the detailed appearance of man at various ranges. This is the best method under service conditions. The following is a guide to distance:-

(a) At 200 yards, all parts of the body are distinct.

(b) At 250 yards, blade of the foresight covers a kneeling man.

(c) At 300 yards the face becomes blurred.

(d) At 400 yards the body remains same in shape but face is difficult to distinguish. Blade of the foresight covers a standing man.

(e) At 500 yards body appears to taper slightly from the shoulder but movement of limbs can still be seen.

(f) At 600 yards head appears as a dot. Details are not visible and body tapers from shoulders downwards noticeably.

Section Average

7. Each man in the section is asked to judge the distance of a given object. The average of the answers given by the whole section is then accepted as the distance. Here caution must be exercised in the estimation of a few who may foolishly over estimate the distance. This method may be resorted to under the following circumstances:-

(a) Ample time is available.

(b) Judging of distance is made difficult by mist or darkness.

(c) Judging of a long distance is involved e.g. beyond 400 yards.

Key Range

8. If the range of the certain object is known, distance to other objects can be found in relation to the known range. This method is called 'Key Range' method.

Halving

9. An object is selected half way between the observe and the target, the distance to the selected object is judged and doubled to get the distance to the target.

Bracketing

10. The observer works out the maximum and the minimum possible distance of the object and then accept the mean as the distance e.g. maximum possible distance 1000 yards, minimum possible distance 500 yards therefore estimated range is 750 yards. The greater the range wider the bracket. In no case the bracket should be less than 300 yards.

Practical Hints

11. **During Night**. Judging distance at night will depend upon the visibility. The only suitable method is the 'Key Range'. Therefore mark prominent objects and work out their distances while there is still day light.

12. **During Day**. Condition which mislead the observer when judging distances are as follows:-

(a) Distance are over-estimated when:-

(i) Light is bad.

(ii) The sun is in the observer's eye.

(iii) The object is small in relation to its surroundings.

(iv) Looking through a valley of narrow lane e.g. street.

(v) Lying down.

(b) Distance are under- estimated when:-

(i) The light is bright or the sun is shining from behind the observer.

(ii) The object is large in relation to its surrounding.

(iii) There is some dead ground between observer and the object.

(iv) Looking up hill.

SECTION-5

RECOGNITION, DESCRIPTION AND INDICATION OF TARGETS

General

1. Landmarks and other objects on the ground on a battle field may be either indistinct due to climatic conditions or other reasons. There may be too many of the same type. Every effort should, therefore be made to indicate their location and extent carefully and accurately.

2. To ensure quick and accurate indication by commanders and recognition by individual soldiers a standard procedure has been laid down in the Army. Even the aids to be used for indicating difficult targets have been laid down.

Definition

3. The following terminologies are commonly used:-

(a) **Target**. It is an object which is indicated with a view to bring down fire on it, whenever required.

(b) **Landmarks and Reference Points**. A reference point is a prominent and unmistakable object from which the position of target in the vicinity can be clearly indicated. A landmark can be used as a reference point. The main difference between the two is that whereas a reference point is used as an aid in the indication of objects, landmark is an object which is indicated and used in the embodiment of operation orders (00s). A reference point must be specific. A landmark may not be specific that is a start line (SL) for an attack could be a road or track, or for a forming up place (FUP) the landmark may be a field or crop.

Principles of Indication

4. The principle of indication is that the most direct and quickest method is the best and should be used. For example, if a boundary runs along the only railway line in sight, say so.

Method of Indication of Easy Targets

5. **Easy Targets.** Can be indicated by the following methods:-

(a) **Indication by Description**. An obvious target can often be described directly. For example 'No. 1 Section BRIDGE' Here BRIDGE is so obvious that no body can make a mistake in recognizing it.

(b) **Indication by Direction or Range or Both**. In slightly less obvious cases other aids should be used e.g. direction or range or both. An example of each is given below:-

(i) **Indication by Direction**. No 1 Section BAEN BGHICHA.

(ii) **Indication by Range**. No 1 Section 600 BAGHICHA.

(iii) **Direction and Range**. When indicting a landmark indicate direction first and than range e.g. BAEN-600, BAGHICHA.

Indication of Difficult Targets

6. The target which can not be indicated by the methods given above are termed difficult targets. The methods to indicate these are explained in succeeding paragraphs.

The Direction Method

7. This is used to indicate the following:-

(a) The general line of direction, or

(b) A known reference point, or

(c) Another landmark.

8. Unless otherwise stated all direction are taken to be with reference to the general line of direction. The following direction will be used:-

Direction	**Measuring**
Slight Left/Right	Approximately 10 degrees
Quarter Left/Right	Approximately 22 ½ degrees
Half Left/Right	Approximately 45 degrees
Three Quarter Left/Right	Approximately 67 ½ degrees
Full Left/Right	Approximately 90 degrees

The Reference Point Method

9. One or more (as per requirement) prominent reference points should be selected before hand and made known to all concerned. The following points should be borne in mind while selecting reference points:-

(a) The number of reference points selected will depend on the width of the arc and the nature of the ground.

(b) Reference points should be so distributed over the arc as to be helpful in indicating targets in any part of the arc.

(c) If more than one reference point is chosen they must be well spaced out.

(d) Each reference point must be specific, if a reference point is large and measure more than one degrees, a point of it must be specified.

(e) Do not select such a reference point which is likely to be confused with a nearby object or another reference point.

(f) Reference points should differ from each other as regards type, name, colour and range.

Selecting and Naming a Reference Point

10. Naming of the reference point is essential to get them indicated and recognized at the same time. An example is given below:-

No. 1 Section -600 Right White House, name-White House reference point No. 1.

11. While using a reference point for indicating a target start with naming the reference point to draw attention to it and then indicate taking it as centre using other method in conjunction as required. An example is given below:-

No. 1 Section – 800- White House-slightly right PIPAL TREE name PIPAL.

12. Range given out is the range to the target and to the reference point. Also direction slightly right is from the reference point and not from general line of direction. Some times the last target can also be used as reference point. An example is given below:-

No. 1 Section – 900- last target, -slightly LEFT two trees name Twin Trees.

The Clock Ray Method

13. The method is used in conjunction with the reference point method as an additional help in indicating target. To use this method it is necessary to imagine the centre of clock face, held vertically on the reference point. The word LEFT or RIGHT are given as preliminary indications. The direction of the object is then given by naming the clock house at which it appears to lie e.g.

Explanation	**Indication**
Reference point	GOLD DARAKHAT
Direction	DAEN
Clock	CHAR BAJE
Object	AAM KA JHUND

14. It must be remembered, however, that the nature of ground under observation will determine the type of clock face either vertical or horizontal is to be used for indication of targets. For instance, if the observer is observing from a higher altitude looking down on a flat bit of country and wishes to make use of the clock ray for target indication, he has no option but to visualize a clock face placed horizontally on the ground, if on the other hand, the observer is observing from a low altitude to the ground then his line of sight used for indication of targets must be visualized as vertical.

15. Keep the persons, to whom a clock indication is being given as close as possible to you. From a point even a short distance to flank, the object may not necessarily be on the clock ray indicated.

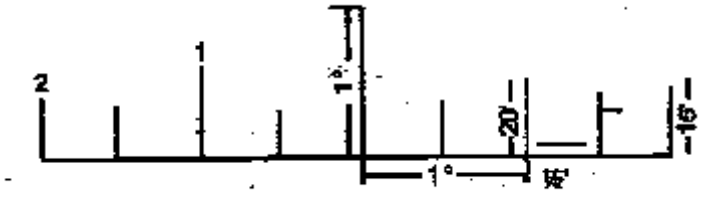
16. The word 'Above' and 'Below' will not be used in conjunction with 12 and 6 O'clock rays. The direction, that is, LEFT or RIGHT can not in this case be specified.

The Degree Method

17. When there is a possibility of confusion in case of more than one similar object in the same direction of the clock ray, this method is used in conjunction with the reference point and the clock ray method. This is a method of indicating how far the object is from the reference point.

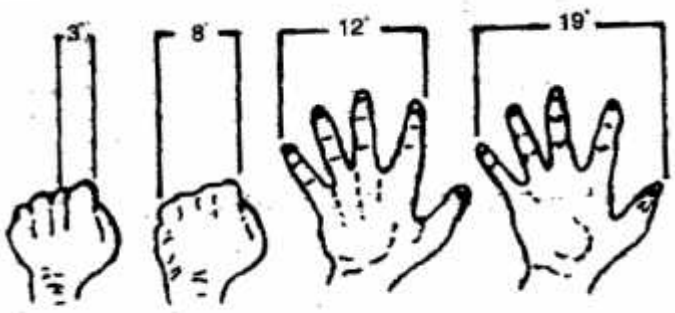
18. Degrees can be measured with various aids. These aids are given below:-

(a) **Binoculars** , The various degree measurements are given in the diagram below:-



Degree Measurements with Binoculars

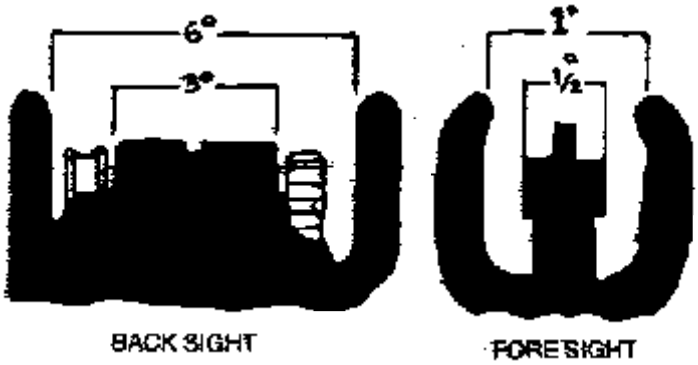
(b) **Hand Angles**. This is a rough method which is sufficiently accurate for practical purposes. The various degree measurements are given in the diagrams below. Remember to keep the left (LEFT) hand fully stretched and tilt it in the required direction. As the size of hand varies considerably the figures given below are approximate only. Each person should with the help of a degree scale check his hand for degrees.



Hand Angless

(c) **Sight and Sight Protectors of the Rifle**

The rifle held in the aiming position gives the following degree measurements:-



(i) Within the inner edges of back-sight protector 6 degree.

(ii) Length of the rectangle of the blade-back-sight – 3 degree.

(i) Within the inner edges of fore-sight protector 1 degree.

(ii) Bed of fore- sight protector ½ degree.

Finger's Breadth and Hand Span Method

19. This is a rough alternative to the degree method for use as an elementary training aid. In this method the LEFT arm is outstretched. One eye is closed and deflections to the Left and Right are given in fingers, ie hold the hand so that the left edge of a finger is in line with the reference point, if the Right edge of the same finger is in line with the object, the object, is one finger width to the Right of the reference point. Announce this lateral interval, announce it as 'Right one finger'. When two fingers can be applied to this lateral interval, announce it as 'Right two fingers' Similarly this interval can be measured as hand span (Hindustani equivalent 'Balisht') representing the distance between the thumb and little fingers when the arm hand and fingers are outstretched. Avoid intervals of more than one hand span as they are difficult to measure. This method can be used with or without clock ray i.e.

"GATE, DAHINE – EK Baje-ek ungal JHONPARI:

Or

"GATE, BAEN-EK Balisht – JHONPARI"

Miscellaneous Methods

20. Some miscellaneous methods are given below:-

(a) **Firing a Burst from LMG**. This method should be used with discretion as it is likely to give away own position, and surprise will be lost.

(b) **Moving Object**. Useful aids for drawing attention but not for using a reference point. One does often come across moving objects like cattle.

(c) **Use of Pointer Staff.** Indicating targets to individuals with the aid of a pointer staff.

(d) **An Unusual Object**. Something which is not part of the natural pattern, will be recognized easily and quickly provided there are not too many in the area e.g. smoke rising or hay stack.

(e) **Use of Intermediate Object**. An intermediate object may be used for indicating a difficult target. Example No 1 Section-reference Darakht Baen-9 baje 8 degrees – do chhoti jharian-baen jhari 7 baje – 3 degree ghas ki ganji.

21. If an object is not recognized after being indicated use a different method of indication.

Verification

22. To ensure that an indication has been correctly recognized it may be desirable to check back. To do this the person indicating will say ' Check back'. The recipient will then indicate some other landmark using the target previously indicated as his reference point e.g.

(a) The indicator might say-

'TEMPLE-DAHINE 2 baje – CHHOTA DARAKHT.

Call it CHHOTA DARKHT – Check back.

(b) The recipient might say

"CHHOTA DARAKHT – BAEN – 7 baje – 2 degree PULIA"

23 Only those who have not recognized object or target after it has been indicated, will shout ' Not seen", silence will imply that the indication has been followed.

How to Describe

24. Some point are given below:-

(a) When describing an area on the ground which includes landmark in the rear of an observer, such as an assembly area, start with the general line of direction. Then go round in clock wise direction finishing with the landmark first pointed out.

(b) When describing an area within an arc, in front of an observe, start with the general line of direction and then indicate the landmark from LEFT to RIGHT. Reference points, if required, are given out after the general line of direction.

(c) When two land marks are in the same line, describe the one nearer to you first and the distant one later in case initiative is with you, if the initiative is with the enemy, describe the distant land mark first and nearer one subsequently.

Sequence of Indication

25. The easy way to remember this sequence is to remember the word 'GRAD'. The sequence is as follows:-

(a) **Designation of Group**. Designation or name of the group to be given out first i.e. No.1 Section.

(b) **Range**. Range to the target to be given out next i.e. No. 1 Section -200, the word 'Yards' will not be used as it is understood that the range is in yards. Note that the range should be given in fifty and hundred only. For example 350, 250,200 and NOT 325 or 275 and so on.

(c) **Aid**. If an aid such as direction has been used it will be given out after the range. The direction will be in relation to the general line of direction.

Description

26. (a) Describe the target (No 1 Section – 350- Adha baen – Pul).

(b) If no aid is used then the description of the target will follow the range e.g 'No. 1 Section - 200 Pull' Description of the target is the most important of all. It should be clear and unmistakable. This can be achieved by describing some prominent trait or characteristic of the target e.g. Kale tane wala darakht'. Or Do Khirkion wala ghar'.

(c) Some-time it may be necessary to describe a target by its position in relation to the objects e.g. 'Ganne ke khet pe baen kone wali mitti ki dheri'.

Conclusion.

27. To achieve success in war it is of utmost importance that the target is understood and recognized by the troops. It is of no use reaching/capturing a target not intended to as this may jeopardise the plans.

SECTION-6

MOVEMENT WITH & WITHOUT ARMS (ONLY FOR SW)

General

1. A knowledge of how to move correctly and how to use ground is important to enable individuals and groups of individuals to close with the enemy, while exposing themselves as little as possible to enemy's view and fire. A knowledge to move correctly using correct cover as per the ground is essential. This is also essential for snipers and the patrols to accomplish their tasks. Every feature, natural and artificial, must be used to provide cover from the fire and view.

2. The method of movement are given below:-

(a) **Crawling by Day with Rifle**

(i) Monkey run.

(ii) Leopard crawl.

(iii) Walk.

(iv) Roll.

(b) **Crawling by Day with LMG**

(i) Knee crawl.

(ii) Side crawl.

(iii) Leopard crawl.

(c) **Crawling by Night**

(i) Ghost walk.

(ii) Cat walk.

(iii) Kitten crawl.

Crawling by Day

3. **Monkey Run**. Ther is useful for moving behind low cover upto about two feet high. Go fast for about 15 yards, drop flat, pause and then crawl further. The method of crawling is explained below:-

(a) **Without Arms**. This is done on hands and knees. Hands are moved forward in turn and so are the knees. Every time a hand is moved forward, the

knee corresponding to it is also moved forward to the spot vacated by the hand. When silence is more important then speed. The knee should be placed on the exact spot vacated by the hand. When silence is more important than speed, the knee should be placed on the exact spot vacated by the corresponding hands. The hand should reach forward to safe place.

(b) **With Rifle**. The rifle may be held in the Right hand at the point of balance. Care must be taken to keep the muzzle up to prevent dirt from getting in.

4. **Leopard or Stomach Crawl**. This is useful for moving behind low cover. The method of crawling is explained below:-

(a) **Without Arms**. This is done on elbows and knees. Hug the ground with chest and crouch flat on the ground and arms, outstretched in front. Propulsion is obtained from alternate elbows and knees movement. While crawling roll slightly from side to side as each knee is bent. Avoid kicking up the heels and keep the head, body and elbows close to the ground. Alternatively, one knee only can be used the other led trailing along the ground.

(b) **With Rifle**. This is done on knees and elbows by moving the rifle forward holding the RIGHT hand under the rifle between the point of balance and the outer hand. An alternative method is to grip the rifle diagonally across the body with small of the butt underneath the RIGHT arm pit.

5. **Walk**

(a) Never walk with the head bent as this affords no protection but hinders observation. Walk with head up and observe all the while. Silence is important when crossing hard ground, the least noise is made if the outside of the sole of the boot is placed first on the ground. Balance is essential to silent movement and this is assisted by keeping the knees slightly bent.

(b) **With Rifle**. Rifle is held in the LEFT hand across the body, ready for instant action. Carry the rifle so that it looks as a part of you. The alternative method is to carry rifle near the front swivel and the RIGHT hand holding the small of the butt.

6. **Roll**

(a) Roll away keeping the arms to the sides or stretched forward. This is often the quickest way of getting away from a spot where the enemy has seen you. Practice is necessary if the tendency to giddiness is to be overcome.

(b) **With Rifle**. When rolling to the right keep the rifle into the RIGHT side and vice versa.

Crawling with LMG

7. **Knee Crawl (No.1)**

(a) This is useful for moving behind waist height cover e.g. wall, hedge rows.

(b) This one is with the LMG only. The LMG is held in the left HAND. LEFT foot, Right knee and Right hand are placed on the ground. The body weight is taken on the RIGHT knee. The Right and the Left foot are moved forward simultaneously followed by the RIGHT knee.

8. **Side Crawl (No. 1)**. Lie on a side and rest the gun on the instep of lower leg which is kept flat to the ground. Hold the carrying handle with the Right hand and the barrel with the LEFT. Propulsion is obtained by kicking with upper leg.

9. **Leopard Crawl (No. 1)**. Take the gun forward to the limit of the extent of the arms and propel the body forward by legs using the leopard crawl method.

10. **Combined Leopard Crawl (Nos 1 & 2)**. No 1 grips the small of the butt in her left hand, No 2 grips the bipod legs in her Right hand. They both move forward using the leopard crawl. No 1's LEFT arm and leg keep step with No. 2's RIGHT arm and leg and vice versa.

11. **Combined Leopard Crawl by Bounds (Nos 1 & 2)**. Nos 1 & 2 crawl forward 2 to 3 yards, and lift the gun forward. In this method the gun is kept continuously in the firing position.

Crawling by Night

12. **Ghost Walk**. For all night movements silence is more important then speed. Silence can only be achieved by perfect balance. Stand up, lift the legs high to avoid long grass and sweep them outwards in a semicircular motion. Feel gently with the toes for a foothold. Makes sure that one foot is safe before the next foot moves, and knee slightly bent. Always lie down when you halt at night

13. **Cat Walk**. Get down on the hands and knee and move each hand forward searching the ground carefully, making sure there are no twigs, then raise the knee and put it sown on the spot where the hand is. Then move the hand forward again. This is very slow method but very sure.

14. **Kitten Crawl**. If the ground is covered with twigs the normal stomach crawl make noise. When moving very close to the enemy and when perfect silence is essential the only sure method is to keep raising the whole body off the ground on the forearms and the toes pressing forwards lowering the body, feeling carefully with hands each time. This is very slow and tiring method which requires considerable practice, but is invaluable. Accurate information at night can often only be obtained by movement very close to the enemy.

15. **Stalk.** Ground however carefully selected together with camouflage alone is not sufficient to enable us approach the enemy. One must use it like an animal staking its

prey instinctively and unerringly. The use of ground and camouflage combined with the actual move forms the basis of all minor tactics.

Points to Remember

16. (a) Move from cover to cover and make use of natural camouflage. Stop, observe and listen from bound to bound and do not keep moving forward the whole time.

(b) Watch your front and flanks.

(c) Crawl slows the movement and hiders observation, therefore crawl only when you must. After crawling for some distance stop, listen and observe and then crawl further.

(d) Weapons must always be kept ready for use.

(e) Look carefully and all round for enemy.

(f) Double across small gaps.

(g) If shot at, drop and crawl away to a side.

(h) Check equipment for noise.

(j) Always consider an alternative route.

(k) Do not disturb the birds, if this can be helped.

BATTLE CRAFT

SECTION-7

FIELD SIGNAL

General

1. It is not always possible to give verbal orders through words of mouth because of battle noise, security reasons and intervening distance being too great for effective voice control.

Signal With Hand

2.	(a)	Deploy	Right arm fully extended above head and waved from side to side, palm open.
	(b)	Advance	Right arm swung from rear to front in 'under arm blowing' fashion.

(c)	Halt	Right arm raised to full extent above head.
(d)	Turn About	Right arm raised and bent above head.
(e)	Change direction	Right arm raised to front in line with shoulder. Body then turned in required direction.
(f)	Close	Right hand place on top of head, elbow to the right.
(g)	Quick Time	Right hand raised to line of shoulder, elbow close to the side.
(h)	Double March	Right fist clenched, moved up and down between thigh and shoulder several times.
(j)	Follow me	Right arm swung from rear to front above the shoulder, in 'over arm bowling' fashion.
(k)	Last order completed	Right hand to salute, then arm raised in air finger extended.
(l)	Last order Not understood	Both hands, cupped behind the ears.
(m)	Commander to close	Right arm to the side at 45 degrees to the body, first clenched.
(n)	Enemy in sight specific numbers	Both arms waved on sides 'Bird fashion' followed by number, indicated by number of fingers held up.
(o)	Enemy Approaching	Both hands open, palm inwards at waist level, with inwards scooping motion.
(p)	Enemy position suspected	Both hands, first clenched, raised to shoulder level, followed by indication of direction.
(q)	Enemy LMG firing	Right hand thumb down signal.
(r)	Engage Target by Fire	Both hands clasped above the head (boxer fashion).
(s)	Attack	Punching motion with Right or Left hand according to direction of attack.
(t)	Closed to Rendezvous	Close sign followed by both hands clasped in front of body at waist level.
(u)	Infantry obstacle ahead	Both hands crossed in front of body at the waist, palm open downwards.

Signals With Weapons

3.	(a)	Enemy in Sight in small number	Rifle held above the head parallel to the ground, muzzle in the direction of the enemy.

	(b)	Enemy in Sight in large number	As per (a) above, but arm moved up and down several times.
	(c)	Advance	Both arms raised to form the letter 'U'.

Signals With Whistle

4.	(a)	Cautionary Blast	A short blast to draw attention to a signal or order about to be given.
	(b)	The Alarm Blast	A succession of alternate long and short whistle.
	(c)	Enemy Aircraft	A succession of short blasts.
	(d)	Enemy Aircraft departed	Two long blasts repeated at interval of five second.

SECTION- 8

SECTION FORMATION

1. The factors which influence the section commander in his choice of formation are as follows:-

(a) Ground.

(b) Task.

(c) Type and direction of enemy fire.

(d) Need for security and control by the section.

(e) Necessity of producing the maximum fire with minimum delay.

2. A section is normally split into two groups, namely the LMG group and the rifle group. These groups facilitate fire and movement.

3. The LMG group should usually be on the open flank or the flank which will provide the best intermediate fire positions. The interval between individuals should be about 4.6 m (5 yards) by day. The distances between groups will vary to suit the ground.

4. Section formations, with advantage and disadvantages, are as follows:-

	Formation	Advantage	Disadvantage
(a)	**Single File**	Good for control, not vulnerable to enfilade fire, useful for moving along ditches, narrow defiles and so on.	Bad for fire production, vulnerable to frontal fire.

(b) **File**.	Good for control. Useful for moving along broad roads, wide nullahs and so on.	Not good for fire production, vulnerable to frontal fire.
(c) **Diamond**.	Good for control, not vulnerable to enfilade fire, good for all round fire production and observation.	Present a good target to frontal fire. Not very good for fire production to the front.
(d) **Arrow-head**	Good depth, not vulnerable to frontal fire, good for fire production, probably the best formation for crossing open ground.	Control more difficult than in diamond.
(e) **Spread-head**	Good depth, less vulnerable to enfilade fire than arrow head, LMG group not committed immediately on contact.	Control difficult. Delay in fire production.
(f) **Extended Line**	The formation used in the final assault. Very good for fire production (from the hip) and bayonet fighting.	Control difficult. Very vulnerable to enfilade fire, no depth.

5. In each of the section formations, the positioning of the LMG and rifle groups is the responsibility of the section commander. He may order a gap to be left between groups and may even split his rifle group into parts as is frequently done in jungle fighting. His own position in the section should ensure good command and control.

SECTION-9

FIRE AND MOVEMENT

General

1. The primary aim of the infantry is to close with the enemy and destroy him. It is only possible to move forward against opposition by skilful use of ground, with the help of supporting fire or by a combination of both. The enemy will select positions which, as far as possible, give no ground cover to the attackers. By means of fire, mines and other obstacles he will attempt to halt the latter's advance. Supporting fire is, therefore, necessary to keep the enemy's head down and make movement possible. The combination of fire and movement is the basis of platoon and section tactics. It demands from the soldier the highest standards of weapon training and fieldcraft.

2. There are five basic considerations for fire and movement. These are as follows:-

(a) There should be no exposed ground without covering fire.

(b) Control by the commander.

(c) The angle of covering fire from direct firing weapons should be as wide as possible without loss of control or time.

(d) Full use should be made of all available cover. When cover is lacking the use of smoke (smoke grenade) should be considered.

(e) Full use should be made of all available weapons for covering fire.

Ground Appreciation

3. In a battle, fire and movement is applied according to the type of country over which it is fought. In open country the problem is how to find cover; in close country, there is the difficulty of finding positions with good observation and field of fire. In attack or defence, the skilful use of ground can help to gain in developing an eye for ground. Ground should be considered from the enemy's point of view. It should be appreciated under the following headings:-

(a) Fire positions.

(b) Observation positions.

(c) Cover from fire.

(d) Cover from view.

(e) Obstacles.

4. **Types of Cover**. Cover from view is often not cover from fire, especially if the move to cover has been seen by the enemy. Concealment from enemy air and ground observation is the chief means of gaining surprise. Some of the main types of cover are:-

(a) Undulating ground which is the least obvious form of cover; when skillfully used, it protects from direct fire and gives no ranging marks to the enemy.

(b) Sunken roads, beds of streams and ditches which give good cover from view and often from fire as well. However, there is always a danger that the enemy may pay special attention to them; they may be mined or booby-trapped and precautions against ambush must be taken. If the roads or ditches are straight, the enemy will be able to fire down them in enfilade.

(c) Hedges and bushes give cover from view but not from fire. In open country they may make good ranging marks for the enemy.

(d) Standing crops give cover from view but movement through them can generally be detected.

(e) Woods which give cover to men and vehicles from enemy air and ground observation. They give some protection from small arm fire but HE bombs and shells will explode in the branches of trees and will cause heavy casualties unless troops are dug in and have overhead protection.

(f) Buildings and walls afford concealment and protection from small arms fire and shell splinters. When isolated they make good ranging marks for the enemy.

5. **Dead Ground**. Ground which a soldier can not see from his position is called dead ground. Platoon and section commanders should be able to recognise ground which is likely to be dead to the enemy. Ground can only be described as dead in relation to the position of an observer. Troops under cover or in dead ground are safe from enemy observed fire but not from indirect fire. These areas are always likely to be selected by the enemy as defensive fire tasks for his artillery and mortars. Dead ground is also safe from detection by battle field surveillance radars, as these have line of sight limitations.

6. **Common Mistakes**. The wrong use of ground may lead to casualties and loss of surprise; some common mistakes are:-

(a) Carelessness by troops while making a reconnaissance, such as unfolding a map in the open or not using a covered approach to an OP.

(b) Unnecessary movement in a position overlooked by the enemy.

(c) Using conspicuous landmarks such as isolated trees, bushes or cottages.

(d) Halting troops near road or track junctions or other mapped features which are always registered as targets by the enemy.

(e) Bad track discipline.

(f) Failure to guard against enemy air observation.

Maps and Air Photographs

7. Maps and air photographs should be used together to obtain the best picture of the ground. The two aids are complementary as is shown by listing the advantages and limitation of air photographs:-

(a) **Advantage**.

(i) Are more up-to-date.

(ii) Gives more detail.

(iii) Show the size and shape of features accurately.

(iv) Allow gradient to be seen in relief with a stereoscope.

(b) **Limitations**

(i) Complete geographical cover almost impossible.

(ii) Expensive to produce.

(iii) Scales vary.

(iv) Details of heights not given.

8. Only the topographical information given by air photographs needs to be understood. The interpretation of the details of enemy defences is the task of the experts. Very little time need be spent in mastering the theoretical knowledge of map reading but a great deal of practice is required. The use of the prismatic compass and the protractor must also be mastered by sub-unit commanders. Navigation is a science and never a guess. An officer must have complete trust in his compass; this only comes with practice.

Selection of Fire Positions

9. The ideal fire position should:-

(a) Provide cover from fire.

(b) Provide cover from view.

(c) Afford a good view of the ground to be watched or target to be engaged.

(d) Provide room in which to use the weapon freely.

(e) Have a covered approach.

(f) Be easy to advance from.

10. The selection of fire positions requires a knowledge both of the characteristics of weapons and of the use of ground. A direct firing weapon must be sited with an eye at the level from which it is to fire. A target which is clear to a man standing may be invisible to one lying down.

11. Sometimes it may be necessary to site fire positions on trees, rooftops, haystacks or walls to produce fire effect. This may result in plunging fire, but this must be

overcome by accurate shooting. Cunning concealed fire positions will puzzle the enemy, protect the troops from observed fire and safeguard them against air attack.

Fire Control in Attack and Defence

12. There is a big distinction between fire control in attack and in defence. In attack men should be allowed a great deal of latitude in opening fire. Speed and immediate fire effect is what is required. With a well concealed enemy it will often be necessary to "neutralise" an area by fire since few definite targets will be visible. In defence, the vital factor in fire control is that early opening of fire may give away positions to the enemy and jeopardize concealment. Normally, a section commander will lay down a line in front of his section post beyond which fire will not be opened without his orders. This is particularly important where a long field of fire is available. In any case fire will normally be opened on the orders of the section commander.

Movement

13. Movement in the face of the enemy should be covered by fire. This does not mean that it is impossible to move unless a heavy weight of fire is brought down on the enemy. An important part of an attack is the movement towards the objective, supporting fire is one of the aids to that movement. A knowledge of how to move and how to use ground for movement is essential to enable troops to close with the enemy with minimum casualties, undetected in the zone of arc of battle field surveillance radars.

14. Usually, troops advancing by day in action will move at a brisk walking pace until they make contact; in the final stages of the assault, they will double. They may have to double or crawl at other times; for example if attacking troops move into enemy defensive fire, it is usually best to double forward and through it; to lie down is often dangerous as well as useless. Doubling and crawling are both tiring however, and should only be used in short spells in critical situations particularly for crossing open ground in full view of the enemy. The commander must himself decide on his pace from his personal knowledge of the state of fitness of his men. In general the aim must always be to keep moving determinedly towards the enemy at the best possible speed.

15. When crossing an open space like a gap in a hedge, it is best for the whole section or group to double across it together, before the enemy has time to fire effectively. When wider gaps are under enemy observation, it may be necessary to filter men across now and again by crawling in ones and twos.

SECTION-10

SECTION BATTLE DRILL

General

1. A section will rarely be employed in an operation by itself but the action of a section is the basis for action of bigger subunits or units and, therefore, it must be thoroughly understood.

2. The Section Battle Drill is divided into 4 stages.

(a) Stage – 1 – Action on coming under effective fire.

(b) Stage – II – Locating and neutralising the enemy.

(c) Stage – III- Attack.

(d) Stag – IV- Re–organization.

Action on Coming under Effective Fire

3. The Section Commander, as he advances, will constantly be on the look out for:-

(a) New reference point for fire control orders. He may describe these to the section as they advance and each may acknowledge with a signal or shout 'Not seen' if he had failed to recognize the reference points, and.

(b) Position where the section can take cover in the event of coming under effective fire. Whenever, possible the section commander will indicate such positions in form of anticipatory orders e.g. 'if we come under effective fire, LMG group takes cover in those bushes, rifle group along that bank'.

4. It is instinctive to most men to drop down on the ground, when under fire. The men should not go to ground till the effective fire of the enemy is brought down or the order 'Take Cover' is given by the Section Commander. On receiving order for taking cover the following action will normally be taken by each man of the section:-

(a) Run to the nearest cover or that already indicated by the Section Commander in his anticipatory orders.

(b) Every man will dive or drop into the cover and crawl away so that the enemy has not got his sights on anyone when he re-appears.

(c) Take position and observe the enemy.

(d) Apply sight and fire on spotting the enemy without waiting for an order from the section commander.

(e) Bunching together should be avoided at times and apart from No 1 and 2 of sthe LMG group, when necessary, no man in the open by day should ever be less than 5 yards from his nearest fellow , depending on the cover available.

(f) On 'TAKE COVER' order by the section commander, DASH-DOWN-CRAWL-OBSERVE-SIGHTS-FIRE (If the enemy has been located).

Locating and Neutralizing the Enemy

5. **Locating**. The location of enemy and its fire is usually not easy. The following drill will be followed for locating the enemy.

(a) **By Observation**. Look in the area from which the 'thump' came. The time between the 'crack' and the 'thump' gives an indication of the range. If nothing is seen after about 30 seconds or so, it is very unlikely that enemy will be located by looking.

(b) **By Fire**. The section commander will give a fire control order to a couple of rifleman to fire two shots each into likely cover. The rest of the section will observe their area of observation carefully. If there is no answer to fire, then the section commander should try another couple of rifleman at some other target. If there is still no enemy fire, either they are well trained or they have withdrawn.

(c) **By Movement**. The section commander will order one or two men to get up and double forward about 10 yards to a different cover. He might do this again if it draws no fire. If the enemy troops are there, they must be extremely well trained not to fall for these tricks and start firing at such poor targets. (A man getting up and moving fast for about 10 yards is a very difficult target to hit). If there is still no enemy reaction then the section commander must continue the advance.

Target Indication

6. If any soldier of the section located the enemy before the section commander, he will insert a tracer round into his rifle, shout 'Watch my Tracer' and fire and continue to fire, until, the section commander issues fire control order or orders to stop the fire.

Neutralisation

7. (a) As soon as the section commander knows the position of the enemy he must give a fire control order to bring on the enemy sufficient weight of the section fire power to neutralize them. If certain individuals have already started the firing, the section commander will resume control by preceding his fire control order with the order 'STOP'.

(b) Having won the fire fight, the section commander must retain the fire initiative by cautiously bringing fire down on the enemy whilst he manoeuvers closer in order to assault them.

The Assault

8. The section commander will decide whether to attack from the flank or right flank depending upon the position of the LMG group, the position of the enemy and the routes available.

9. The section commander's orders, for the assault are confined to :-

(a) LEFT or RIGHT flanking (to indicate which side of the LMG group, the rifle group will work).

(b) Which group will move first and.

(c) Place to which LMG group will move, if it is to move first.

10. The main points to note are:-

(a) The section commander will lead the rifle group in person, he is normally in the centre.

(b) Covering fire will be provided for all movements in the open. The angle of the fire should be as wide as possible.

(c) When the rifle group gets down into fire position after a bound, the LMG group must move forward into a new fire position automatically. Once the LMG group is in a position from which it can support the assault from a good angle, the rifle group will move in one bound. Before the assault goes in, the rifleman armed with the grenade discharger cup and the projector strim grenade should be ordered to remove these from their rifle, if necessary.

(d) Normally the assault will start at the 'walk' with firing being carried out from the shoulder or the hip (marching fire). The section doubles only during last 100 to 50 yards when the section commander gives order 'CHARGE'.

(e) No 1 and No 2 of the LMG group must carry sufficient magazines to support a normal section attack.

(f) As the assault goes in, the LMG group will fire as long as possible and then switch its fire across the objective just in front of the rifle group.

Re-Organisation

11. Once the assault is made the following action will take place as drill:-

(a) The LMG group will rejoin the fire group 'at the double' immediately it sees the rifle group take cover after the assault.

(b) The section commander will organize a search of the area of the objective for any enemy hiding or wounded. Rifle numbers detailed to search will be covered by other rifleman.

(c) The section commander will check positions of rifleman and LMG group, allot arcs of observation and detail reference points.

(d) The section commander will check:-

(i) Causalities,

(ii) Ammunition expenditure, and

(iii) Refilling of LMG magazine.

(e) The section commander will await the platoon commander for further orders.

SECTION-11

FIRE CONTROL ORDERS

Introduction

1. By opening of fire indiscriminately, too early or at too great a range, the defender's position will be disclosed prematurely which will mean wasting of ammunition without advantage. This means Section Commander should be able to control the fire of his section by exercising good fire discipline.

Important Terms

2. Certain terms given below are commonly used in connection with fire control:-

(a) **Fire Unit**. Any number of men firing under the command of one man, usually, a section. The person responsible for giving the executive order of fire, is the fire unit commander.

(b) **Fire Direction Orders**. These are the orders which the fire unit commander receives from his superior, telling him when, at what target and with what intensity to open fire. A section commander will receive fire direction orders from his platoon commander. They include special directions about opening and withholding fire.

(c) **Fire Control Orders**. These are orders given by the fire unit commander to direct and control the fire of the section. Emphasis should be on control and supervision. These orders are the final with complete instructions after all factors have been considered and before fire is actually opened.

(d) **Arc of Fire**. This denotes the area of ground for which the fire unit is responsible and with in which it will engage targets. An arc of fire, must not be confused with field of fire which is the area upon which it will be possible to fire effectively in any direction.

Points for Section Commander

3. There are certain points which must be remembered before giving a fire control order. These are explained below:-

(a) **Indication**. No fire control order can be effective unless the target is clearly indicated and can be easily recognized by the men of the fire unit.

(b) **Range Visibility and Vulnerability**. It should be considered if the range, visibility and vulnerability of the target justify fire at all. Would it be better to wait and get a more vulnerable or more complete surprise?

(c) **Best Weapon to Use** . What is the best weapon to use, although the LMG is the main weapon of the section, the target may be more suitable for the fire of the riflemen only or for a combination of both weapons.

(d) **Single Round or Burst**. Should the fire be in single rounds or in burst. Should it be rapid or at the normal rate? Rapid rate is justified only on a comparatively few occasions when it allows the maximum effect to be gained from surprise when an especially vulnerable target presents itself or to cover move in the final phase of an assault.

How to Give Fire Orders

4. Having decided to open fire, the next problem is how to give the orders. The four main rules which must be followed are as under:-

(a) The orders should be given clearly, calmly and consciously.

(b) It should be given loudly, so as to be heard over the noise of battle but should not be louder than required.

(c) It must be given as an order, and obeyed as such.

(d) It must be given with adequate pauses, so that those being addressed may have time to take the correct action, for example, there must be time for sight adjustment after the range is ordered. No 1 Section (Pause) 300 (Pause) fire when you see a target.

Types of Control Orders

5. There are four types of control orders. These are explained below:-

(a) **Delayed Fire Order**

(i) " No. 1 Section – 600-enemy approaching await my orders".

(ii) "No. 1 Section 600-enemy advancing through jungle, fire when enemy reaches, open ground".

(b) **Opportunity Fire Order**

"No. 1 Section. Enemy hidden in broken ground, fire when seen".

(c) **LMG Group Fire Order**. "LMG group sight down – enemy running left to right – fire"

(d) **Full Fire Order**

(i) **Pin Point Target**. "No 2 Rifleman – 300 Tree Right – 50 RED HUT- enemy sniper-fire".

(ii) **Area Target**. "LMG-Group -500-Tree-Right Grove, enemy section, burst fire".

Sequence of Fire Order

6. An accepted sequence should always be used in order to avoid confusion, or misunderstanding. The suggested code work is 'GRIT', each letter of which signifies stage in fire orders as follows:-

G-The Group of the section which is addressed, that is the LMG group or the whole section. An order starting with "No 1 Section" indicates that the whole of No. 1 Section will fire. "LMG-Group or Rifles Group" means that the group named only will fire.

R-The Range to the target. To ensure accuracy of fire and to concentrate attention on a limited area of ground.

I- The Indication of the point of aim by its description.

T-The type of fire to be employed.

Conclusion

7. Fire control orders are essential to maintain surprise, save ammunition and engage targets with speed. The correct sequence must be followed to avoid confusion.

SECTION-12

TYPES AND CONDUCT OF PATROLS (ONLY FOR SD)

General

1. Patrolling is the acid test of a trained cadets individual training. The success of any operation depends largely on the availability of accurate and timely information about the enemy. This information is mostly obtained by patrols.

2. Patrolling develops four essential qualities of the fighting man:-

(a) Discipline

(b) Comradeship

(c) Aggressiveness.

(d) Alertness.

Functions

3. There are two functions performed by patrols:-

(a) **Reconnaissance.** To obtain information upon which commanders can base their plans.

(b) **Protection.** It involves preventing enemy patrols from obtaining information or giving early warning of the approach of enemy forces.

Types of Patrols

4. There are two types of patrols:-

(a) Reconnaissance Patrols (Recce Patrols)

(b) Protective Patrols.

Recce Patrols

5. The aim is to gain information secretly and silently without getting involved in fight. It may however have to fight some times for information which should be conveyed to proper commander in time to be of value.

6. **Composition**. The party should be small. It should consist of a patrol leader usually an officer or a JCO and his escort of one or two men. Where it is evident that information can not be obtained unless the patrol is prepared to fight, its strength must be adjusted in accordance with the requirements.

7. **Arms**. It is ideal to carry only close quarter battle weapons. Heavier weapons should be avoided.

Protective Patrols

8. **Duties**. Patrols engaged in protective duties will have to patrol on the front allotted to them. Their tasks will include to deny approaches to enemy patrols and obtain earliest possible information of the approach of the enemy.

Strength and composition

9. Patrols engaged in protective duties should be prepared to fight and should be organized accordingly. The strength will depend on the task. This must be supported by a carefully worked out fire plan if required.

Technical Representatives

10. Patrols whose tasks are solely of obtaining information of technical nature will include representatives of technical arms. The commanders of such patrols are infantry officers, irrespective of the rank of the specialist representatives included in the patrol.

Stages of Patrolling

11. There are three stages of patrolling:-

(a) Preparation.

(b) Conduct.

(c) Debriefing.

TASKS

General

12. Patrols may be employed for various tasks according to the needs of the situation. The main tasks are however as follows:-

Recce Patrols

13. **Tasks**

(a) Location and details of enemy position.

(b) Location of obstacles laid by enemy and constant plotting of features.

(c) Study enemy habits.

(d) Any other specific information asked.

Protective Patrols

14. (a) To deny approaches to enemy patrols and obtain earliest possible information of the approach of the enemy.

(b) To gain and confirm topographical information including that of artificial obstacles.

(c) To give early warning of the enemy's intentions.

(d) To deny information to enemy patrols.

(e) To dominate 'No Man's Land'.

(f) To protect flanks by aggressive patrolling.

RESPONSIBILITIES OF PATROL LEADER AND SCOUTS

Responsibilities of Patrol Leader

15. The patrol leader being the commander of the patrol party, is responsible and accountable for the following:-

(a) Quick thinking and out line planning.

(b) Selection of men. Same man should not be taken time and again. None should be suffering from cough or other ailment. Keep few reserves.

(c) Details of arms and ammunition to be carried by each.

(d) Any special equipment to be carried.

(e) Communication.

(f) Gaining maximum information.

(g) Detailed recce and planning.

(h) Briefing of patrol.

(j) **Rehearsals.** Rehearsals of the following should be carried out when ever time is available.

(i) Formations.

(ii) Method of crossing obstacles.

(iii) Action on meeting the enemy.

(iv) Protective measure during the halts.

(k) Final inspection.

(l) Successful conduct of the patrol and completion of assigned tasks.

(m) Debriefing.

RESPONSIBILITY OF SCOUTS

General

16. Scouts are a pair of soldiers from the section who work ahead of the section when it is on move except when another section is leading. These two men work as the eyes and the ears of the section. Their function is to:-

(a) Protect the section by giving early warning of the enemy and to prevent their section from getting either ambushed or from under enemy fire unexpectedly.

(b) Increase the speed of move of their section by permitting it to move more closed up than it would if there was no one between the section and the enemy.

Some Points to Remember

17. (a) Scouts should move from cover to cover using the correct methods of observation around cover.

(b) Scouts should move by short bound in area where enemy is suspected.

(c) A pair of scouts should move one behind another and should keep each other within easy voice control .The leading scout should often look over his shoulder to ensure that he has the second scout in visual contact. However, it is for the second scout to keep up.

(d) Scouts must always be alert.

(e) Scouts must protect each other by placing themselves in such a way that they can cover each other by fire.

(f) Scouts move as individuals making use of ground and cover.

(g) Scouts must always remain in contact with the unit through the sub-units commander.

(h) Communication are from front to rear. Contact is visual.

(j) Scouts must so move on ground and take cover in such a way that they do not give away each others position.

(k) Scouts must not bunch together on bounds.

Conclusion

18. The training and efficiency of a section is judged from the work of the scouts. Its speed and safety depends upon them. They should work in pairs making intelligent use of the ground.

ADMINISTRATIVE REQUIREMENTS

General

19. In any military operation however, large or small scale it be, the administration is of paramount importance and plays a vital role in the ultimate analysis. No operation can sustain for long without an effective and sound administrative back up and hence need no emphasis.

20. For the successful conduct of a patrol the following administrative aspects should be borne in mind:-

(a) Composition of patrol and selection of men.

(b) Dress and equipment.

(c) Arms, amn and equipment.

(d) Food including extra rations to be carried.

(e) Water consumption and discipline.

(f) Evacuation of casualties if any.

(g) Rest and refit.

(h) Communication with in and out side patrol.

(i) Security, Items of security value should be discarded.

(k) Any special equipment specially required for night operations.

CONDUCT OF PATROL

21. **Formations.** The formation adopted by a patrol will depend on

(a) Cover.

(b) Control.

(c) Protection.

(d) Ground.

22. The exact formation adopted will also be affected by the size of the patrol and individual preference of the patrol leader. It must at all times provide for effective control by the commander and the security of the patrol.

23. **Patrol Base**. A patrol base is established in an area of tactical importance close to the enemy but not observed or dominated by him. Radio sets, stretcher bearers and the men and material not required by subsidiary patrols are left here. Necessity of patrol base will arise when:-

(a) 'No Man's Land' is wide,

(b) Two more small patrols are required to be sent from there, and

(c) There is a danger of small isolated patrols suffering serious interference from the enemy on the way.

24. A patrol base should be:-

(a) Suitable for defence and always have enough strength for this,

(b) Neither too close to be safe, nor too far to be useful, 500 to 700 yds by day and 300 to 400 yds by night is a rough guide in open country.

(c) Easily recognisable at night.

Some Practical Hints

25. The following points are worth noting:-

(a) For better observation move on high ground during day and on low ground during night.

(b) Be alert and avoid obvious places like bridges, villages, roads, tracks, junctions. Patrols should use land marks to keep direction while keeping clear of them.

(c) Move by bounds, one foot on the ground.

(d) Do not give away your presence by shine, light, coughing or rattling.

(e) Observe and note down whatever you can while enroute.

(f) Be aggressive if you meet the enemy and cannot avoid without being detected. In an encounter the patrol which shoots first is likely to win.

(g) While returning, do not lose the information gained by unnecessarily getting involved in a fight.

(h) If not sure whether an object is moving, do not look at it continuously but fix its position relative to a star or another object. Look away and look back to see whether its position has changed. A bush will 'present arm' if you stare at it long enough.

(j) Noises at night sound closer than they really are conversely any noise made by your own patrol goes a long way.

(k) A careful balance must be maintained between speed and silence. At night, it is easier to hear than to see. You cannot listen on the move. It is advisable, therefore, in the early stages, to move rapidly from point to point, stop frequently and listen. Nearing the enemy, silence is more important than speed.

(l) Detail one man (Get away man) before setting out, who, if the patrol gets heavily involved, may be ordered to try and return with such information as has been obtained. For such patrols RVs detailed are usually the bounds, so that the men know where to re-assemble it they are scattered.

Debriefing

26. Immediately on return to its own unit, the patrol leader should report the return of the patrol and give a brief report of his task. Any thing of urgent nature which may affect the conduct of operation should be told immediately. A detailed interrogation should be done of the whole patrol preferably by the same officer who briefed. Debriefing should be done when the patrol has collected the thoughts but before their memory becomes dim. The following points should be remembered:-

(a) Air photographs should be used for checking information regarding ground.

(b) The patrol commander should be allowed to tell his own story without interruptions.

(c) Important information should be cross-checked with other members of the patrol. A great deal of tact and care is required in this. It is not necessary to interrogate every member of the team,but key personnel and the representatives of other arms, if any, should always be interrogated.

(d) Any information of immediate importance must be passed on at once to those affected by it. The interruption thus caused in the interrogation of the patrol has to be accepted.

(e) Tired men are not very communicative. Detailed interrogation should be carried out after the patrol has had some rest. Hot tea and a smoke can be a great help.

(f) There is a normal tendency for exaggeration but it should not be taken for granted that all reports are exaggerated.

(g) Patrolling is difficult and very tiring. Interrogation should, therefore, be done with sympathy and understanding.

(h) All information collected by interrogation should be checked with any other information if already available.

Conclusion

27. The success of any patrol depends upon careful preparation, good leadership, determination of all member of the patrol, good warning and high morale.

CHAPTER-V

MILITARY HISTORY

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SECTION-1

BIOGRAPHY OF INDIAN HISTORICAL LEADERS

BIOGRAPHY OF CHHATAR PATI SHIVAJI

Early Years

1. On 10th April 1627 Shivaji was born at Shivneri, some 50 miles, North East of Pune. At that time his father , Shahji Bhonsle was being pursued by his father–in–law Lukhuji Jadhav with the borrowed might of the Mughals. Leaving his pregnant wife Jijabai at Shivneri fort, Shaji was eluding his pursuers. Jijabai's loyalty was to Shahji and she was naturally very disturbed by the fact that it was her own father who was in hot pursuit of her husband. Jijabai vowed that if she were blessed with a son, she would name him after the God. Thus when the son arrived, he was named Shivaji.

2. When Shahji was exiled from Maharashtra, he left his wife Jijabai and Shivaji in the care of a shrewd and able Brahmin, Dadaji Kondadev whom he had appointed Administrator of his Pune jagir. Dadaji Kondadev took particular care in the up bringing of his illustrious ward. He initiated Shivaji in to the art of administration and ingrained in him a love for his country. From his mother young Shivaji imbibed a deep religious spirit. An inner urge kept taking him to the remote countryside which in those days was extensively covered with jungles. Mavles (locals) were pleased to see their Sirdar's son visiting them so often despite hazards and hardships of movement in that difficult terrain.

3. Shivaji did not relish the idea of service under his father's overlord, the Sultan of Bijapur. He wanted to become an independent and sovereign ruler so that he could protect his people from the depredations of the Muslim rulers. The legitimate aspiration of the son of a Hindu Chieftain was supposed to be advancement in service under a muslim overlord, but Shivaji was cast in a different mould and nursed ambitions of attaining "Hindu Swaraj".

4. By 1645 when he was only 18 years old, Shivaji gathered a band of one thousand Mavles. He took possession of Fort of Rohida near Pune. The Deshpande of Rohida was asked by the Sultan to explain why he had allowed this act of indiscipline. On his referring this enquiry to Shivaji, the latter wrote to him on 17 April 1645, "We are not disloyal to the Shah. The God whose abode is on the hills of your valley has given us the inspiration and He will fulfill the wishes of all of us to establish our own Raj. It is God's wish that we establish our own rule and be independent". This shows that Shivaji had already begun to harbour thoughts of independence.

5. Shivaji's small beginning at territorial expansion received a setback as Sultan Adil Shah imprisoned Shahji for alleged disloyalty and rebellious activity of his son Shivaji. Adil Shah tried to secure Bangalore, Kondana from Shahji's son, however his armies were defeated by Shambhaji and Shivaji. This was first major success in battle for Shivaji. Shahji was later released from jail and invested with a robe of honour.

6. Shivaji attended to his army's organisation and training. Troops were trained to march long distances and to scale perpendicular heights with the help of gharpeo (Lizzards). Shivaji defeated Chandra Rao in a clever move and captured Javli on 15 Jan 1656 and brought surrounding areas under his control. Shivaji renamed the stupendous hill fort of Riari as Raigad and it became his capital later. In Sep 1656 Shivaji paid a friendly visit to his uncle Shambhaji, who was not administering the Pargana of Supe in satisfactory manner and took him prisoner. The whole of Pune District was now under Shivaji's rule.

7. His early clash with two powerful adversaries was epitomized by two dramatic personal encounters with the Commanders-in-Chief of the enemy's forces Afzal Khan in 1659 and Shaista Khan in 1663. In both encounters, he came out successful. This helped him in establishing a charismatic control over his people. In Nov 1656 Sultan of Bijapur died and this gave Shivaji an opportunity to raid Bijapur territory. He took over Dabhol and his forces crossed the Bhima River and plundered Mughal territory in Ahmednagar District. In the later half of 1657 Shivaji entered Konkan, by middle of 1658 Shivaji secured whole of North Central Konkan, Kalian, Bhivandi, Mahuli and forty forts were captured.

Encounter with Afzal Khan

8. Famous General of Bijapur Army Afzal Khan was sent on strong punitive expedition to bring Shivaji to book. However, Shivaji realising that his adversary was too powerful agreed to one to one meeting, with Afzal Khan who was notorious for treachery and cruelty. Afzal Khan arrived first at the pavilion erected for the meeting at Pratapgad. Shivaji soon followed him arriving seemingly unarmed. The Khan embraced Shivaji and held his neck with his strong arms. Shivaji being much shorter barely came up to his shoulder. Having got Shivaji in a stranglehold, the Khan drew his dagger and hit his side. This blow turned out to be harmless. Shivaji's body armour protected him. The wiry Maratha retaliated by tearing open the Khan's bowels with his steel tiger claws he has hidden in his left sleeve and with his right hand he stuck into Afzal Khan's side. The Khan fell down shouting, " Treachery, Murder, Help". The attendants rushed from both sides. One Sayyid Banda attacked Shivaji with his long sword and cut his turbun making a deep dent on the steel beneath. One of Shivaji's attendants quickly came up hacked the right hand of Banda who was later killed. Shambjaji Kavji cut off Afzal's head and carried it in triumph to the Fort.

9. Within a few moments the Marathas rushed upon the confused Bijapur Army. Leaderless and surprised, they broke and fled. Supe and Shirwal were captured the same day but the remanents of Afzal Khan's army and his son Fazal Khan escaped to Bijapur. Shivaji advanced 100 miles along a different route to Kolahpur and captured the fort of Panhala on the night of 28/29 November 1659.

10. Thus ended the battle of Pratapgad. The khans army lost over 3,000 men killed and many prisoners including certain prominent Sirdars. Among the booty captured were 65 elephants, 4000 horses, 1200 camels, 2000 bundles of clothing and rupees ten lakhs. Fazal Khan swore revenge . Hurriedly another force of 10,000 men was concentrated under the Rustam-i-Rahman. Shivaji did the unexpected and on 28 December 1659 suddenly attacked the Bijapuri Army, East of Kolahpur. Already demoralized at the news

of Afzal Khans debacle these soldiers could not hold ground when surprised. Shivaji's men fell upon this force with full fury and soon this Army also disintegrated . This spread great alarm and consternation in Bijapur. The Sultan felt his existence threatened. An appeal to Aurangzeb was made to send a large force to attack Pune and take possession of Shivaji's dominion. Aurangzeb was looking for this opportunity and he readily responded.

Encounter with Shaista Khan

11. A combined offensive of the Mughals and Bijapur was now planned against Shivaji. The Mughal Viceroy in the Deccan since 1659 was Aurangzeb's maternal uncle Shaista Khan who held the title of Amir-ul-Umrao. He left Aurangabad on 28 January 1660 with a force of 1,00,000 men comprising 70,000 cavalary and 30,000 infantry and 4,000 elephants, 100 camels and a large number of ordanance pieces. Adil Shah of Bijapur gathered a force of 20,000 cavalry and 1,50,000 infantry under Salabat Khan. Shivaji realised that he could not give battle to these forces in the open. He therefore took refuge in Panhala fort on 2nd March 1660. Salabat Khan laid siege to Panhala and this dragged on for nearly five months. Shaista Khan enterd Pune on 9th May 1660. He occupied Shivaji's house, the Lal Mahal. Shivaji decided to escape from Panhala. Prior to escaping, he lulled the Bijapuris by an offer of submission. In view of this meeting, the Bijapuri Army was a little off its guard on the previous day. Moreover, it was raining heavily on the night of 12th July. Taking advantage of this, Shivaji escaped and reached Vishalgad with some 600 men.

12. In the North, further reverses awaited Shivaji, Shaista Khan advanced from Pune to the strategic fort of Chakan. He captured this fort on 15th August 1660 despite the stout defence put up by the garrison. Shivaji spent the next few months quietly at Raigad maturing his plans. Shaista Khan turned his attention to Kalian District and North Konkan. He dispatched Kartalab Khan to advance into North Konkan. Shivaji had got scent of this move and with lighting speed had come up with his Army to lay an ambush near Umbre. The Mughals could not manoeuvre and there was complete confusion in their ranks with the Marathas showering arrows from all sides. Kartalab sent an emissary to Shivaji and agreed to surrender all his arms and equipment provided he and his men were allowed to return to Pune.

13. Shivaji now proceeded South towards Rajapur some 100 miles from Umbre. The townsmen surrendered to Shivaji and gave him traditional gifts. Shivaji spent the next two years consolidating his rule over the Konkan and keeping the large Mughal Army around Pune at bay. This was the best he could do under the circumstances as he could not match the strength of the Mughals and evict them from his territory . The Mughals on their part chose to co-exist with Shivaji and did not attempt to cross the Sahyadri Range in to the Konkan after the battle of Umbre.

14. Shaista Khan had been in occupation of the Pune region for nearly three years and his large army was living off the land. Shivaji could not face Shaista Khan's large army in battle. He therefore conceived a very bold and audacious plan to raid Shaista Khan in his palace and kill him. Shaista Khan was living in Lal Mahal with a large guard around the palace. A little down the road from Lal Mahal towards Singhgarh was a contingent of 10,000 men. It was therefore a very difficult task to raid Shaista Khan in his palace. Shivaji handpicked 400 of his trusted followers for this raid. On the night of 5 April 1663 which was the sixth day of Ramzan, the month of fasting, Shivaji choose to strike.

Shivaji with his band gained entrance into the camp, Marathas pretended to be a marriage procession with Shivaji acting as the bride groom. Hacking his way Shivaji entered Shaista Khan's bedroom. He stuck the Khan with sword. Shivaji thought he had killed Shaista Khan but in actual fact that the Khan lost only three fingers of his right hand and managed to escape from the room.

15. The raid having been accomplished, Shivaji got his men together and promptly withdrew along the main route. In this raid the Mughals lost 43 killed including one son and one son-in-law of Shaista Khan who himself had been wounded. These losses were negligible but the loss of prestige was tremendous. When Aurangzeb heard of this, he immediately removed Shaista Khan from the Deccan to Bengal and sent Prince Muazzam as the next Mughal Viceroy of the Deccan.

16. While the change of Viceroys was going on at Aurangabad, Shivaji raided Surat, the richest port of the West Coast. Governer of Surat fled from the city into the fort. The plunder of Surat yielded cash and valuables worth over one crore of rupees. The city was ransacked for four days from 6th to 10th January 1664. This was Shivaji's retaliation against the Mughals for desolating his territory for three years.

To Agra and Back

17. Aurangzeb decided to throw the full might of the Mughal Empire against the "mountain rat". The emperor appointed his ace general, Mirza Raja Jai Singh to put down Shivaji. In January 1665 Shivaji returned to Raigad where he received the news of Jai Singh's expedition. Shivaji realized that Jai Singh would take some time to reach Deccan. He decided to utilize this time to carry out a naval expedition to Basrur, a rich coastal town and collect tribute. He accordingly embarked with 6000 troops in 3 large and 85 small ships. He moved some 180 miles by sea and appeared before Basrur. The rich merchants of the town gave him a handsome tribute. He then returned to his capital in March 1665.

18. Jai Singh advanced with speed and on 3rd March 1665, he entered Pune. He started sending troops to capture important centers of communication and to plan capture of Shivaji's forts. The first fort chosen for capture was Purandhar. The siege of Purandhar commenced on 1st April 1665 and by the end of May 1665 the siege lines had come closer to the outer wall of the fort. Realising that further resistance at Purandhar was futile, he sued for terms and sought an interview with Jai Singh. This meeting was arranged and a treaty concluded whereby Shivaji was to surrender 23 of his forts and surrounding area yielding an annual revenue of 4 Lakh huns to the Mughals. 12 forts with an annual revenue of 1 lakh huns were to be retained by Shivaji on condition of service and loyalty to imperial throne.

19. The terms of Purandhar Treaty were confirmed by the emperor. A royal firman was issued to Shivaji and he was given robes of honour. Jai Singh now set out for an invasion of Bijapur and Shivaji agreed to accompany him with a contingent of 9000 men. Shivaji led the advance and the Bijapur forts enroute were either evacuated in terror or they surrendered. It is interesting to note that in this campaign Shivaji fought alongside the Mughals . However. Jai Singh was concered about the loyalty of Shivaji . He there fore, persuaded Shivaji to visit the Emperor at Agra. Although Shivaji agreed to go to Agra, he fully realized the danger he was facing.

20. On his reaching Agra, the Emperor appears to have decided to either kill Shivaji or confine him in a fortress. A large force was placed around Shivajis camp and he was made a prisoner. Shivaji feigned illness and began to send out several huge baskets of sweetmeats for distribution to Brahamins as an act of religious piety. Shivaji and Shambhuji got into two baskets and on 19th August 1665 went out along with several other baskets of sweet-meats.

21. On escaping from Agra, Shivaji first proceeded to Mathura which is in opposite direction. He shaved off his moustaches and beard and smeared ashes on his body. On 12 September he reached Raigad having covered about 1000 miles in 25 days riding approximately 40 miles a day. There was great jubiliation throughout Maharashtra at the miraculous escape of Shivaji. Ballads were composed praising his ingenuity and superhuman qualities. His escape from captivity caused lifelong regret to Aurangzeb.

Consolidation and Coronation

22. During the period 1669, Shivaji stayed quietly at Raigad avoiding giving any provocation to the Mughals. This period of peace was essentially a hollow truce. The year 1670 saw the renewal of conflict between the Mughals and the Marathas. Shivaji opened his offensive in January 1670 with great vigour and immediate success. He plundered Mughal territory and attacked several of the forts he had ceded to Aurangzeb by the Treaty of Purandar. One after the other, forts began to fall to the Maratha and in a few months, Shivaji recovered almost all the 23 forts he had ceded to the Mughals . Alarmed by Maratha raids, the Emperor ordered his trusted general Diler Khan, to proceed from Nagpur to Aurangabad.

23. On 3rd October 1670 for the second time Shivaji plundered Surat. Later on he plundered the rich city of Karanja collected cash and gold and returned to Pune with his booty loaded on 4000 bullocks and donkeys. In 1671 Shivaji captured Ahivant. On 24 November 1672 Sulatan Ali Adil Shah of Bijapur also died. Shivaji declared war on Bijapur and recaptured Panhala Fort. In January 1674 while the Marathas were engaged with Bijapuri's in Panhala region, Diler Khan tried to descend into the Konkan and create a diversion. This attempt was foiled by Shivaji and Diler Khan had to withdraw having lost 1000 Pathans killed.

24. Having defeated both the Mughals and Bijapuris and finding both his enemies peoccupied, one with uprising in the North-West and the other with internal squabbles, Shivaji considered this an opportune moment to coronate himself. Coronation was a necessary formality to give him the legal and formal status of an Independent Sovereign. Shivaji's coronation took place on 6th June 1674 and was one of the most fabulous events of that time. A magnificent throne of gold and other precious gems and a richly embroidered canopy were made for the occasion. His mother, Jijabai was alive to see her son at the height of his glory. She died a few days after the coronation.

Karnatak Campaign and After

25. Shivaji had set his eyes on the rich Karnatak Coast for some time and was waiting for a suitable opportunity to undertake a campaign in that theatre. Mughal camp of Padgaon was plundered in July 1674 and all tents were burnt. The Marathas carried away booty worth one crore rupees as also 200 fine horses. Padgaon raid was followed

by other raids into the Deccan plateau. Shivaji also wanted truce with the Mughals so that he could conduct operations on the Kanara Coast. While negotiations were being carried out with the Mughal, Shivaji marched into the Konkan with force of 30,000. Shivaji's navy joined in the siege and intercepted Portgugese ships carrying rations, fodder and gunpowder to the besiged garrison. Fort fell to repeated Maratha attacks on 6th May 1675. Shivaji also captured Karwar, Aukola and Shiveshwar and annexed the entire coast except the enclaves held by European traders. A treaty of friendship was signed between Shivaji and Adil Shah of Bijapur whereby Krishna was recognized as the boundary between the two kingdoms. In December 1676 a treaty of friendship was signed with Mughals.

26. Shivaji was now ready to proceed on his long cherished campaign to the Karnatak Coast in the South. This was to be his longest and greatest campaign. To find finance for this campaign, Shivaji chose to seek the assistance of Abdul Hasan Qutb Shah of Golconda. Bijapuri Karnatak was to be conquered in the name of the Sultan of Golconda and for his efforts Shivaji was to get all the spoils of war and the territory in the uplands of Mysore. Shivaji headed for the Karnatak via Kurnool, Maratha invasion was very different. No temples were being desecrated, nor any idols were being broken. Instead the King was halting en route at important places of pilgrimage like Srisailam and Tirupati to worship and distribute alms to the Brahmans.

27. Jinji surrendered to Shivaji without a fight. Shivaji next proceeded to Vellore. After fourteen months of heroic defence the garrison ultimately surrendered to the Marathas on 22 July 1678. From Vellore, Shivaji proceeded further South to deal with Sher Khan Lodi. Sher Khan fled first to the fort of Tiruvadi and from there escaped to another fort at Bonagiratam. The Marathas now systematically started capturing one fort after another and ultimately on 5th July 1677 Sher Khan made terms with Shivaji giving up all his territory. In August 1677 Shivaji captured the entire Bijapuri territory North of Cauvery covering an area of 10000 square miles. Shivaji was back in Panhala by February 1678. He rested for some time at Panhala and in June he reached his captal, Rajgad. As 1679 drew to a close, Shivaji's men were also drawn into a naval battle, first with the English then with the Siddi Janjira.

28. The events of 1679 had showed that Shivaji had become invincible on land. Even the greatest military land power on the sub-continent had to yield before him. His superiority at sea was not so complete. Although his forces could defy the English and force them to give up their aggressive posture against Khanderi and Underi. Against this backdrop of events of 1679 was ushered 1680. And this was the year in which the Chhatrapati's health began to falter. Worn out with constant campaigning of over thirty years, Shivaji's health deteriorated. On 23 March 1680 he fell seriously ill at Raigad, suffering from fever and blood dysentery. Twelve days later at noon on Sunday the 4th April 1680, he breathed his last. Thus ended the scintillating career of this great Indian, whose memory was to guide and inspire his countrymen for centuries to come.

Shivaji as Military Leader

29 The achievements of the neglected son of the exiled jagirdar of Pune and his rise culminating in his becoming of Chattrapati is fascinating. A study of his life clearly brings out that he was by all standards, a great and unique figure of Indian history. There

have been few insurgent leaders in the history of mankind who can match his genius as a guerilla captain.

30. Few military leaders have led their armies by their personal example to the same extent as Shivaji. He enforced strict discipline and set a personal example before his men. Unlike the Mughal and other armies of that time, he did not permit woman or ostentatious equipage to accompany his army in any campaign. He himself set the pace in this regard. An English visitor to his camp was struck by his austere living and has left a record of it. He noted that there were only two tents in the camps one of the King and the other of his Minister. An army unencumbered with heavy baggage obviously achieves greater mobility and this was a major factor contributing to Shivaji's success.

31. Another factor that helped Shivaji to maintain discipline in his army was the system of regular payment to soldiers which was rigidly enforced by him. Their pay was not allowed to fall in arrears as was the practice in other contemporary armies. No soldier, irrespective of his rank was allowed to retain any booty. It had to be surrendered to the State. Discipline was also enforced through an efficient organization of the army with clearly defined chains of command and making promotions on the basis of merit. The system of granting hereditary military rank was discontinued.

32. Shivaji realised the importance of the infantry in battle. This was remarkable because in all contemporary armies of that time infantry was no more than a "ragtag force" which used to be ill-trained and ill-equipped. They used to be like pioneers or militia who carried loads and performed other such duties. The real fighting in battle was the prerogative of the cavalry .Shivaji was quick to perceive the fallacy of such an approach particularly for fighting on the hills. He trained his Mavle hillmen into an efficient and disciplined infantry. The infantry was organized in sections of ten , each under a Naik, a Havildar commanded five sections and a Jumledar had three Havildars under him. There was one Hazari in charge of ten Jumledars and a Panch Hazari commanded 5,000 troops. The cavalry was also similarly organized with a little variation. There were two types of soldiery in the cavalry - the Bagirs who were provided horses and equipment by the state and Shiledars who brought their own horses and saddlery.The latter received higher rates of pay. A Havildar commanded 25 horses, a Jumledar five Havildar, a Subedar ten Jumledars and a Punch Hazari had ten Subedars under him. Although Shivaji's army also had an artillery arm, it was not so well organized. The technique of manufacturing ordnance pieces had not been developed and he depended more upon captured guns or getting guns from European traders for equipping his army.

33. Shivaji had a keen eye for ground and he fully appreciated military realities. He knew that he could not match the well equipped and large Mughal armies in the open. He, therefore generally avoided fighting pitched battles with his enemies on the plains. He realized that his forte lay in the mobility of his army, in achieving surprise and in fighting in mountainous terrain. He fully exploited these aspects in all his campaigns . Travelling light and hardened by continuous training and fighting, his army could advance with lightning speed. His sudden attack of Baji Ghorpade at Mudhol or his fleeting raids to Surat and other parts of Mughal possessions were good examples of the mobility achieved by his army. He fully realized the value of surprise in battle . He repeatedly succeeded in surprising his enemy. His legendary assault of Sinhgah across the Donagiri precipice or the Maratha attack on the camp of the Mughal Viceroy at Padgaon showed

how Shivaji could achieve success by surprising his enemy. The annihilation of Afzal Khan's army in the narrow Koyna Valley and the defeat of Kartalab Khan in the Ampa Valley was achieved not only through surprise but by the masterly use of ground . It may also be recalled that he was always prepared to stake his personal safety on the battlefield and repeatedly faced grave risks. His decision to have a personal encounter with Afzal Khan or to personally raid the living quarters of the Mughal Viceroy , Shaista Khan show the extent to which he was prepared to go.

34. Like all great generals, Shivaji always exploited success. Victory in battle was followed up by a vigorous pursuit. Thus after the battle of Pratapgad where he defeated Afzal Khan's forces, he launched a pursuit to Bijapur territory capturing Kolhapur. Similarly at Tiruvadi his pursuit turned the retreat of Sher Khan Lodi into a rout.

35. Shivaji's strategy was based on securing a chain of forts in the hills to provide security for his operations. From the firm base provided by these forts, he used to sally out for raids into enemy territory. When operating against his enemy he generally adopted the strategy of indirect approach. Instead of going directly for enemy's main strength, he preferred to attack where the enemy was weak. In 1671 he forced Diler khan and Badadur Khan to withdraw from Pune on account of the success of his army against the Mughals in the North. Similarly in 1679, be relieved the pressure on Bijapur and forced Diler Khan to lift the siege by plundering Jalna and other Mughal possessions.

36. While dealing with enemy forts, Shivaji preferred not to lay long sieges. The sieges of Phonda in 1675 or of Vellore in 1677 lasting fourteen months were exceptions . He normally captured forts through surprise night attacks as at Singhgarh in 1670 or Panhala in 1673. Another method often employed by him was to secure forts through bribing the enemy fort commanders. This process started with his securing of Torna in 1646 and continued almost throughout his career.

37. There is no doubt that Shivaji was a great military leader as he relied primarily on hit and run tactics, his fame to military greatness rests essentially in his success as a guerilla leader. His exemplary exploits as a guerilla captain have remained unique in the history of mankind.

MAHARANA PRATAP

Introduction

1. Maharana Pratap was born on May 9th 1540 in Kumbhalgarh, Rajasthan. His father was Maharana Udai Singh II and his mother was Rani Jeevant Kanwar. Maharana Udai Singh II ruled the kingdom of Mewar, with his capital at Chittor. Maharana Pratap was the eldest of twenty-five sons and hence given the title of Crown Prince. He was destined to be the 54th ruler of Mewar, in the line of the Sisodiya Rajputs.

Ascending the Throne

2. In 1567, when Crown Prince Pratap Singh was only 27, Chittor was surrounded by the Mughal forces of Emperor Akbar. Maharana Udai Singh II decided to leave Chittor and move his family to Gogunda, rather than capitulate to the Mughals. The young Pratap Singh wanted to stay back and fight the Mughals but the elders intervened

and convinced him to leave Chittor, oblivious of the fact that this move from Chittor was going to create history for all times to come.

3. In Gogunda, Maharana Udai Singh II and his nobles set up a temporary government of the kindom of Mewar. In 1572, the Maharana passed away, leaving the way for Crown Prince Pratap Singh to become the Maharana. However, in his later years, the late Maharana Udai Singh II had fallen under the influence of his favorite queen, Rani Bhatiyani, and had willed that her son Jagmal should ascend to the throne. Pratap Singh, in deference to his father's wishes, decided to let his half-brother Jagmal become the next king. However, knowing this to be disastrous for Mewar, the late Maharana's nobels, especially the Chundawat Rajputs, forced Jagmal to leave the throne to Pratap Singh. Unlike Bharat, Jagmal did not willingly give up the throne. He swore revenge and left for Ajmer, to join the armies of Akbar, where he was offered a jagir - the town of Jahazpur - in return for his help. Meanwhile, Crown Prince Pratap Singh became Maharana Pratap Singh I, 54th ruler of Mewar - founded in 568 AD by Guhil - in the line of the Sisodiya Rajputs.

Blockade of Mewar by Mughals

4. The year was 1572. Pratap Singh had just become the Maharana of Mewar and he had not been back in Chittor since 1567. His old fort and his home beckoned to him. The pain of his father's death, and the fact that his father had not been able to see Chittor again, troubled the young Maharana deeply. But he was not the only one troubled at this time. Akbar had control of Chittor but not the kingdom of Mewar. So long as the people of Mewar swore by their Maharana, Akbar could not realize his ambition of being the Jahanpanah of Hindustan. He had sent several emissaries to Mewar to get Maharana Pratap to agree to sign a treaty but the latter was only willing to sign a peace treaty whereby the sovereignty of Mewar would be intact. In the course of the year 1573, Akbar sent six diplomatic missions to Mewar to get Maharana Pratap to agree to the former's suzerainty but Maharana Pratap turned down each one of them. The last of these missions was headed by Raja Man Singh, the brother-in-law of Akbar himself. Maharana Pratap, angered that his fellow Rajput was aligned with someone who had forced the submission of all Rajputs, refused to meet Raja Man Singh. The lines were completely drawn now - Akbar understood that Maharana Pratap would never submit and he would have to use his troops against Mewar.

5. With the failure of efforts to negotiate a peace treaty in 1573, Akbar blockaded Mewar from the rest of the world and alienated Mewar's traditional allies, some of whom were Maharana Pratap's own kith and kin. Akbar then tried to turn the people of the all-important Chittor district against their king so they would not help Pratap. He appointed Kunwar Sagar Singh, a younger brother of Pratap, to rule the conquered territory, However, Sagar, regretting his own treachery, soon returned from Chittor, and committed suicide with a dagger in the Mughal Court. Sakta Singh, Pratap's younger brother now with the Mughal army, is said to have fled the Mughal court temporarily and warned his brother of Akbar’s actions.

Preparation for the War

6. In preparation for the inevitable war with the Mughals, Maharana Pratap altered his administration. He moved his capital to Kumbhalgarh, where he was born. He commanded his subjects to leave for the Aravali mountains and leave behind nothing for

the approaching enemy - the war would be fought in a mountain terrain which the Mewar army was used to but not the Mughals'. It is a testament to the young king's respect amongst his subjects that they obeyed him and left for the mountains. The Bhils of the Aravalis were completely behind him. The army of Mewar now raided Mughal trade caravans going from Delhi to Surat, on their way to Europe. A section of his army guarded the all important Haldighati Pass, the only way to get into Udaipur from the North.

7. Maharana Pratap himself undertook several penances, not because his finances forced him to do so, but because he wished to remind himself, and all his subjects, why they were undertaking this pain - to win back their freedom, their right to exist as they wished. He foreswore that he would eat from leaf-plates, would sleep on the floor and would not shave. In his self-inflicted state of penury, the Maharana lived in mud-huts made from mud and bamboo.

Battle of Haldighati

8. In 1576, the famous battle of Haldighati was fought with 20,000 Rajputs against a Mughal army of 80,000 men commanded by Raja Man Singh. The battle was fierce though indecisive, to the Mughal army's astonishment. Maharana Pratap's army was not defeated but Maharana Pratap was surrounded by Mughal soldiers. It is said that at this point, his estranged brother, Sakta Singh, appeared and saved the Rana's life. Another casualty of this war was Maharana Pratap's famous, and loyal, horse Chetak, who gave up his life trying to save his Maharana.

Subsequent Events

9. After this war, Akbar tried several times to take over Mewar, but failed each time. Maharana Pratap himself was keeping up his quest for taking Chittor back. However, the relentless attacks of the Mughal army had left his army weaker, and he barely had enough money to keep it going. At this time, one of his ministers, Bhama Shah, came and offered him all this wealth - a sum enabling Maharana Pratap to support an army of 25,000 for 12 years. It is said that before this generous gift from Bhama Shah, Maharana Pratap, anguished at the state of his subjects, was beginning to lose his spirit in fighting Akbar. In one incident that caused him extreme pain, his children's meal - bread made from grass - was stolen by a dog. It is said that this cut into Maharana Pratap's heart deeply. He began to have doubts about his resolute refusal to submit to the Mughals.

10. In one of these moments of self doubt - something each and every human being goes through - Maharana Pratap wrote to Akbar demanding "a mitigation of his hardship". Overjoyed at this indication of his valiant foe's submission, Akbar commanded public rejoicing, and showed the letter to a literate Rajput at his Court, Prince Prithiraj. Prithiraj was also a gallant warrior and a longtime admirer of the brave Maharana Pratap Singh. He was astonished and grieved by Maharana Pratap's decision, and told Akbar the note was the forgery of some foe to defame the Mewar king. "I know him well", he explained, "and he would never submit to your terms". He requested and obtained Akbar's permission to send a letter to Pratap, ostensibly to ascertain the fact of his submission, but really with a view to prevent it. The now-famous letter led to Pratap reversing his decision and not submitting to the Mughals, as was his initial but reluctant intention.

Freedom of Mewar

11. After 1587, Akbar relinquished his obsessive pursuit of Maharana Pratap and took his battles into Punjab and India's Northwest Frontier. Thus for the last ten years of his life, Maharana Pratap ruled in relative peace and eventually freed most of Mewar, including Udaipur and Kumbhalgarh, but not Chittor. He swore his successor, Crown Prince Amar Singh to eternal conflict against the foes of his country's independence. Maharana Pratap was never able to win back Chittor but he never gave up fighting to win it back.

Maharana's Last Days.

12. In January 1597, Maharana Pratap Singh I, Mewar's greatest hero, was seriously injured in a hunting accident. He left his body at Chavand, aged 56, on January 29, 1597. He died fighting for his nation, for his people, and most importantly for his honour.

Maharana's Other Side

13. Maharana Pratap displayed great love for Arts and became a patron of the Arts. During his reign Padmavat Charita and the poems of Dursa Ahada were written. Palaces at Ubheshwar, Kamal Nath and Chavand bear testimony to his love of architecture. These buildings, built in the dense hilly forest have walls adorned with military-style architecture

AKBAR THE GREAT

Introduction

1. Jalaluddin Muhammad Akbar also known as Akbar the Great (Akbar-e-Azam) (October 15th , 1542-October 27th , 1605) was the son of Humayun whom he succeeded to become ruler of the Mughal Empire from 1556 till 1605. Akbar was born at Umarkot in Sind. He was brought up in the rugged country of Afghanistan rather than in the splendor of the Persian court by his uncle Askari and his wife. Humayun had been drive into exile following the decisive battle by the Afghan leader Sher Saha.

Early Years

2. Akbar was born at Umarkot in Sind to the Mughal Emperor Humayun and his first wife, Hamida Banu Begum on October 15th, 1542. In 1540, Humayun had been driven into exile following decisive battles by the Afghan leader Sher Shah. Akbar did not go to Persia with his parents, and was raised for a time instead by his uncle Askari and his wife in the rugged country of Afghanistan rather than in the splendor of the Persian court. He spent his youth learning to hunt, run and fight, but he never learned to read or write, the sole exception in Babur's line. Nonetheless, Akbar matured into a well-informed ruler, with refined tastes in the arts, architecture and music, a love for literature, and a breadth of vision that tolerated other opinions.

3. Following the chaos over the succession of Islam Shah (Sher Shah's son), Humayun reconquered Delhi in 1555. Only a few months later, Humayun died from an

accident. Akbar succeeded his father on February 14th, 1556 and was proclaimed "Shahanshah" (Persian for "King of Kings").

Clash with Hemu

4. Early into Akbar's career, he decided that he should eliminate the threat of Sher Shah's dynasty, and decided to lead an army against the strongest of the three, Sikandar Shah Suri, in the Punjab. He left the city of Delhi under the regency of Tardi Beg Khan. Sikandar Shah Suri presented no major concern for Akbar, and withdrew from territory as Akbar approached; however, back in Delhi Hemu, a low-caste Hindu warrior, succeeded in launching a surprise attack on the unprepared Tardi Beg Khan and appointed himself ruler.

5. Word of the capitulation of Delhi spread quickly to the new Mughal ruler, and he was advised to withdraw to Kabul, which was relatively secure. However, Bairam Khan urged Akbar to fight the invaders and reclaim the capital. On the march forward, he was joined by Tardi Beg and his retreating troops, who also urged him to retreat to Kabul, but Akbar refused; later, Bairam Khan had the former regent executed for cowardice.

6. On November 5, 1556 Akbar's Mughal army defeated the numerically superior forces of General Hemu at the Second Battle of Panipat, fifty miles north of Delhi. The victory also left Akbar with over 1,500 War Elephants which he promptly used to re-engage Sikhander Shah at the siege of Mankot. Sikhander surrendered and was as such spared from death, and lived the last remaining two years of his life on a large estate granted to him by Akbar. In 1557 the only other threat to Akbars rule, Adil Shah, brother of Sikhander, died during a battle in Bengal. Thus, by the time Akbar was 15 his rule over Hindustan was secured.

Bairam Khan

7. Akbar was only 13 years old when he became emperor, and so his general ruled on his behalf till he came of age. The regency belonged to Bairam Khan, a Shia Turkoman noble and who successfully dealt with pretenders to the throne and improved the discipline of the Mughal armies. He ensured power was centralised and was able to expand the empires boundries with orders from the capital. These moves helped to consolidate Mughal power in the newly recovered empire.

8. However, during Bairam Khan's Hajj journey, he was encoutered by an Afghan whose father had been killed five years earlier in a battle led by Bairam. The Afgan saw a chance to reap vengeance, and promptly stabbed Bairam, who died on January 31st, 1561.

Restoration

9. While previous Muslim rulers, in particular the Mughal founder Babur, allowed freedom of worship for Hindus and other religious groups, Akbar engaged in a policy of actively encouraging members of the varying religious groups to enter his government. In one instance, he persuaded the Kacchwaha Rajput rulers of Amber(modern day Jaipur) to a matrimonial alliance: The King of Amber's daughter, Hira Kunwari, became Akbar's queen. She took the name Mariam-uz-Zamani was the mother of Prince Salim, who later became the Mughal emperor Jahangir. Further, while other Muslim rulers had married

Hindu wives, he was the first one to allow to fully practice their religion, not just without hinderance but with everything they needed in that regard. During his reign more Hindus than in any other Mughal ruler, or in any previous Indian administration, were employed in the Civil Service.

10. The other Rajput kingdoms also married daughters to Akbar, until only two Rajput clans remained against him, the Sisodiyas of Mewar and Hadas (Chauhans) of Ranthambore. Entering into an alliance with these groups helped to secure Akbars control, as for the next 100 years Rajput soldiers served on behalf of the Mughal empire. He went on to expand the Mughal empire to include Malwa (1562), Gujarat (1572), Bengal (1574), Kabul (1581), Kashmir (1586), and Kandesh (1601), among others. Akbar installed a governor over each of the conquered provinces, under his authority.

11. Akbar did not want to have his court tied too closely to the city of Delhi. He ordered the court move to Fatehpur Sikri, near Agra, but when this site proved untenable, he set up a roaming camp that let him keep a close eye on what was happening throughout the empire. He tried to develop and encourage commerce. He had the land accurately surveyed for the purpose of correctly evaluating taxation; and he gave strict commands to prevent extortion on the part of the tax gatherers.

Personality of Akbar

12. Akbar is said to have been a benevolent and wise ruler, a man of new ideas, and a sound judge of character. As a ruler, he was able to win the love and reverence of his subjects.

13. According to Abul Fazal, his chief adviser, Akbar had a commanding personality. He was fearless in the chase as well as in the field of battle, and, "like Alexander of Macedon, was always ready to risk his life, regardless of political consequences". He often plunged his horse into the full-flooded river during the rainy seasons and safely crossed over to the other side. Though a mighty conqueror, he did not usually indulge in cruelty. He is said to be affectionate towards his relatives. He pardoned his brother Hakim, who was a repented rebel. However, on some rare occasions, he dealt cruelly with the offenders, as was shown by his behavior towards his maternal uncle, Muazzam, and his foster-brother, Adam Khan. He is said to have been extremely moderate in his diet. According to records, he was fond of fruits and had little liking for meat, which he ceased to take altogether in his later years.

Views on Religion

14. At the time of Akbar's rule, the Mughal Empire included both Hindus and Muslims. Profound differences separate the Islamic and Hindu faith. When Akbar commenced his rule, a majority of the subjects in the Mughal Empire were Hindus. However, the rulers of the empire were almost exclusively Muslim. In this highly polarized society, Akbar fostered tolerance for all religions. He not only appointed Hindus to high posts, but also tried to remove all distinctions between the Muslims and non-Muslims. He abolished the pilgrim tax in the eighth year and the jizya in the ninth year of his reign, and inaugurated a policy of universal toleration. He also enjoyed a good relationship with the Catholic Church, who routinely sent Jesuit priests to debate.

15. Akbar built a building called Ibadat Khana (House of Worship), where he encouraged religious debate. Akbar encouraged Hindus, Catholics and even atheists to participate. He tried to reconcile the differences of both religions by creating a new faith called the Din-i-Ilahi ("Faith of the Divine"), which incorporated both versions of Islamic Sufism and 'bhakti' or devotional cults of Hinduism. Even some elements of Christianity - like crosses, Zorosastrianism- fire worship and Jainism were amalgamated into the new religion.

Patron of the Art and Literature

16. Although Akbar was illiterate, he had a fine literary taste. He took interest in philosophy, theology, history, and politics. He maintained a library full of books on various subjects, and was fond of the society of scholars, poets and philosophers, who read books to him aloud, and thus enabled him to be conversant with Sufi, Christian, Zoroastrian, Hindu and Jain literature. He used to invite scholars from different religions for discussions with him.

17. Akbar also possessed a fair taste of art, architecture and mechanical works. Many pieces, including the magnificent Hamzanama, was produced under Akbar. Akbar is also credited with many inventions and improvements in the manufacture of matchlocks. He erected a vast administrative machinery on a comprehensive plan.

Navratnas

18 As with many Indian rulers Akbar's court had *Navaratnas* ("Nine Jewels"), a term denoting the group of nine extraordinary people. Akbar's Navratnas were:

- Abul-Fazel - Akbars's chief advisor and author of Akbarnama, Akbar's biography Faizi
- Mian Tansen - known for his voice and music
- Birbal - known for great wit
- Raja Todar Mal
- Raja Man Singh
- Abdul Rahim Khan-I-Khana
- Fakir Aziao-Din
- Mullah Do Piaza

Final Years

19. The last few years of Akbar's reign were troubled by the misconduct of his sons. Two of them died in their youth, the victims of intemperance. The third, Salim, later known as Emperor Jahangir, was frequently in rebellion against his father. Asirgarh, a fort in the Deccan, proved to be the last conquest of Akbar, taken in 1599 as he proceeded north to face his son's rebellion. Reportedly, Akbar keenly felt these calamities, and they may even have affected his health and hastened his death, which occurred in Agra. His body was interned in a magnificent mausoleum at Sikandra, near Agra.

SECTION-2

FAMOUS BATTLES /WARS OF INDIA

INDO PAK WAR 1971

EASTERN SECTOR

Introduction

1. 1971 war was thrust upon us by an arrogant and aggressive neighbour who bullied, terrorised, and bled it's own constituent partner in the East to the extent that ten million refugees fled to India resulting in a situation that was unsustainable to India politically, economically and militarily .

2. When repeated attempts to find a reasonable solution with Pakistan failed, India sought the assistance of the international community to help Pakistan to come to it's senses. Unfortunately the world was indifferent and Pakistan's brutal atrocities against it's own citizen continued unchecked . Instead, it was able to drum up support from China and the USA. The rest of the World looked the other way stating that this was an internal matter of Pakistan.

3. For India however, it was an outrage against humanity and also a matter of it's own survival. The influx of 10 million refugees with the attendant problems of housing, food, water, medical care, hygiene and sanitation imposed an unsustainable burden on her people. It also had-dangerous security and law and order implications.

4. India stood alone in it's predicament against the studied indifference of an essentially partisan world and the malevolent machinations of an insolent and high-handed neighbour. Immense pressure by an agitated public began to build-up demanding immediate action against Pakistan-but the time was not ripe. There were factors against early intervention-political, military and climatic that demanded a self- imposed delay.

5. A proper appreciation was carried out that took into account the state of arms and ammunition, equipment, training, commerce and industry, road and rail communication, world opinion, climate, weather, morale, enemy options and likely course of action. All this indicated a particular time-table for war that would be favourable to India. Indian leaders held their hand and adhered to this time-frame and used the intervening period to gear up for the expected Pakistani offensive. When it did come on the 3rd of Dec 1971, the nation was well prepared.

Origin of the Conflict

6. Ever since the creation of Pakistan, political power had always been wielded by West Pakistan and most of the resources of the entire country had been used for the benefit of West Pakistan.

7. In the elections held on 07 Dec 1970, the Awami Leage led by Sheikh Mujibur – Rahman won against Bhutto's People's Party and it thus emerged as the majority party. Bhutto had no intention to see political power slipping from his hands and threatened to plunge Pakistan into a civil war if Mujib was allowed to form the government. Yahya Khan the President of Pakistan also did not relish the idea of power being transferred to East Pakistan, and readily fell in with Bhutto's wishes and postponed the Assembly session. When this happened, East Pakistanis who had all along been treated as inferior citizens of the State felt cheated.

8. The infuriated Bengalis rallied round Mujib and the functioning of the government in the Eastern province came to a halt. All government and semi-government offices, central and provincial, were closed, students and agitated crowds took the law into their own hands and indulged in open plunder of non-Bengali property and killing of non-Bengalis.

9. This in fact was an outburst of the simmering discontent that prevailed in the Eastern Wing of Pakistan. Except for religion, there was nothing common between the two wings. The West had exploited the Eastern wing's economic resources for the benefit of the Western wing. The West took 70% of foreign aid the country received and 70% of it's imports, and monopolized 85% and 90% of all posts in the bureaucracy and the army respectively. No attention was paid to protecting and improving living conditions of disaster prone East Pakistan.

10. By 03 Mar 1971, Mujib's writ ran wide in East Pakistan. Curfew had been imposed in Dacca on 02 Mar 1971. Troops moved into the city and resorted to firing, causing casualities. Mujib at a big rally asked the army to go back to barracks. Lt Gen Sahabzada Yakub Khan the Governor General and Marshal Law Administrator, withdrew the troops. This was hailed as a victory for Mujib. At a huge rally Mujib made his four demands. These were:-

(a) Withdrawal of martial law.

(b) Return of troops to barracks.

(c) Enquiry into army killings.

(d) Transfer of power to duly elected representatives of the people.

11. It seemed that Mujib and his associates had already become the rulers of East Pakistan. Pakistan however did not take it lying down. Yakub Khan was recalled and replaced by Lt Gen Tikka Khan who was later to become notorious as the "Butcher of Bangla Desh".

12. Yahya Khan did not accept Mujib's four demands, and the civil disobedience movement had turned the situation out of control. Negotiations between Yahya Khan and Mujib dragged on but led nowhere. It appeared that these were delaying tactics to permit the induction of additional troops for the final crackdown.

13. Negotiations between Yahya Khan and Mujib dragged on, but led nowhere. It appeared that these were delaying tactics to permit the induction of additional troops for the final crack-down.

14. On 25 March Tikka Khan launched 'Operation Blitz' against the resistance. Tikka Khan did not hesitate to use artillery and machine guns against unarmed civilians Operation blitz resulted in a mass exodus of terrified civilians pouring into India which finally totalled to more than 10 million refugees that became India's responsibility..

15. Five East Pakistan Rifle (EPR) battalions revolted and they organized the Mujahids, the Ansars, the police and ex-sevicemen to resist West Pakistan army rule. Overall coordination however was lacking. EPR detachments concentrated on attacking Pakistani border outposts and surrounding isolated garrisons. Tikka Khan got two more divisions flown in via Sri lanka.

The Indian Response

16. The exodus of terrified refugees to India however continued unabated. The burden of refugee relief was estimated at about half of India's defence budget. Besides this intolerable economic burden, it created grave security problems. These consequences-economic, political, and military were unsustainable for India.

17. Boarder incidents multiplied and Pakistani troops made forays into Indian territory against Mukti Bahini forces who had their bases in India. As these clashes grew in number and intensity, our boarder posts had to be reinforced by the army. This brought Pakistani and Indian Army units in direct confrontation with each other. By end Oct 1971 these boarder clashes became more violent. Both sides strengthened their positions on the borders in the East.

18. India decided to call upon the world powers to persuade Pakistan to come to terms with Mujib and install the legitimate government in Dacca so that the refugees could go back. The USA however maintained that the issue was an internal matter of Pakistan & instead counseled restraint. President Yahya Khan became more arrogant & declared "War with India is very near, and in case of war, Pakistan will not be alone". He was banking on support from the USA, China and the Muslim Middle-East countries. India signed a treaty of Peace, Friendship and Cooperation with the USSR in August 1971.

19. On 23 Oct 1971, Prime Minister Indira Gandhi in a last minute attempt to avert war proceeded to France, West Gemany, Belgium, the UK, the USA and Australia. She pointed out to them the genocide being carried out by Pakistan in it's Eastern constituent, the unbearable burden that the refugees had imposed on India and urged them to advise President Yahya Khan to settle with Mujib. This they could not, or would not do. Meanwhile pressure by the opposition, the public and the press was building up for immediate military action against Pakistan.

Reservation by the Army Chief

20. Gen Manekshaw has his own reservations about early action. He was against half-baked, inconclusive involvement and had the moral courage to withstand pressures that went against his convictions. His reasons were :-

(a) A reorientation of operation plans needed to be carried out along with necessary administrative infrastructure and backing.

(b) The quantum of force needed for this operation would take time to collect and by the time this was done, the monsoon would be imminent and that left an impossibly tight schedule for the operations.

(c) There was a shortage of reserves of armoured and specialized vehicles and of bridging equipment.

(d) Climate and weather imposed their own restrictions. Adequate time was not available to complete operations before onset of the monsoons. It was desirable to time our operations in such a manner that China would not be able to help Pakistan even if wanted to. This was only possible after the snow had set in and the passes in the Himalayan border regions would then be closed.

21. General Manekshaw felt that December would be the best for launching of an offensive by either country.

Options Open to India

22. By March 71 it had become apparent that war with Pakistan was a distinct possibility. The first major consideration was choosing the time of the offensive-should such a choice be available. One choice was to launch an offensive straight away and relieve the misery of million of East Pakistanis, or to launch the offensive after the monsoon. The former option had the advantage of putting an end to the suffering of the citizens of East Pakistan-but the big disadvantage was that we might be caught by the monsoons and get caught and bogged down in the riverine delta region of East Pakistan without being able to achieve our objectives. Also, in summer, the mountain passes leading from Tibet into India were open and that would permit Chinese intervention. It would also permit easy infiltration from POK into the higher reaches of Kashmir.

23. Gen Manekshaw felt that the Indian army was not quite ready and that there were much better chances of success if we could wait till December both from the point of view of better preparedness and also because speedier operations were possible in December well after the monsoons.

24. Other than the consideration of time , the following options were open to India :-

(a) To attack on both fronts simultaneously.

(b) To carry out a holding attack in the West and to attack in the East.

(c) To encourage and assist the Mukti Bahini in East Bengal in their guerilla warfare against West Pakistan, thus slowly drawing more and more Pakistani troops to that region, and then to hold in the East and carry out the main offensive in the West.

25. The aim of the government was to create conditions by political pressure and persuasion if possible for the installation of the legitimate government in East Pakistan and for the 10 million refugees to return home. Considering the above it was therefore decided to hold in the West and to carry out the main offensive in the East.

The Mukti Bahini

26. By the end of Apr 1971, most of the revolting Bengali troops had been flushed out into India. For all practical purpose the insurgency that started on 26 Mar had virtually died and something was needed to be done to bring it back to life again.

27. **Causes of Failure of the Insurgency**. Although the rebellion and consequent insurgency by the East Pakistani military elements of the Pakistani army started well, the revolt did not achieve results. The failure of the insurgency could be attributed to the following causes :-

(a) The revolt was not properly planned. There was total lack of coordination in the rebel's operations.

(b) The intensity of Operation Blitz demoralized the Mukti Bahini.

(c) The rebels instead of going in for guerilla warfare, chose to fight pitched battles. In consequence they suffered heavy casualties.

(d) Operations were conducted by comparatively junior officers who failed to plan systematically for long term results.

(e) Shortage of junior leaders especially in JCO and NCO ranks.

(f) Failure of the organizers to draw up and implement an integrated plan laying down aims, objectives and proper priorities.

(g) No effort was made to establish a countrywide and regional system of command and control by nominating leaders and defining areas of responsibility.

(h) No link had been established between the military elements and clandestine militant organizations raised by various political parties during the period of political uncertainty. As a result the revolt lacked a strong political base. It had no organized infrastructure to sustain a prolonged insurgency.

28. **Organising the Mukti Bahini**. Two types of support were thought of at this stage by the Indian Government:-

(a) A limited supply of arms together with facilities for training in guerilla warfare.

(b) **Diplomatic Support**. Although the Indian Government had not yet recognized the provisional government of Bangladesh, this government was functioning from Mujib Nagar near Calcutta.

29. On 14 Apr, the provisional government of Bangladesh appointed Col Osmani Commander-in-Chief of it's armed forces. On 30 Apr the Indian Army was asked to take over the guidance of all aspects of guerilla warfare for the Mukti Bahini.

30. **Preparation for War.** Important issues that were attended to by the Army Chief in preparation for an Offensive by Pakistan:-

(a) Reserve holdings of stockpiles of equipment and ammunition.

(b) Making units and formations fit for war.

(c) Rationalisation of Equipment.

(d) Rationalisation of location of ammunition and equipment.

(e) Critical shortages in unit holdings.

(f) Unit turnovers.

(g) Manpower hortage.

(h) Leave.

(j) Courses.

(k) Command of Units.

(l) TA Units.

(m) Road communication.

(n) Communication facilities.

(o) Telegraph.

(p) Mobilisation Schemes.

(q) Movement of strike corps.

31. **Operations in Support of the Mukti Bahini.** In view of the training being given to the Mukti Bahini and Indian support to Bangladeshi guerillas, Niazi strengthened his border defences at the expense of his depth areas and his reserves.

32. Niazi apparently did not anticipate a major attack from India and felt that Indian efforts would be confined to capturing a large chunk of territory adjacent to it's own base for establishing a Bangladesh government. Niazi therefore surrendered depth for strength of forward defence. He tried to seal the border by establishing a large number of BOP. Troops meant for depth defences of Dacca, and reserves were strung out on border posts. This was a fatal mistake made by him but eminently suitable to our plans.

33. Mukti Bahini activities against these border outpost increased and Niazi reacted to them violently. He kept telling his troops that not an inch of territory would be allowed to be lost. Gradually the whole border became alive against the nibbling attacks by the Mukti Bahini. By the middle of November Pakistani troops were provoked to such an extent that they began crossing into India.

34. The Mukti Bahini operated inside Pakistan territory supported by Indian artillery deployed on our side of the border. The biggest action was fought at Bayra in the Jessore Sector North East of Calcutta. Indian troops pursued Pakistani intruders across the border. A fierce battle took place near the village of Garibpur

about 5 Km inside Pakistan territory in which Pakistan lost 13 Chaffee tanks and three saber-jets against Indian troops loss of 6 tanks.

35. Crossing over of Pakistani troops into India gave licence to Indian troops to likewise cross over into East Pakistan. Pakistan BOPs and strong points were captured all along the border. Whenever the Indian troops attacked fortified positions the Pakistani troops fought back. It was increasingly realized that for speedy victory, by-passing of fortified positions was imperative.

36. Mukti Bahini operations helped the Indian army which got to know the Pakistani pattern of fighting. It also helped in the following ways:-

(a) In some instances the initial ingress helped to cross start lines well ahead of the opening of hostilities.

(b) By passing the Pakistani defensive positions completely threw Niazi's forward posture off balance, and he was never able to recover from it.

37. Yahya Khan opted for all out war against India . On 03 Dec 1971 Pakistani aircraft attacked Indian airfields at Srinagar, Pathankot, Amritsar, Halwara, Ambala, Sirsa, Faridkot, Jamnagar, Jodhpur and Agra.

The Battle for Dacca

38. From 03 Dec 1971, when Yahya Khan formally declared war on India by attacking our airfields in the Western Sector , the situation in East Pakistan was already getting out of control. By 07 Dec 1971, the Indian Army was well beyond it's planned start lines and in some Sectors nearly half way towards it's objectives. In the North Western Sector Pirganj was captured and Bogra was being threatened. In the South Western Sector Jessore and Jhenida had been captured. In the Central Sector Indian Troops had reached the line of the local Brahmaputra river. In the Eastern Sector, a heliborne operation had been mounted on Sylhet, Ashuganj was being threatened and Mudaffarganj had been captured. Thereafter the situation deteriorated badly in all sectors with the Indian army moving with great speed and determination towards it's given objectives. The Army Chief had been repeatedly calling upon Pakistani forces to surrender. The Governor of East Pakistan had been sending messages to Yahya Khan asking for a Cease-Fire and a political settlement but nothing happened. Yahya kept assuring Niazi that the Chinese and the USA would intervene on their behalf. Although nothing happened in the North as far as the Chinese were concerned, on 13 Dec information was received that a Task Force of the United States Seventh fleet had entered the Bay of Bengal. On 14 Dec, information was received that the Governer was going to hold an important meeting. Indian Air Force attacked Government House the same day and rocketed the roof of the building. The Governor resigned and went over to the International Red Cross.

39. On the military side, the Pakistanis had got into a panic, Maj Gen Jamshed who was responsible for the security of Dacca was ordered to speedly organize the defence of Dacca Bowl, the reason for this was that no order had been given and no action taken to organise a planned and systematic withdrawal. Thus when the crisis developed all the divisional commanders were either out of touch or refused to send any troops back for

fear of being intercepted and destroyed. Even Inf Bde which had been tasked with the defence of Dacca had broken up and only remnants were falling back. Pak tried to organize some semblance of a defence of Dacca by mustering soldiers belonging to different arms and services and rear parties in Dacca with all sorts of weapons from the Ordnance Depot. It was however a hastily organized affair and lacked cohesion, and leadership. The morale of it's troops was at it's lowest ebb. Indian Forces by this time were on on the outskirts of Dacca in all sectors.

40. Early in the morning of 16 Dec, a message was intercepted from Niazi to his commanders asking them to cease fire. Gen Nagra exploited the situation by sending a message to Niazi asking him to surrender. It was learnt that Yahya had instructed Niazi to obtain a ceasefire and Niazi in turn had approached the American Consul General in Dacca to arrange the Cease Fire on Dec 15. The USA in turn approached the Indian Government for the Cease Fire on the same day.

41. On the same day, 16 Dec 1971 General Manekshaw conveyed the Indian decision to the Pakistani High Command that cease fire would be acceptable provided the Pakistani Army in the East surrendered to the Indian Forces.

42. Niazi agreed to immediate Cease Fire. As decided by both sides, Indian troops entered Dacca on the morning of 16 Dec. Messages were sent by the Pakistani command at Dacca to all it's formations to surrender. At about 0430 PM General JS Aurora, GOC-in-C Eastern command took the surrender of the Pakistani Army from Gen Niazi on the Dacca Race Course. A total of over 90,000 troops with a large amount of weapons, ammunition and equipment surrendered to the Indian Army. The surrender brought to an end the tyranny of Pakistan over its Bengali consitutent and liberated it finally from it's military shakles giving birth to a new nation- Bangladesh.

Conclusion : War in the East

43. The most remarkable aspect of this campaign is the speed with which the Indian Army brought to a successful conclusion the campaign in East Pakistan fought across a land that was literally interspersed with a thousand rivers.

44. The Indian Armed Forces executed in the short span of 12 days an impossible task and decimated in most difficult terrain a formidable enemy taking 93,000 prisoners. Although the sympathy and support of the people of the world were with the people of Bangladesh and the people of India, the governments of these countries failed to even condemn the barbarous acts of a dehumanized Government of Pakistan.

45. Bangla Desh was liberated in 12 days, well before the American Task Force ordered by President Nixon and headed by the nuclear powered USS 'Enterprise' arrived in the Bay of Bengal. It however arrived too late to be of any assistance, moral or material, to their pampered protégé. The war was over, and Bangladesh was born.

Lessons Learnt-War in the East

46. **General**. There are always more lessons to learn from defeat than from victory. Victory engenders a feeling of complacency. This needs to be guarded against. The high level of leadership in the 1971 Indo-Pak war engendered a great feeling of confidence in

ourselves that encouraged certain leadership styles and functioning. These are discussed in following paragraphs.

47. **Unconventional and Unorthodox Tactics**. When the Indian Army was helping the Mukti Bahini in it's initial struggles against Pakistan, the army was forced to adopt unconventional and unorthodox tactics. The successes gained, encouraged leadership at all levels to adopt the unconventional and the unorthodox.

48. **Risk Taking**. The need to achieve decisive results in a short time frame was necessary because of the fear of international intervention. This prompted leaders at all levels to take calculated risks which paid off.

49. **Sound Administrative Infrastructure and Sound Planning** Without sound planning and a sound administrative infrastructure success in the war in the East would not have been possible.

50. **A Sound National Aim** For once we had a clear national aim which is the start point of all planning of war.

51. **Inter Service Cooperation** Although we did not have a Chief of Defence Staff or a Combined Service Headquarter the cooperation between the Services was of a high order.

52. **Civil Military Cooperation.** Cooperation between the Civil and the Military with Central and State Government and essential services like Railways, Telegraph, Docks and ports and Transport agencies was of a high order. This cooperation helped ensure flawless moves and communication.

53. **Good Handling of the Press** The press was well briefed and they behaved with a responsibility.

WAR IN THE WESTERN SECTOR

General

54. As the crisis in the East deepened , more and more Indian formations were moved there. For a long time the Western border lay unguarded and reserves for the Northern and North Eastern borders were depleted. A Pakistani attack at this time combined with a Chinese threat would have had very serious consequences.

55. To ensure this, India had to be careful not to give any reason to alarm Pakistan to launch a pre-emptive offensive in the West. For this reason , movement of troops was not permitted to the very end.

56. By the first week of November, forces in the western sector were in position and had completed their defences sufficiently to withstand any attack. On 03 Dec 1971, Yahya Khan opened hostilities by an air-strike at 5.40PM. against our air fields at Srinagar, Pathankot, Amritsar, Halwara, Ambala, Sirsa, and Faridkot in Western command, Jamnagar, Jodhpur and Uttarlai in Southern Command and Agra in Central Command.

Conduct of Operations

57. Till 1965, Pakistan believed that Indian reaction to any Pakistani military action in J & K which she claimed was disputed territory would be confined to J & K itself, and would not spill over. However, in 1965, when she mounted a divisional attack on Chhamb from Gujarat in Pakistan, India crossed the international Border and threatened Lahore, thereby indicating that India meant what she said that "J & K was an integral part of India and any threat to J & K was a threat to India". Conduct is discussed in succeeding paras very broadly section wise i.e. operation in J & K and Punjab.

58. **J & K** The state of J & K was divided into six sectors:-

(a) The Ladakh Sector.

(b) The Kargil Sector.

(c) The Kashmir Valley.

(d) The Rajauri Sector.

(e) The Chhamb Sector.

(f) The Jammu Sector.

59. **Ladakh Sector**. Partapur Headquarter had in 14 days advanced 22 kms and captured approximately 804 sq kms. A feat possibly un-equalled in the history of warfare, considering the appalling conditions under which these troops had to fight.

60. **Kargil Sector**. Kargil is a strategically important town located on the banks of the river Shingo, a tributary of the Indus, It is located on the road connecting Srinagar to leh. To ensure security of the road and to prevent infiltration both sides of the road are guarded by piquests on the high hills dominating the road. During the war all Pakistani posts that observed and dominated the Srinagar-Kargil-Leh road were eliminated.

61. **Kashmir Valley**. Some gains were made in Lippa Valley and all along the line of control Pakistani posts were captured.

62. **Rajauri Sector**. Pakistan's major offensive in Poonch was repulsed with heavy casualties and Indian Army was able to capture some of enemy's post.

63. **Chhamb Sector**. Partial success was achieved by Pakistanis in Chamb Sector

64. **Jammu Sector (Chicken's Neck Action)**. Chicken's Neck is the name given by our troops to a wedge of Pakistan territory between the Chenab and it's tributary close to Akhnur. It is an area that affords a good base for the enemy to launch attack. Indian army captured Chicken neck area by achieving total surprise. Enemy positions were bypassed and attacked from the rear.

65. **Operations in Punjab**.

(a) In Sial Kot Sector, our forces had broken through the enemy network of minefields and crossed Basantar River and were poised for further advance when ceasefire was declared.

(b) Enemy was thrown out of Dera Baba Nanak and Shejra Bulge and we gained territory North of Ravi. South of Ravi also positions of enemy were over run.

66. Thus, in beating back all Pakistani offensive in the West, Western Command played an important part in the collapse of Pakistan's military regime, and the Liberation of Bangladesh.

Lessons Learnt -War in the West

67. **Need for Integral Armour for Plains Divisions.** Use of armour 'en masse' can be very effective. Piece meal use should be avoided. It is imperative that plains infantry divisions have their own integrated armour.

68. **Co-Location of Headquarters**. It is desirable that Headquarters of Air Formations be located close to Army Formations for closer cooperation and better results in combined operations.

69. **Problems of Short Wars**. Short wars give great advantage to the side which attack first. It is always with the attacker who makes initial gains and waits for the Cease Fire to be in a better bargaining position to obtain political and military objectives. Our nation is always at a great disadvantage in this respect. The only way to minimise this aspect is to ensure adequate hard hitting mobile forces to quickly redress the situation and go on the offensive.

70. **Cease Fire**. In all Indo-Pak wars '48', '65' and '71' our Government has responded to Pakistani calls for cease-fire without properly assessing the military implications. Invariably Pakistan has gained over us in timing of Cease Fire and invariably we have lost by agreeing too early to such requests when the situation on ground needed a little more time to redress military imbalances.

71. **Intelligence.** The lack of coordination between various intelligence agencies has always been drawback in all conflicts. This also applies to inter-Services intelligence agencies.

72. **Army Air Corps.** The need for integral air resources for reconnaissance, casualty evacuation, tactical interdiction, counter air operations in tactical battlefield, direction of artillery fire, and most of all close air support to it's troops is crucial.

73. **Integrated Command**. Need for Combined Service Headquarters and Chief of Defence Staff is critically important. Failure to do so can only be detrimental to the nation's security.

74. **Loss of Territory**. Loss of territory in a particular sector can be accepted to achieve major gains in some other area/sector.

75. **Counter Attack.** Every war has highlighted the need for quick counter attacks when objectives are lost and the need to be prepared for a quick counter attack by the enemy when objectives in his area are captured.

76. **Leadership** Good leadership is a battle winning factor. India was fortunate to have good political and military leaders. Leadership in units and formations was of a very high order.

THE KARGIL WAR

General

1. Nothing has threatened India's territorial integrity as seriously since 1971 as Pak's ill-conceived intrusion across the Line of Control (LOC) into the Kargil District of J&K in the summer of 1999. By infiltrating its soldier in civil clothes across the LOC to occupy large tracts of ground on the Indian side, Pak created a new dimension to the 10 year old proxy war against India. This grave provocation resulted in a firm but measured and restrained operation to evict the transgressors. Operation VIJAY was a finely tuned operation by the Indian Army and IAF in synergy to regain the territory occupied by the Pak intruders. In what was acclaimed internationally to be a very mature and restrained action in the face of extreme provocation, the primary aim of India's military action was to regain ground and conclude the military action against Pak forces without enlarging the scope of the conflict. The last of the intruders was unceremoniously evicted on 26 July 1999.

2. India and Pak have been in conflict with each other over J&K since 1947. None of these conflicts have ended decisively and the 1999 conflict in Kargil was but a continuation of the fostering problem. This time however there were some differences. These were : Pakistan occupied a sizeable piece of Indian territory across the LOC, the conflict took place between two democracies which are declared nuclear powers and could have escalated out of control. To this extent it was unique.

3. **The First Three Wars** Pak's first three wars had failed to achieve its central objective of annexing J&K. The first war was started on 20 Oct 1947 with irregulars and tribal raiders led and supported by the Pak Army. The second war started on 06 Aug 1965 with the launching of the 6000 strong Force Gibraltar followed by a full scale invasion spearheaded by the armoured division. The third war was fought in 1971 on two fronts. The war on Eastern Front resulted in the liberation of East Pakistan and creation of Bangladesh. The war on Western Front ended with limited gains.

4. **The Kargil War** Often termed 'the Fourth War' Kargil war was a war with a difference. A series of fundamental factors appear to have propelled Pak towards the fourth war for J&K. These may be summed up as :-

(a) Continuing ideological conflict with India.

(b) Deepening a self perpetuating belief of Kashmir being the core issue and the unfinished agenda of partition.

(c) Tension in the internal power structure of Pak.

(d) Deep desire to take revenge against India for previous defeats.

(e) The military aggressive ethos.

5. The Kargil conflict was different to the usual hostilities across the LOC. Earlier each spring Pak intensified the cross border firing to facilitate infiltration, but there was no physical occupation of Indian territory. The Kargil episode was entirely different in that it involved the intrusion of regular Pak troops across the LOC, interspersed with mujahideen of Pak and other foreign origin. They succeeded in occupying and fortifying a number of critical locations on the Indian side of the LOC

REASONS OF WAR

6. **Internationalisation of Kashmir**. The three possible reasons underlying Pak's attempt to internationalise the Kashmir issue are as under:-

(a) **Internal Situation in Kashmir**. After the election, Kashmir was fast retuning to normalcy due to the Indian Governments proactive policy comprising a four tiered strategy:-

(i) Defeat the ISI's design in J&K.

(ii) Better coordination between the various int agencies in the state.

(iii) Economic development.

(iv) Rehabilitation of the Kashmiri Pandits.

(b) **Declining Global Support for Kashmir.** Contrary to Pak's expectations, major nations did not want to intervene in the Kashmir question, but expected India and Pak to resolve it bilaterally. Thus Pak felt unless something dramatic was done, Kashmir would become a non-issue internationally.

(c) **Nuclear Capability and the Strategic Environment**. Both India and Pak became nuclear powers in 1998. Pak thought this made India's conventional superiority redundant and irrelevant, if not obsolete. Thus Pak perceived it could now take on India in Kashmir without the threat of a full scale war.

7. **Pak Reasoning**. The likely line of Pak reasoning for the internationalization of the Kashmir problem are:-

(a) Kashmir had become the 'Nuclear flashpoint' in the region. If the issue was not resolved it could lead to nuclear war.

(b) The international community should understand the grave implications of Kashmir on the security situation in the region and globally. Thus India must be pressured into a just and final solution on Kashmir.

(c) There was a need for a third neutral force to monitor the LOC and why was India not allowing the United Nations Monitoring Group for India and Pakistan (UNMOGIP) to monitor violation of the LOC ?

8. Thus it appears, that the primary objective of the infiltration was to internationalise the Kashmir problem. The second part of the strategy was linked with the first- provoke India to retaliate so that the issue would get automatically internationalized.

PAK ARMY PLAN FOR KARGIL INTRUSIONS

9. The essentials of this plan were to use the Pak army to occupy important heights in the Dras-Kargil-Batalik-Turtok area and thus cut off troops in Ladakh and Siachen. By doing so, the Indian Army would be forced to move troops out of the valley to face the challenge, thus enabling Pak to induct a wave of foreign mercenaries into the valley to give a fresh impetus to the flagging insurgency. This would cause the overstretched Indian security forces to lose control and Pak would be able to internationalise the J&K issue.

10. **Pak Military Aim**. To capture maximum territory here and elsewhere along the Indo- Pak border, to isolate the state from the rest of India and be in a position of advantage to bargain and settle issues subsequently . In doing so, it must not lose any territory of significance to India.

11. **Indian Army Assessment**. India assessed the military aims of Pak as:-

(a) Cut NH 1A.

(b) Alter status of the LOC.

(c) Give a boost to military in the Valley and elsewhere in J&K.

12. **Objectives**. The main objectives of Pak offensive are likely to have been as under:-

(a) Choke the strategic Srinagar-Leh road and prevent winter stocking for troops in Ladakh.

(b) Occupy Dras and Kargil thereby opening the LOC issue.

(c) By occupying heights in Turtok and Batalik areas, choke access to Siachen Glacier and force India to back down on the issue.

(d) Control the Mushkoh Valley near Dras and use it as a major route for infiltration.

(e) Spread insurgency in Kargil district to ease pressure on insurgent groups in the Kashmir Valley.

(f) Negate the Simla Agreement by altering the LOC and bring back the Kashmir issue to international attention.

13. **Preparations by Pak**. Even through the intrusions took place in the spring 1999, it is clear that preparations had been going on for quite some time. The operational task had been allotted to Force Commander Northern Areas (FCNA). The troops employed were the Northern Light Infantry (NLI) suitably augmented and supported by well trained Islamic fundamentalist mercenaries from POK and other Islamic countries. The latter had been trained, funded and equipped by the ISI. Their presence in the area was to deceive the international community into thinking that this was an 'indigenous freedom movement' and that the Pak army had no part in it.

14. The Kargil operation was approved by Gen Musharraf when he took over as COAS in Nov 1998. During the period from Dec 1998 to Mar 1999 when the upper reaches of Kargil District were inaccessible due to winter, preparations were made on the Pak side of the LOC. Essentially these preparations consisted of :-

(a) Roads and mule tracks extended upto the LOC.

(b) Administrative bases were established to support the impending intrusions.

(c) Heavy weapons and their ammunitions were stocked.

(d) Telephone cable were laid.

(e) Material for constructions of "sangars" (fortifications) was moved forward.

(f) Artillery was readjusted to be in position to support the intrusions as well as interfere with Indian reinforcements along NH 1A. Additional artillery was inducted from neighbouring formations.

(g) Additional helipads were constructed.

(h) Throughout the winter months the designated troops carried out training in high altitude warfare.

(j) The Northern areas were placed under Army rule so as to facilitate optimal use/exploitation of resources as well as deny access to the media.

15. **Nature of Intrusions**. The nature of intrusions are as under:-

(a) The extent of intrusions varied in depth depending on the area.

(b) Each major ridge was held by approximately 40 to 60 NLI soldiers under an officer, supported by adequate personnel of the Scouts and some fighting porters.

(c) Each post was equipped with support weapons like machine guns, rocket launchers, automatic grenade launchers, mortars, anti-aircraft guns and missiles.

(d) Anti-personnel mines were laid along approaches.

(e) A degree of mutual support was ensured between adjacent posts.

16. **Surprise and Deception**. The Pak Army took the following steps to ensure surprise and maximize deception:-

(a) **Additional Troops**. There was no induction of fresh troops into FCNA for the proposed operation.

(b) **Artillery**. Additional artillery inducted in 1988 for trans- LOC firing was not de-inducted.

(c) **Reserve Formations**. No movement of reserve formations into FCNA until after the Indian Army's response.

(d) **Logistics**. No additional stocking was done or new bases established, stores from existing defences were utilized. Logistic lines of communication followed concealed routes away from Indian Army positions.

17. We need to acknowledge that the deception plan was successful and that initially India was caught by surprise. This was perhaps also enhanced by the following:-

(a) This sector had not been the focus of any earlier attempt to disturb the LOC.

(b) The apparent absence of militant infiltration through this sector.

(c) The high altitude and difficult terrain may have introduced complacency on the Indian side, thinking that no viable military operations could be launched in such terrain. Indian patrols may have become predictable and routine.

(d) The Indian Army's focus on internal security (IS) duties for more than 17 years had possibly caused officers and soldiers to think that Low Intensity Conflict (LIC) was the primary threat to India and thus the logical task of the Army. Initial responses to the intrusions were more in the nature of LIC response rather than eviction of Pak regulars as it turned out.

The Indian Response

18. **Development in Kargil Prior to Operations**. The Indian deployment in Kargil was based on one Infantry Brigade. The area was divided into four sub-sectors and battalions spread thinly along the LOC. In early 1999 the brigade had four infantry battalions and one BSF battalion under command.

19. There were substantial gaps between the battalions and the brigade. The brigade received two additional battalions in summer to block routes of ingress of militants in the Mushkoh-Dras and Batalik sub-sectors.

20. **Patrolling.** Regular patrolling was carried out in summers. In winter due to heavy snow and harsh weather, patrolling was limited. In the winter of 1998- 99 there were large gaps in period between patrols.

21. **Detection of Intrusion and Immediate Reaction**. On 03 May 1999 three residents of Garkhun Village were the first to spot the intrusions in the area of Jubar Langpa when they saw some armed men in Pathan attire digging bunkers. They informed

the nearest military unit. Patrols on subsequent day by various units confirmed the intrusions.

22. On confirming the intrusions, Opertion VIJAY was launched to evict all intruders from Indian territory, it covered all actions from 01 May 1999 onwards.

23. The Indian Government stipulated that the LOC was not to be crossed so as to avoid escalation.

24. The initial assessment was that about 200-300 Pak Army regulars and trained mujahideen had infiltrated and occupied unheld areas. By 18 May it became apperent that the strength was greater, 600 to 800 Pak regulars and not mujahideen had infiltrated. The Defence Minister visited forward areas on 12 to 14 May, he was accompanied by the GOC-in-C Northern Command and the 15 Corps Commander. The PM was then briefed on India's plan to evict the intruders.

25. **Initial Aim**. The initial aim of Indian forces was to establish contact, assess the extent of the intrusions and contain the enemy.

26. **Establishing Firm Bases and Patrolling**. Consequently a series of attacks were launched on features held by the Pak troops. In the face of heavy fire and intense oppositions our troops established viable firm bases and carried out intensive patrolling to find out exact deployment and strength of the intruders. It gradually emerged that a large number of the enemy were well entrenched and it would require a deliberate effort to evict them.

27. On 26 May the IAF joined Operation Vijay and air strikes were begun. MIG-21, MIG-27 fighters and MI-17 helicopter gunships were used out of Srinagar and Awantipur airfields.

28. On the subsequent two days two fighters and a helicopter were lost, two due to enemy action and one due to mechanical failure.

29. **Indian Plan of Operations**. The Indian plan of operations was to- first evict the enemy from those areas where he was dominating NH 1A and then from other areas. Priority for capture of objectives were as under:-

(a) **Priority 1**. Dras Sector

(b) **Priority 2**. Mushkoh Valley Sector, initially to be encircled.

(c) **Priority 3**. Batalik Sector.

(d) **Priority 4**. Kaksar Sector. This area was not held in strength by Pak Troops and areas held did not dominate Indian lines of communication.

30. **Use of Troops**. Important aspects of use of our troops were:-

(a) The Indian Army used about 17 battalions to evict the intruders.

(b) During conduct of actual operations troops were moved from one sector to another to achieve concentration of force at the required place.

(c) Many of the troops employed were from out of the area of operations and hence had to be acclimatized before being committed to battle.

(d) Time would be required to move and acclimatize troops; dump ammunition, fuel and supplies, hence the operation could not be time bound.

31. **Crossing the LOC**. It was a major dilemma on whether to permit troops to cross the LOC, and in the process lose all the international goodwill earned through restraint, or continue to lose brave men as the intruders continued to fire from positions of advantage. Crossing the LOC would have resulted in escalation and could have had two major negative outcomes:-

(a) It would have made Pak insecure and thus threaten the use of nuclear weapons. This would have led to rapid international intervention.

(b) India has had major problems in its international PR battle over Kashmir, crossing the LOC would have further worsened the situation.

32. The decision not to cross the LOC, though at high military cost, was a mature and diplomatically astute move which showed the world that we demonstrated a high degree of restraint and acted responsibly in managing the crisis.

Defeating the Enemy

33. A number of very important battles were waged throughout the four section i.e. Dras, Mushkoh, Batalik and Kaksar. A few of them are 'Battle of Tololing', 'Battle of Tiger Hill', 'Battle of pt 4875', 'Battle of Batalik', Capture of pt 5203 etc. 'Battle of Tiger hill' only is being discussed here.

Battle of Tiger Hill

34. Tiger Hill is the most dominating features in the Drass Sector. From here, well entrenched intruders had directed precise artillery fire on the Srinagar-Leh highway for over a month.

35. **The Plan**. It was estimated that the enemy had about a platoon plus located on Tiger Hill itself and some additional troops were seen moving in the area. However there was limited knowledge of enemy defences. A Mountain Brigade was tasked to clear the feature and was allotted 4 x Inf Bn. It was also felt by the GOC of Mountain Division that ideally Point 4875 and Tiger Hill should be attacked simultaneously to keep enemy attention diverted. However, the paucity of artillery precluded this option, thus it was decided that Tiger Hill would be attacked one day prior to Point 4875.

36. The plan was for GRENADIERS Bn to launch a three pronged attack on Tiger Hill from South, East and North East, from the firm bases provided by SIKH Bn. Thus GRENADIERS established a fire base at Point 4460 and an administrative base at Huliyal in preparation for the attack.

37. **Conduct** The attack commenced as planned at 2000 hrs on 03 July 99. Due to bad weather and poor visibility progress was very slow. By 0200 hours on 04 July, the Ghataks got a foothold and against fearful odds managed to hold on. During this action **Sepoy Yogendra Singh**, part of the Ghatak platoon, showed inordinate heroism and indomitable spirit. Despite being grievously wounded he continued climbing the sheer cliff face and destroyed two enemy bunkers that were holding the assault, killing the enemy in fierce hand to hand combat. For this act he was awarded the PARAM VIR CHAKRA (PVC).

38. D Company from the East also managed to come close to the Top. Throughout 04 July our troops were around Tiger Hill Top from three sides and continued a fierce exchange of fire. Apprehending that the enemy would be able to reinforce Tiger Hill along the ridge from the West the Brigade Commander ordered the reserve company of SIKH to be located at Helmet. After a steep climb under intense fire the SIKH managed to get a foothold on India Gate and Helmet in the early hours on 05 July. This foothold was further reinforced on 06 July.

39. Realising that the SIKHs had interposed themselves in between, at 0600 hours on 06 July, the enemy launched a series of counterattacks supported by heavy artillery fire. Fierce fighting continued throughout the day and the SIKH being in the open, suffered heavy casulities and were forced back from Helmet to India Gate. But, with great grit and determination, they held on and then in a brave riposte they turned the tables on the enemy by retaking Helmet.

40. On the night of 07/08 July , GRENADIERS launched an attack on areas of Reverse Slope and captured them by 0800 hours 08 July. On 11 July C Company GRENADIERS captured Rocky Knob and Rhino Horn. This brought an end to the Tiger Hill operations and effectively defeated Pak's Kargil adventure.

41. **Unit Citations**. The COAS awarded unit citations to SIKH for `West of Tiger Hill' and GRENADIERS for 'Tiger Hill'.

Military Leadership Lessons

42. **Leader-Ship**. This conflict re-emphasised the importance of military leadership at all levels for successful conduct of war. Of particular importance are:-

(a) Professional integrity.

(b) Ability to lead by personal example.

(c) Training of one's command, particularly for the unforeseen.

(d) Knowledge of terrain and troops in the area of command.

(e) Physical fitness, particularly in terrain such as this.

The Media

43. This has often been referred to India's 'first media war' as for the first time the media was so pervasive on the battlefield and war reporting so much in real time. The media brought the war into every Indian's home by the regular coverage of the fighting, the trials and tribulations of the Indian soldier fighting in such harsh conditions. The media was possibly the single most important factor in generating intense patriotism.

44. Initially the Army was not well prepared to handle this massive media attention and banned entry of the media into the region. This policy was however soon reversed and better engagement of the media resulted. Detailed briefing arrangements were made in Kargil and in Delhi. In Delhi the organizational face to the media consisted of the spokesman of the Ministry of External Affairs (MEA), and representatives of the Army, Navy and Air Force of the equivalent rank of Colonel. A Liaison Cell under a Major General was created at Army HQ to prepare media kits and press releases in real time. The outcome of this concerted effort to engage the media gradually resulted in high credibility of the governments and the military's actions to evict the intruders.

45. Internationally too, the media was invaluable in conveying India's restraint and measured response to the world, quickly swinging world opinion in India's favour.

46. It cannot be said that the media obediently reported everything that the official spokesmen gave out. Government policy and military actions were questioned, generating a healthy debate about national security in the country.

Conclusion

47. Dras is reputed to be one of the coldest places in the world and from the heights of Tololing and Tiger Hill bitter winds sweep down on the men that dare to tread here. The indomitable men of the Indian Army braved enemy action and terrain to make previously little known places like Mashkoh, Kaksar, Bimbat, Batalik, Yaldor and Turtok household names synonymous with courage.

48. This was no mere border war or another artillery exchange that characterizes the LOC and Actual Ground Position Line (AGPL). The 'Fourth War' for Kashmir was an extraordinary war, likely to be recorded in history as being fought in the most inhospitable battle ground in the history of warfare.

SECTION-3

BIOGRAPHY OF SUCESSFUL GENERALS

PATTON

Introduction

1. Patton was born in 1885 in affluent circumstances. His father was a wealthy rancher, but his grandfather was a Colonel in the Confederate Army and was killed in the

American Civil War. In 1904 he entered West point through the Virginia Military Academy . He took five years to commission having failed in mathematics and hence relegated for a year .He was commissioned into the Cavalry in 1909. In 1912 he was selected as ADC to Chief of Army Staff and where he came to know many who later came into prominence, including Stimson, the future Secretary of State of War in World war II. In 1912 he represented the USA in the Olympiad games at Stockholm in the Modern Military Pentathlon.

Patton's Military Career

2. In 1916 he took part in Punitive Expedition into Mexico in pursuit of Panch Villa, a Mexican bandit as Headquarters Commandant and acting ADC to General Pershing. He experienced almost a year of active service, full of speed with dash and adventure. Patton's military career covers a period from before World War I, until the end of Word War II in Europe. He had started his active service career under General Pershing in Mexico, even before the US entered World War I. Even at that time, he had made his impact as a dashing, bold and unconventional officer showing great promise.

3. Patton is still a most controversial military figure of World War II. His military career is enveloped in controversies.

World War I

4. In 1917 he went over with the American Expeditionary Force to France as General Pershing's aide. He rose from the lowly rank of Captain in 1916 to a Colonel Commanding the US Ist Brigade Tank Corps in 1918 having distinguished himself in Argonne battle, been wounded and decorated for gallantry in action, with Distinguished Service Corps (DSC). It is typical of the man, that he had also been admonished for taking too many risks.

Between the World Wars

5. Between the two World Wars, he had gone through the normal professional training indicative of higher promotion. World War II found him a keen and active student of mobile warfare. Well imbued with the teaching of Liddell Hart and equally well in military history, covering the past many centuries of warfare, he was convinced that American required well trained forces capable of large scale operations, using armour and mobility, in both of which the Americans would have an advantage over their allies as also the Germans. It was with this end, that he trained his armoured division for carrying out what appeared to be at that time, impossibly long maneuvers in the deserts of California.

6. Patton's entire back-ground pointed the way for his advancement to high rank. He had important connection to sustain him on the one hand; and on the other, he had trained himself to be thorough professional, whose job was to get the best results fastest. At one time he had feared that he would be considered too old to command a division, but that was overlooked due to his competence, assisted, needless to say, by his connections. He had, also established a style for himself by which he felt he could get across to his troops, imbue them with his own galvanising fervour for military perfection.

World War II- North Africa

7. He started his armoured career by taking command of a Brigade of the 2 Armoured Division, ultimately rising to its command. The division acquired a great reputation and served to be the breeding ground of many of America's armoured commanders. He therefore, can be said to have made a deep and important impact on the moulding of many of America's armoured commanders.

8. In August 1942, Patton was appointed the Commanding General (CG) of the Western Task Force landing in Morocco- North Africa. He was at that time a Major General. Although the landing operations in Morocco did not involve any major operations, they did indicate enormous problems pertaining to command and control and in dealing with the allies. Patton with his characteristic aplomb came through with flying colours, although unconventional approach to the problem did raise many an eye brow.

9. Pattern recalls that one of the most important things he did during this landing, was to remain on the beaches for 18 hours at a stretch to quieten the nerves of raw troops and bring order to the confusion which prevailed. "People say that Army Commanders should not indulge in such practices. My theory is that Army commanders should do what is necessary". During the fighting as also the negotiations which took place in Morocco, Patton made a great impression on those who came in contact with him. The landing itself presented many problems, not the least of which was the greenness of the American Troops. It required Patton's personality and presence on the beaches to get the troops to move in and extend the beach head.

10. Patton, however, caught the eye of Churchill and Roosevelt when they came to attend the Casabalanca conference. Patton was the host. Churchill described the management of this Conference as "beautiful". Roosevelt reviewed 40,000 troops fresh from battle, but immaculately turned out, each man the epitome of discipline and self respect. But behind this exterior show went the serious business of transforming Morocco into a first class base to take more US troops for North Africa. At the same time serious training started, and strict discipline including the wearing of neckties, legging and helmets.

Tunisia

11. On 1 February 1943, Fredendall was removed and Patton was moved over from Morocco to replace him as Cdr US II Corps. Patton's immediate task was to galvanise II Corps into an efficient fighting formation for battle of Gafsa. This he did by his characteristic insistence on discipline, turn out and leadership, with himself being the driving force. In Patton's own words, " I have been here for 43 days, fought several successful battles, commanded 95,800, men lost about 10 pounds, gained the third star and a hell of a lot of praise and confidence otherwise I am the same.

Sicily

12. The attack on Sicily, was the first major amphibious operation of world War II designed to attack Hitler's Fortress Europe. Two Armies, Montgomery's Eighth and Patton's Seventh were to be employed. Patton insisted that American troops should

continue to be dressed formally, with neck- ties and leggings in sharp contrast to the British, who were more comfortably and casually attired. This aspect of Patton's discipline caused far greater heart burning amongst his troops and his Commanders. But he was determined to make the civilian turned into soldier Americans to realize the value of these outward symbols of discipline. He felt that discipline was a precursor for valour and he over and over again thought that without disciplined valour, there could be no success. The initial landing of Patton's army were chaotic. Once again, by his personal dash and drive, he aided the troops on their initial objective and inspired his commanders to heroic action.

13. At the end of the Sicilian campaign, Seventh Army as a formation was second to none in the allied armies with an identity of its own, and Patton had won a reputation as an aggressive, exuberant personality with a will to win.

North West Europe

14. Patton's career as a Commander in the North West European Campaign falls into some distinct compartments. In time-frame it extends from August 1944 to April 1945.

Birth of the Third Army

15. By the time the Sicilian campaign came to its end. The Germans were well aware of the military potentials of Patton. In fact he was the only American General who had any reputation. News of his and of his command were therefore, of utmost importance to them. For the same reasons, the secrecy which was to surround this army was of paramount importance to the allies. The Third Army was most lavishly equipped with tanks and transport. It is said that when planning, Patton personally always used the Michelin tourist map. He considered that details should be left to be wrestled with on large scale maps by his staff. He was satisfied with the broad perspective, and he had full confidence in his staff which had been trained to carry out his orders.

Dash Across France

16. In the fluid campaign which ensued, Patton using his strong mechanized forces as also the offensive spirit inculcated in his Army, surprised the German Generals, when his columns covered 50 miles a day. Although the Third Army was halted between 16 and 18th of August, Patton's Forces were on the Seine by 25th August. Third Army by passed Paris leaving it to Free French formations to take its surrender.

17. German counter attacks began but Patton with some sixth sense had expected this and they were blunted. However even during this temporary phase of defensive the Third Army made more spectacular gains and cleared the eastern region of France right upto the formidable fortress of Metz it is said that during this period Patton and his Third Army resorted to some shady dealings in obtaining petrol, ammunition supplies allotted to other formations and by not declaring when they captured large quantities of petrol from the enemy.

18. Patton's dash across France was the culmination of a lifetime devoted to being ready for this supreme moment. The soldiers of the Third army were freeing the countryside from the German yoke. The soldiers were cheered and greeted with flowers in every town where they passed, for they were the saviours of France.

Epilogue

19. Patton went on to receive hero's welcome in the United States soon after World War II. He had finally to relinquish command of his beloved Third Army. He was posted to the Fifteenth Army, a "paper" posting to a "paper" Army with little to do except compile the record of the operations since the D Day.

20. Death came to Patton shortly thereafter when on 9th Dec 1945 he was involved in an automobile accident. Paradoxically, he who dreamt of a soldier's sudden death in battle, lingered on for 12 days.

Patton as a Military Leader

21. The strongest impression of Patton which prevails today is that of a leader. He comes out as one of only two striking military leaders of the United States Army from World War II, the other being McArthur. In the American military legend, he is eulogized and Hollywood (Paramount) has made a full length film of him which shows him even larger than life. It is worth examining Patton as a leader.

22. Right at the very onset it must be pointed out that Patton was made in the heroic mould of the dashing military leader . He had aimed for this right from childhood. From the very beginning of his military career he had dreamt of leading an army and at the same time had prepared himself for doing so. All the conventional qualities required of a military leader were in him . He was an impressive personality by any standards, athletic, well-built, imposing in all respect except for his high-pitched voice and somewhat small beady eyes.

23. Patton believed in the effect of the spoken word on his audience. Right from his young days he had found he had verbal facility for the picturesque phrase. He believed that attention of troops could be riveted to what he was saying if it was said in the most earthy if not a profane manner. At times this was carried to a ludicrous extreme. A senior officer in the position of Corps and Army Commander using blasphemous profanity in his speech becomes counter productive and irritating rather than striking. For the media. however, he became "Good Copy" instantly and his quotable quotes got him headlines .

24. If in a matter of appearance and speech there were elements of the theatrical, in other aspects of his leadership traits, he was genuinely sound. He had vision, ability, courage, drive and confidence. His vision was responsible for enabling him to see far earlier than any other American field commander the value of mobility which armour and mechanized forces provided.

25. His courage was legendary. Right from his earliest days he had shown this. He believed that the best way to command was from the front end and as he rose in rank, he was convinced that irrespective of rank, the leader had to exercise his influence where things were at there stickiest. In the bargain, if there was an element of danger involved, that had to be taken in his stride.

26. Patton firmly believed that any action taken quickly and executed violently was sure to achieve results far out of proportion to more deliberate and sedately carried out ones. He used to say that in the military field that "the best was often the worst enemy of

the good". Temperamentally he was impatient, but he also knew that when there was a plentitude of material it was possible to steam roller through, if the action be carried out vigourously and violently. He used these tactics to the best advantage and trained his command accordingly. He had found from experience that the personal drive and zest of the Commanding General would often produce desired results and there are numerous examples from his campaigns to illustrate this. His personal example on the beaches at Morocco and Sicily, his personal reconnaissance's and pushing troops forward over rivers and obstacles are indicative of this.

27. There is one other quality of leadership which appeared at that time strange to the American soldier and public. That was Patton's religious belief, it would appear that they were not aware of many other dashing Captains of war who have been moulded thus. In other countries also religion has given great support to military leadership, their faith was further sustained by religion. Thus religion was in no way incompatible with the profanity of his speech, which was a veneer which had formed itself into a habit.

28. There is one other aspect in the leadership qualities of Patton which need emphasis, his loyalty to his commanders and staff. It is known how he became subordinate to Bradley in North West Europe after having been his superior in the Sicily campaign. Seniority wise Patton was the senior. Bradley had doubts about having Patton serving under him in Europe but these were soon dispelled , because Patton "joined him eagerly, as a friend, without peak, rancour or grievance". Their association together was one of the highlights of such associations in World War II. In the same way, Patton was loyal to his subordinates. His Headquarters staff consisted of average men but he had been able to weld them into a well-knit team delegating responsibility which in return begot trust. As the war progressed, his Third Army had an elan and pride not only in themselves but in the commander, they nick-named him "Georgie".

29. We must also examine the elements of instability in Patton's make up. It was this, which led him to this screening range at minor misdemeanours. In a way it could be said that he let off steam to make up for the stress and strain he was under when working at such high pressure. The well known slapping incidents in Sicily could have emanated from such a situation. However, this was a facet of his make up which was a weakness. Great leaders have perforce to keep themselves under great control and not permit their emotions to surface in any manner which would be derogatory to the functioning of their Command.

30. Having seen the leadership traits of Patton, it is worth examining whether it was the situation which created this leadership image. In World War II, the press and to an extent radio had begun to emerge as important factor for the maintenance of morale not only of fighting troops but of the public at home. The Americans had no outstanding public figure in the military field in the Western Theatre until the advent of Eisenhower and Patton. Whereas Eisenhower was the kindly father figure at the highest level of the military echelon, Patton was the dashing hero on the battle field.

31. As we have noted earlier, the character traits were ideal for the purpose. In some cases the exaggerated manner in which these were projected were excellent copy. As such it may be said that Patton was made to appear the larger-than-life-hero to meet the situation for consumption of the home population. In a way, this was also his undoing, because such publicity will often tend to raise animosities based on factors other than the

capability or otherwise of military leadership in the field. As Bradley says "Few Generals could surpass Patton as a Field Commander, but he had one enemy he could not vanquish and that was his quick tongue".

32. In conclusion, while discussing Patton's leadership qualities, it is worth noting that his command was up to that of a Field Army numbering some hundred thousand men or more. Except for the brief period in Morocco and another in military government he was basically only a Field Commander. Problems of State as such, hardly came his way. It is therefore, difficult to say how he would have been measured up to as one of the "Great Captains" who have to deal with major strategic as also national and international problems. As a Field Commander, he was indeed great and the tradition he laid down for this type of leadership is without doubt of a high order to be followed by all Military Commanders who are in direct contact with troops. The pitfalls of publicity are, however, a warning, as also the need for emotional balance.

BIOGRAPHY OF GENERAL MACARTHUR

Early Years

1. Douglas MacArthur was born on 26 January 1880 in Arsenal Barracks at Little Rock. His father, Lieutenant General Arthur MacArthur was at that time commanding a company of the 13th Infantry. Born in a family steeped in martial traditions, he became associated with the Army from his birth. This was only in the fitness of things as he was in later years to become the greatest General of his country.

2. Douglas MacArthur's grand father and father had migrated from Scotland to America. His grandfather joined militia attaining rank of Captain and later of Judge Advocate General of Western Military District. He became Governor of his state for a short period and later on served as Judge of Supreme Court for 18 Years. His father (Arthur MacArthur) was only 16 year old when the civil war broke out. Even at that tender age, he was keen to answer the call to arms and join the Army. His father took him to President Lincoln to get him a Presidential vacancy at the United State Military Academy. The President put his arm round the young boy and told him that all Presidential vacancies had been filled for that year but promised to get him one the following year. Arthur however, could not wait that long and joined 24th Wisconsin Volunteer Infantry as its Adjutant in the rank of Lieutenant. He saw action in several battles during the Civil War. In his first battle he was cited for gallantry in action and given the brevet rank of Captain. In those days except for Medal of Honour there was no other gallantry award. Later at the battle of Missionary Ridge he led a remarkable charge. Against withering fire he scaled the ridge and planted the regimental flag on top when other members of the colour party had been killed or wounded. The regiment rallied and followed him to the top of the ridge. For this supreme act of gallantry, he was awarded the Medal of Honour. He was also given command of the regiment and he led it throughout the war attaining the rank of Colonel at the age of 19. He became the youngest officer of this rank in the Union Army. After the Civil War, he joined the regular army and slowly worked his way up the promotion ladder. For 23 years after the Civil War, he served as a Captain as promotions in the Army were slow. On promotion to

the rank of Major, he served in the Adjutant General's Branch at Washington and after some time was promoted Lieutenant Colonel.

3. In 1898 war broke out with Spain and Arthur MacArthur, father of Douglas Mac Arthur, attained the rank of Brigadier General. He was assigned for service in the Philippines where he distinguished himself, earning promotion to the rank of Major General, the highest rank in the US Army in those days. After the war he was appointed Governor General of the Philippines. Although he was a successful administrator, some misunderstanding arose between him and the Administration at home. This cost him the appointment of the Chief of Staff of the Army, However, after his assignment in the Philippines, he was promoted to the rank of Lieutenant General by a special act of the Congress with a provision that this rank be abolished after him. He thus became the only officer in the US Army to attain this rank until the ban imposed by the Congress was lifted during the First World War. He was asked to carry out a tour of the Russo-Japanese battle fields and of the Far East. After completing this tour, he retired from the Army and died some years later in 1912 while addressing a reunion of the veterans of his old 24th Wisconsin Regiment.

4. Douglas Mac Arthur spent the early years of his life living with his father in various frontier posts. He saw the life of the Wild West. In his early upbringing he was not only influenced by his parents but also by the regimental sergeant major. It was only natural that he should aspire for a career in the Army. When his father was posted to Texas after his tenure at Washington, young Douglas joined the West Texas Military Academy. Good at both studies and sports, he appeared for the competitive examination to West Point and came out first. He joined West Point in 1899.

5. War with Spain had broken and Douglas wanted to skip his cadetship to enlist in the Army so that he could see active service. His father advised him against this saying, " My son, there will be plenty of fighting in the coming years and of a magnitude far beyond this , Prepare yourself". Douglas took his fathers prophetic advice and stayed on at West Point to complete his cadetship.

6. While Douglas MacArthur was at West Point, his father General MacArthur had become a national hero for his role in the Spanish American War and for combating insurgency in the Philippines. This gave Douglas a certain amount of prominence at West Point and he had to suffer more then the normal share of "ragging" from the seniors. A little before MacArthur had joined West Point, a "fresher" had been made to leave the institution because of ragging and he subsequently died of tuberculosis. This sparked off a controversy and the President ordered an inquiry into the practice of ragging at West Point. MacArthur was an important witness before the court of inquiry and he was required to divulge the name of his seniors who had ragged him. His parents had taught him never to lie and never to tattle. He was therefore determined not to disclose any names even though his refusal to do so might result in his expulsion. The whole incident passed off without the authorities taking the extreme step against him for not disclosing any name. It was a period of trial for MacAruther in which he amply showed his moral fibre.

7. MacAurthur distinguished himself at West Point in all spheres-at games, in studies and in his profession. He was appointed First Captain on the basis of his military performance and he also stood first in scholarship. He scored the highest marks registered

for a century at West Point. As First Captain he led the line of 93 graduates when he passed out from West Point in 1903, proudly watched by both his parents. He was commissioned in the Crops of Engineers. In those days top ranking cadets were given the choice of the branch and they generally opted for the Engineers because of better promotion prospects. MacArthur also volunteered for service in the Philippines where his father had won laurels and there was some chance of active fighting against insurgents. Within ten days of joining his Engineers battalion at San Francisco, he sailed for Manila in September 1903.

8. Soon after landing in the Philippines, MacArthur was engaged in various engineering duties. He was employed in constructing piers and docks at the harbour. He went out with a detachment to cut timber in the nearby jungle. Despite his early frontier training, he allowed himself to be waylaid by two guerillas in the jungle .One of them fired antiquated rifle and the slug tore the top of his hat. MacArthur was quick with his pistol and shot both the guerillas before his men joined up with him. What his men saw on arrival only helped to build their confidence in their young leader.

9. In 1904 General MacArthur was appointed Military Attache to the American Legation at Tokyo and Chief US Military adviser for the Russo- Japanese War. His Son Douglas Mac-Arthur was appointed as his ADC. Soon after his return from the Far Eastern tour, he was appointed ADC to President Theodore Roosevelt. Mac Arthur was posted to Fort Leavenworth with the Third Battalion of Engineers. He served with this unit for three years and was promoted Captain in 1911. In 1913 he was selected for the General Staff, the brains of the Army in planning operation and deciding matters of highest importance.

First World War and Inter War Years

10. First World War broke out in 1914 but America was initially not involved in the hostilities. She joined the war only in 1917. MacArthur was detailed as a military aide to Mr. Baker, Secretary of War. MacArthur suggested to have an adhoc division with elements of National Guard from all States which would “stretch over the country like a rainbow” for sending to France. General Mann was appointed Commander of 42 Division, popularly known as the Rainbow Division, and Douglas MacArthur became the Chief of Staff of the Division.

11. MacArthur sailed with the Rainbow Division for France in October 1917. On arrival in France after an initial period of training and reorganization, Rainbow Division moved into a combat sector. He accompanied a French riding party to bring German prisoners. He acquitted himself extremely well in the savage fighting that took place in this raid into German lines. He was awarded the Silver Star for extraordinary heroism and gallantry in action. In March 1918 the Rainbow Division was ready for the acid test- the attack. It had withstood an enemy raid and endured a night gas attack. MacArthur obtained his commander’s permission to accompany the leading troops. The Division despite its mounting casualties secured its objective. For his gallantry in this action MacArthur was awarded the Distinguished Service Medal. The last and biggest German attack of the war was launched in July 1918 and the Rainbow Division again acquitted itself well. MacArthur was promoted Brigadier General and given command of 84 Brigade in the Division. Position at Cote de Chatillon held by German in strength was holding up the advance of the Rainbow Division.

12. MacArthur was ill and suffering from gas wounds. He, however next morning led the attack capturing Cote de Chatillon after heavy fighting in which his troops suffered many casualties. When the war ended, MacArthur temporarily took over command of the Rainbow Division. General Pershing the C-in-C of American Forces in France referred to him as the bravest of the brave in a brave division. For his outstanding qualities of leadership and personal gallantry he was awarded the Distinguished Service Medal, three silver stars and many foreign decorations including the French Legion of Honour. He, however, again could not get Medal of Honour, the highest US award for gallantry even though he had been recommended for it. On return to the USA in 1919 he was appointed Superintendent of the West Point, a post reserved for an officer expected to reach the highest rank in the American Army. At 39, he became the youngest officer to hold this coveted appointment.

13. In 1922, MacArthur was posted to the Philippines as Commander of the Military District of Manila and later of the Scout Brigade. In 1925 he was promoted Major General in command of the Philippines Division and two years later as Commanding General of all American troops on the islands. Soon after his arrival for this tenure in the Philippines he set about demolishing the concept of colonial theory of racial superiority in his own way. He found that on the three-decker boats, only American officers and their families could travel on the upper deck. Fillipinos had to travel on the lower decks with the enlisted men. He had this arrangement changed at once. Little stories like this endeared MacArthur to the Fillipinos.

14. In October 1930 MacArthur was appointed Chief of Staff with the four stars of a General. MacArthur's major contribution during the five years that he was Chief of Staff was to reorganize the American Army, keeping in view the nature of the coming war. MacArthur completed his tenure as Chief of Staff in 1935 and was appointed as Military Adviser to the President of the Philippines. A few days before MacArthur left President Roosevelt spoke to him " Douglas if war should suddenly come, don't wait for orders to return home. Grab the first transportation you can find. I want you to command my armies". It was gracious of the President to so speak to him. It showed his recognition of the patriotic motives of MacArthur.

Second World War

15. War broke out in Europe in September 1939 but America kept out of it for two years. By 1941 it became increasingly clear that America would soon be involved in the war. Japanese threat loomed large over the Pacific. To guard her interests in the Pacific, America based a large fleet with supporting Air Force at Pearl Harbour in Hawai Islands. In July 1941 MacArthur was recalled to service in the rank of Lieutenant General and appointed Commanding General of the United States Army Forces in the Far East. The strategic importance of the Philippines in preventing Japanese advance to the South or the West was obvious. The forces available on the island were not adequate to meet the Japanese challenge.

16. The Japanese struck at Pearl Harbour on 7 December 1941 and in a surprise attack wrote off the US Pacific Fleet. Eight heavy battleships, two cruisers and several destroyers were either sunk or put out of action in an hour or two. The strike at Pearl Harbour not only damaged the US Pacific Fleet but also crippled US Air Power and

eroded its ability to put up effective defence of the Philippines. On 8 December the first Japanese air attack came over the Philippines. With the ground forces denied effective air and naval support, the stage was set for Japanese invasion of the Philippines. The invasion commenced on 10 December with the Japanese Fourteenth Army. The situation was grim for MacArthur. His two Corps, one in the North and the other in the South had to steadily yield ground. Japanese combat strength on the ground was almost double. MacArthur was quick to perceive the Japanese plan of closing on the plains of Central Luzon around Manila and annihilating his Army in a two pronged offensive. He carried out a masterly withdrawal by side-stepping out of Central Luzon in to the Jungles of Bataan Peninsula.

17. Bataan was organized for protracted defence. Savage fighting continued on the peninsula for nearly five months when the defenders were forced to surrender. This gained valuable time for the Allies and stood in the way of further Japanese expansion. By February, through heavy casualties and lack of supplies, the situation was desperate. The Japanese sent a message to MacArthur to surrender but he was determined to fight it out till the bitter end. He was already making plans for starting a guerilla war against the Japanese on Mindano island after Bataan was lost. Japanese record of unbroken success in Indo-China, Malaya, Indonesia and Philippines posed a grave danger to Australia. Australian Cabinet decided to request US government to depute MacArthur as the Supreme Commander. President Roosevelt agreed and issued a personal order as his country's Commander-in- Chief asking MacArthur to leave the Philippines and proceed to Australia. MacArthur was reluctant to comply because he did not want to desert his troops at Bataan. He was persuaded to leave because by doing so he would be able to organise a relief operation from Australia to rescue the Philippines.

18. The Japanese had got to know of MacArthur attempting to break through their cordon. Their radio announced that if captured, he would be publicity hanged on the Imperial Plaza in Tokyo. This threat did not materialize, but five years later, MacArthur as Supreme Commander took the salute of the Occupation Troops at the Imperial Plaza from the precise spot, where his execution had been so confidently predicted. The US Government awarded MacArthur the medal of Honour, its highest award for gallantry, for his outstanding leadership in the Philippines. The citation for his award read "He mobilized, trained and led an army which has received world acclaim for its gallant defence against tremendous superiority of enemy forces in men and arms. His utter disregard of personal danger under heavy fire, his calm judgment in each crisis inspired his troops, galvanised the spirit of the Fillipino people and confirmed the faith of the American people in their Armed Forces".

19. MacArthur found a spirit of defeatism rampant in Australia. Plans were being made for holding the Brisbane line which meant giving up two thirds of Australian territory in the North. The newly appointed Supreme Commander decided completely to abandon the Brisbane Line plan and chose to defend Australia a thousand miles forward in the mountains of New Guinea. The battle for Australia was to be fought beyond her borders. If successful, he would not only save Australia but switch over from the defensive to the offensive for eventually liberating the Philippines. After his victory in New Guinea, he started his island-hopping operations. He leap-frogged from one island to the other which was hailed as something new in warfare. He opposed the idea of direct attack on the strong bases of the enemy. Instead he chose to bypass these bases and in the process secured lightly held islands. The Japanese strongpoint at Rabaul was bypassed.

This meant bypassing 60,000 Japanese troops and leaving them for mosquitoes, hunger and disease to finish off.

20. In October 1944 MacArthur redeemed his promise of returning to the Philippines. In a series of brilliant operations on the ground MacArthur neutralized eight Japanese armies on these islands. At the end of this campaign the Japanese lost 80,000 counted killed. The campaign on the Philippines lasted nine months. Soon after the liberation of the Philippines, atom bombs were dropped at Hiroshima and Nagasaki in August 1945. Japanese surrendered and this ended the second World War.

Japan, Korea and After

21. On 15 August 1945 the Emperor of Japan in a dramatic broad cast to his prople announced the capitulation of his country. On the same date President Truman appointed MacArthur as the Supreme Commander of Allied Powers in Japan. MacArthur took the formal surrender of Japan on board US battleship Missouri on September 2, 1945. Apart from disarming and demobilising seven million Japanese soldiers, MacArthur was now entrusted with the responsibility for administering a war-ravaged country of 80 million people. MacArthur wanted to carve a place for himself in history not as a conqueror but as a protector of Japan. He planned to introduce reforms in Japan to bring it abreast of modern progressive thought.

22. After disarming the Japanese forces, one of the first tasks facing MacArthur was to abolish militarism in Japan. This was achieved in many different ways. Apart from punishing war criminals, introducing equality among people, emancipating the Japanese women, liberalizing the system of education and separating the State from the Church, MacArthur steadily divested the Emperor of his divine halo and decentralized political power. Based on the new constitution, general elections were held in April 1946 which were the first completely free elections in the history of Japan. Another far-reaching achievement of MacArthur's administration in Japan was the land reforms introduced by him. The education system was liberalized and the previous militaristic ultra-nationalistic approach discarded.

23. MacArthur's role as Pro-consul of Japan for five years was a great achievement of history. When he left that country two million people lined his route to the airport and bade him an affectionate farewell. Many years after his official association with Japan had ended, the Japanese Government awarded him the Grand Cordon of the Order of the Rising Sun- Japan's highest award reserved for monarchs and heads of Government. Towards the later stages of MacArthur's stay in Japan he was again to answer the call of his profession and be engaged in war. His last campaign was fought in Korea. Till Japan was defeated, Korea was her colony. In the summer of 1950 North Korean Communists were threatening to attack South Korea. On 25 June 1950 the expected North Korea assault started. They soon captured Seoul, the capital of South Korea. MacArthur was suddenly given the task of defending South Korea. MacArthur mobilized his forces with lightning speed and airdropped one division around Pusan. The presence of American ground troops imposed caution on the North Koreans and they halted their advance to bring up their heavy artillery and other equipment. This enabled MacArthur to gain ten precious days for bringing in his remaining ground forces from Japan. The battle for Pusan continued for two months in July and August during which the offensive potential of the North Korean Army was blunted.

24. In September, MacArthur was planning a counter-stroke. He planned an amphibious landing at Inchon, the second largest port in Korea and only 20 miles from Seoul. The seizure of Inchon and Seoul would cut the enemy's supply line and seal off the entire southern peninsula. The brilliant landing at Inchon on 12 September, personally supervised by the Supreme Commander, was a complete success. Seoul was quickly captured and the enemy's supply and communications were completely cut off. Within a month over 1,30,000 prisoners were taken and the North Korean field army was virtually destroyed. MacArthur now raced towards the North capturing Pyongyang the capital of North Korea on 20 October. On 27 November Communist Chinese started their massive invasion of Korea across the Yalu bridges. Against the massive Chinese onslaught and because of hampering restrictions from Washington, MacArthur was forced to withdraw. The Chinese offensive having outrun its initial impetus, MacArthur now launched a limited counter-offensive. He established the front on the 38th parallel.

25. On 11 Apr 1950 President Truman relieved Gen MacArthur of his command in Far East. MacArthur left Tokyo at day break on 16 April 1950 to return home to America. There was a hero's departure for him at Tokyo with 2 Million Japanese lining his route and a still greater welcome for him on return to America. The period of MacArthur's retirement ended after 14 years. At last the final roll call came in 1964 and the great soldier faded out of life leaving behind a legacy of un paralleled greatness.

MacArthur as Leader

26. The wide and varied canvas of life of MacArthur establish him as a unique figure of modern history. Seldom has any soldier been an heir to such a rich family heritage and made it so much richer, by his own achievements. From his earlier days, he stood out as a man of destiny to whom rank and honours would come if merit could bring them to any man. His life was one long record of unbroken and outstanding success. Even during adversities, whether during the siege of Bataan or on dismissal from Japan, success appeared to smile on his fortunes, adding luster to his name and fame.

Personal Qualities

27. A deeply religious man, MacArthur upheld a high sense of values. His faith in God always remained unshaken and he made constant reference to the Supreme Being on all important occasions in his life-on the fall of Bataan, at the liberation of the Philippines, at the surrender of Japan and in his address to the American Congress. Whether as a cadet at West Point or in later life while dealing with several heads of State, MacArthur's personal conduct was always unimpeachable. On a matter of a principle he was not prepared to make any compromise. As a cadet, at the risk of his career he refused to disclose to a Presidential Enquiry Committee, the name of senior cadets guilty of ragging. And again as the Army Chief, he staked his career with President Roosevelt on the issue of retrenchment of the officer cadre.

28. Intensely devoted to his family, MacArthur had a human approach to his fellow being. He was deeply attached to his mother who lived with him after his father's death. As Army Chief, he avoided social functions in Washington to be able to spend his evenings with his old and ailing mother. He would not accept the assignment of Military Adviser in Philippines till he was assured that his mother could accompany him. His

father died in 1912 while addressing a veteran's rally. Half a century later when he himself was nearly 80 years old, he wrote about his passing away with a pang, "My whole world changed that night. Never have I been able to heal the wound in my heart". He was also deeply attached to his wife Jean and their only son Arthur. They went through the siege of Bataan with him and later shared in his glories. In 1943 he was named as the father of the year in the USA for his devotion to his son. On receipt of intimation conferring this distinction on him, he wrote, "By profession I am a soldier and take pride in that fact, but I am prouder, infinitely prouder to be a father. A soldier destroys in order to build; the father only builds never destroys. The one has the potentialities of death; the other embodies creation and life. And while the hordes of death are mighty; the battalions of life are mightier still. It is my hope that my son when I am gone will remember me not from the battle, but in the home, repeating with him our simple daily prayer -Our Father thou art in Heaven".

29. His attitude to his fellow beings was commendable. Even during the colonial era of pre-second world war days, he realised racial superiority was an outmoded concept. His treatment of Fillipinos on equal terms won him their love and regard. With his long experience of service in the East, he realized that the people of the Orient wanted to shake off the shame of subjugation and demanded the dignity of equality. This realisation stood him in good stead while ruling over Japan.

30. MacArthur had a remarkable style of speaking and writing, The language used by him on important occasions was truly sublime, expressing great and noble ideas in the most appropriate manner. His speech after the Japanese surrender on board the Missouri was hailed as the greatest speech after Lincoln's Gettysburg address. His address to the American Congress on being relieved of command in Japan, is a unique piece of literature. Similarly his farewell address to the Cadets at West Point bore the hall mark of his genius. In the same class may also be ranked his speech to the Philippine Congress at the fifteenth anniversary of their Independence. He spoke, "The tide of world affairs ebbs and flows in and out. Old empires die, new nations are born, alliances arise and vanish. But through all this confusion the mutual friendship of our two countries shines like a beacon in the night. Together we suffered in war. Together we seek the peace. And in this long twilight era, that is neither war nor peace, we stand as firmly as before, together".

Military Leadership

31. His military leadership can be viewed from different angles-personal bravery, combat leadership in battle, strategic direction of campaigns and breadth of vision. In all these spheres, he showed a touch of genius. His encounter with Fillipino guerillas, the deep reconnaissance carried out by him at Vera Cruz, his leading the attack at Cote-de Chatillon in France when he was suffering from gas wounds, his response to a hold up while on the road to West Point, his landing at airfield in Japan and his reconnaissance of the Yalu river in an unarmed aircraft were all examples of personal bravery of an outstanding nature. The young subaltern in the Philippines was just as much regardless of physical danger as the 70 years old Supreme Commander of the United Nations in Korea.

32. He was the guiding force of the Rainbow Division in the First World War both as its Chief of Staff and later as one of the Brigade Commanders. He repeatedly displayed skill and bravery of the highest order in combat leadership. He led his troops in battle by his personal example and won several gallantry decorations. Both American and The

French Army Commanders referred to him as the finest and bravest officer they had ever seen. His divisional commander said that he had commanded larger bodies of troops in the battle line than any other officer of the American Army. It was primarily on the basis of his achievements as a leader in battle that even before the Second World War, President Roosevelt referred to his record in war and peace as a brilliant chapter of American history.

33. The Second World War gave MacArthur an opportunity to show his genius in the strategic sphere. His decision to side-step into Bataan avoiding the Japanese trap closing on him in Central Philippines, his decision to defend Australia in the mountains of New Guinea, his concept of island hopping operations leading to the destruction of several Japanese armies with comparatively much less casualties of his own forces , and finally his brilliant landing at Inchon destroying the North Korean field army prove that he was a great master of war. Many renowned world authorities have acknowledged his military greatness. Lord Alanbrooke the famous British Chief of Staff who had been critical of American commanders wrote of him, "MacArthur was the greatest General and the best strategist that the war produced. He certainly out shown Marshall, Eisenhower and all other American and British Generals including Montgomery. As a fighter of battles and as a leader of men, Monty was hard to beat, but I doubt if he would have shown the same strategic genius had he been in MacArthur's position …….. I am convinced that, as the war can be viewed in better perspective, it will be agreed that the strategic ability shown by MacArthur was in a class of its own". Similarly, that great military analyst and thinker, Liddel Hart wrote, "MacArthur was supreme among the Generals. His combination of strong personality, strategic grasp, tactical skill, operative mobility and vision put him in a class above other allied commanders in any theatre". MacArthur's personal bravery, his leadership in combat and his conduct of campaigns were brilliant in every way. He also combined with all these a rare breadth of military vision. After the first world war, he was quick to perceive the requirements of a modern officer in a citizens' army and accordingly oriented the training of cadets at West Point. He also realized the importance of the air arm in the inter-war years and was its strong exponent. He foresaw the coming of the Second World War as the US Army Chief, and did his best to prepare his country and his army for it.

34. MacArthur was a legendary figure with varied and outstanding achievements in different spheres. He served his country as an active soldier for over half a century participating in numerous campaigns and battles on three continents. If awards and honours can be measure of judging his achievements, then he easily stands head and shoulders above any other soldier of this century. Philippines made him a Field Marshal, Australia awarded him the Pacific Star, Japan conferred upon him the Grand Cordon of Rising Sun, France decorated him with the Legion of Honour and Britain made him a Grand Knight Commander. His own country gave him the Medal of Honour, the highest award for personal gallantry. Besides this supreme award he won the Distinguished Service Medal for gallantry five times and the Silver Star for gallantry seven times. The US Congress presented him with a vote of thanks of the nation and had a gold medal struck in his honour bearing his effigy and with the following words inscribed on it:

> " Soldier of America ; Protector of
> Australia; Liberator of the Philippines;
> Conqueror of Japan; Defender of Korea."

BIOGRAPHY OF FIELD MARSAL SAM MANEKSHAW

Early Years

1. Sam Hormusji Framji Jamshedji Manekshaw was born on 3 April 1914 into the Manekshaw family at Amritsar. His father Captain Hormusji who saw service with the Royal British Army as a "Medical Officer" in the Middle Eastern region of Messopotamia during the "First World War," had come to Amritsar from Bombay where his medical practice did not flourish too well! At Amritsar, Dr. Hormusji started a medical practice and a chemist shop/pharmacy, where his prescriptions were formulated, so that his patients could have easier access to medication especially when pre formulated patented drug formulations were few and far between!

2. Although he had promise, Dr Manekshaw felt that this son, Sam, who had passed the Senior Cambridge examination with distinction from "Sherwood" in Nainital at the age of 15 years, was not yet ready to be on his own in England for further studies. He was therefore admitted to the Hindu Sabha College, Amritsar. In 1931, when the practice of training Indian Officers at "The Royal Military Academy" at Sandhurst in England came to an end and India had its' own Military Academy set up in Dehra Dun, Sam was amongst the first batch of Indians to qualify in the examination to gain admission and enroll into the "Indian Military Academy" at Dehra Dun. He joined the Academy on 30th September, 1932. Being a good tennis player, he was appointed the Captain of the "Academy Tennis Team" and was awarded the "Tennis Blue" on 12th October 1933.

3. On passing out from the Academy he was commissioned into the Indian Army as a Second Lieutenant in "The Frontier Force Regiment" on 4th February 1934. The "First Course" with which Sam passed out, gave three chiefs to three Armies! They were, General Sam Manekshaw-Indian Army, General Mohammed Musa-Pakistan Army and General Smith Dun- Burmese Army. On completion of his attachment, as was customary then, with a British Infantry Battalion, the 2nd Battalion the Royal Scots, he joined the 4th Battalion, 12 Frontier Force Regiment, also known as the 54th Sikhs. After partition of India, this Regiment opted to join the Pakistan Army.

Second World War

4. In the Second Great War, he saw service with his unit on the Burma front as a part of the famous 17 Infantry Division. On 22nd February 1942, Sam was wounded while gallantly leading his company to capture a vital enemy position, when he took the impact of a burst fired from a Japanese machine gun in his stomach and body. He was taken to the "Regimental Aid Post" from where the regimental medical Officer, Captain GM Diwan, evacuated him to the Hospital at Pegu. Here the surgeon who examined him asked him what had happened. Sam told him, "I was kicked by a bloody mule!" Hearing this response, the surgeon laughed and said "Given your sense of humour, it will be worth saving you!" After being operated upon, he was evacuated to Rangoon, from where he sailed for India in one of the last ships to leave that port before it fell to the Japanese. For this act of gallantry he was awarded the "Military Cross".

Various Appointments

5. Once discharged from the hospital and reunited with his family after a long separation, Sam was detailed to attend the "8th Staff Course", at the Staff College Quetta (In Pakistan) from 23 August 1943 to 22 December 1943 in the rank of a temporary Major. On completion of the Staff College Course, he was posted as the "Brigade Major", (BM) a critical appointment, to the "Razmak Brigade" in Waziristan close to the North Western Frontier Province, now in Pakistan. He remained in this job from 13 January to 22 October 1944 whereafter he was posted to 9/12 Frontier Force Rifles (FFR) in Burma (now known as Myanmar) who were then on the move astride the Rangoon-Mandalay highway as a part of the victorious 14th Army under General Slim. During the closing days of the war, he went as a staff officer to General Daisey to Indo China, where, after the Japanese surrender, he helped in the rehabilitation of over 10,000 Japanese prisoners of war. He was then posted to the Staff College Quetta as General Staff Officer, Grade -2 (GSO-2). Before he could take up this assignment, he was selected by Field Marshal Lord Claude Auchinlek, the Commander-in-Chief of India to go on a lecture tour to Australia for a period of six months in 1946. The main purpose of this tour was to bring home to the Australians, India's war effort and the achievement of its' Armed Forces since it was perceived that this was not too well known in that region!

6. On his return from the Australian lecture tour, he was promoted to the rank of a local Lieutenant Colonel and while continuing to be on the panel of Frontier Force Regiment, he was posted to General Headquarters at New Delhi as General Staff Officer, Grade-1 (GSO-1), Military Operations-3 (MO-3) till then the sole preserve of the British Officers. He was the first Indian posted to the MO Directorate. In December 1946 when the division of assets and regiments between Pakistan and Indian Armies crystallized a little, and it became clear that the Frontier Force Regiment would remain with Pakistan, Sam was empanelled on the panel of 16th Battalion of The Punjab Regiment, and posted as GSO-1, MO-1. Here he served from 1st January 1947 to 21 July 1947. On 15th August 1947, when India became independent, Sam was transferred to the panel of the 5th Royal Gorkha Rifles, (FF) and was posted to command the 3rd Battalion of the 5th Gorkha Rifles. However, before he could proceed to take over this Battalion, Pakistani tribals with the help of Pakistan Army had attacked parts of Kashmir and managed to reach close to Srinagar. Considering the operational situation, his posting to command the Battalion was cancelled and he continued to serve with the MO Directorate as GSO-1 (Ops) at Army HQ. It was thus that the future and first Field Marshal of the Indian Army was denied a chance to command a Battalion in the Army! This has always been disappointing for him.

7. At the time of these operations, Sam Manekshaw , had a ringside view of events. Then a Lieutenant Colonel, he accompanied V P Menon on his historic mission to Kashmir, to get the then ruler of the State of Jammu & Kashmir, Maharaja Hari Singh to sign the "Instrument of Accession" and accede to the Indian Union. Later he was granted the acting rank of a Brigadier and appointed Director, MO (OPS). Sam continued in this assignment till 10th March 1952. During this trying period, Sam had numerous opportunities to interact with Sardar Vallabh Bhai Patel who was the Home Minister in the Union Government. The Sardar was constantly in touch with Sam seeking update on the operations in Kashmir, Hyderabad and so on and in the process both got to know each other well.

8. In 1948, Sam and Thimayya, then a Major General, were a part of the Indian Delegation to the UN, led by Sir BN Rau, as military advisors. It was here that he first met Mrs. Indira Gandhi, who was on board the same ship along with her father, Pandit Jawahar Lal Nehru, the Prime Minister of India, sailing to Paris.

9. In March 1952, Sam was posted to Ferozepur in command of 167 Infantry Brigade. It was his first command assignment after the war. In 1953, he was appointed Colonel of the 8th Gorkha Rifles. Having finished with the command of the brigade, Sam was posted to the Army HQ as "Officiating Director of Military Training" (DMT) from April 1954 to January 1955. In May 1955, Brigadier Sam Manekshaw was posted as Commandant to the Infantry School. He was the first Indian to be posted to that Institution.

10. In November 1956 Sam left for the UK to attend the course at the "Imperial Defence College" (IDC) till December 1957. On completion of this course and his return in December 1957, he was posted to command 26 Infantry Division at Jammu. He took over the Division from Major General PP Kumaramangalam, DSO, who was posted to the Staff College at Wellington as Commandant. It was here, at Jammu, that a life-long friendship developed between Sam and Mr DP Dhar, who was then a minister in the State Cabinet of the State of Jammu & Kashmir. After command of the Division Sam was posted to the Staff College at Wellington to replace General Kumaramangalam. While commanding the Staff College, he was cleared for his next rank. Sam was appointed to command 4 Corps after General Kaul resigned in the walk of the Chinese war.

11. General Manekshaw was appointed GOC-in-C Western Command with it's Headquarters at Simla after the tragic death of Gen Daulat Singh in a helicopter crash in Poonch in J&K, in November 1963. He assumed command of Western Command on 4th December 1963, and moved to replace Gen Kumaramangalam in Eastern Command in 1964 yet again. On 8th June 1969, Sam took over as the Chief of Army Staff, once again from General Kumaramangalam, where apart from other contributions his finest hour was the surrender of the Pakistan Army in Dacca in 1971. In recognition of his service to the nation, he was appointed as the first "Field Marshal" in independent India on 1st January 1973.

Highlights of His Career

12. In 1942 at the height of the World War II a fierce battle was raging in Myanmar, then Burma, at the Sittang Bridge. A company of the Indian Army was engaged in hand-to-hand combat with the invading Japanese forces for the capture of a position, which was critical for the control of the bridge. The young company commander was exhorting his troops when his stomach was riddled by a machine gun burst. Afraid that his company would be left leaderless if he were evacuated, he continued fighting till he collapsed. His company won the day and the general commanding the Indian forces arrived at the scene to congratulate the soldiers. On seeing the critically wounded commander, he announced the immediate award of the Military Cross-the young officer was not expected to survive much longer and the Military Cross is not awarded posthumously. Thus began a historic military career that spanned the Indo-Pak wars and the Sino-Indian conflict, the wounded captain surviving to become India's first Field Marshal.

13. In 1947 when Pakistan invaded Kashmir, Sam Manekshaw was the Colonel in charge of operations at the Army Headquarters. His incisive grasp of the situation and his acumen for planning instantly drew the attention of his superiors and Manekshaw's rise was spectacular, though not without controversy. He was outspoken and stood by his convictions. This, coupled with his sense of humour, often got him into trouble with politicians.

14. In 1961, for instance, he refused to toe the line of the then defence minister V.K. Krishna Menon and was sidelined. He was vindicated soon after when the Indian army suffered a humiliating defeat in NEFA the next year, at the hands of the Chinese, resulting in Menon's resignation. Prime minister Jawaharlal Nehru rushed Manekshaw to NEFA to command the retreating Indian forces. This had an electrifying effect on the demoralised officers. In no time, Manekshaw convinced the troops that the Chinese soldier was not "10 ft tall". His first order of the day characteristically said, "There will be no withdrawal without written orders and these orders shall never be issued". The soldiers showed faith in their new commander and successfully checked further ingress by the Chinese.

15. The Indo-Pak war of 1965 saw Manekshaw as Army Commander, Eastern Command. When India was forced to launch operations in the West, Manekshaw was against attacking in the East since the main sufferers would be the people of East Pakistan. The wisdom of his advice dawned when the Indian forces fought the Pakistan army in East Pakistan in 1971.

Victory in 1971 War

16. Victory in the 1971 War was Manekshaw's finest hour. As Army Chief and Chairman, Chiefs of Staff Committee, he planned the operation meticulously refusing to be coerced by politicians to act prematurely. His strategic and operational finesse was evident when Indian pincers cut through Pakistani forces like knife through butter, quickly checkmating them. When the Prime Minister asked him to go to Dacca and accept the surrender of the Pakistani forces, he declined, magnanimously saying the honour should go to his Army Commander in the East. He would only go if it were to accept the surrender of the entire Pakistan Army.

17. Manekshaw's competence, professional standing and public stature was such that the politician and the bureaucrat alike crossed his path only at their own peril. On one occasion, he found that the Defence Secretary had penned his own observations on a note he had written to the Prime Minister and Defence Minister. Infuriated, Manekshaw took the file and walked straight into Mrs Gandhi's office. He told her that if she found the Defence Secretary more competent than him to advise her on military matters she did not have a need for him.

18. As a commander, he was a hard taskmaster. He encouraged his officers in the face of adversity but did not tolerate incompetence. That is perhaps Manekshaw's greatest contribution, to instil a sense of duty, efficiency, professionalism in a modern Indian army and to stand up to political masters and bureaucratic interference.

19. In a way, he was following the path of army chiefs, Gen K.S. Thimayya and Gen K.M. Cariappa. A humane but strict General, there are many tales of the power of his whiplash. Following Pakistan's surrender in the east, Manekshaw flew into Calcutta to

compliment his officers. The ceremonial reception over at Dum Dum airport, he was escorted to a car - a Mercedes captured from the enemy. Manekshaw refused to sit in it, leaving the officers red-faced. On another occasion, a general accused of misusing funds was marched up to him. "Sir, do you know what you are saying?" asked the general. "You are accusing a general of being dishonest". Replied Manekshaw: "Your Chief is not only accusing you of being dishonest but also calling you a thief. If I were you I would go home and either shoot myself or resign. I am waiting to see what you will do". The General submitted his resignation that evening.

20. **Land Marks**

1914: Born in Amritsar.
1933: Joins the Indian Military Academy.
1934: Commissioned into the army.
1947: Pakistan invades Kashmir. Is Colonel in charge of operations.
1962: Sent to NEFA to check further Chinese intrusion.
1965: Commander, Eastern Command during the Indo-Pak war.
1969: Appointed Chief of the Army staff.
1971: Indo-Pak war. Steers India to victory, and Bangladesh is created.
1973: Given the rank of Field Marshal.

CHAPTER-VI

COMMUNICATION

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SECTION-1

IMPORTANCE OF COMMUNICATION IN ARMY

Introduction

1. The information age is experiencing dramatic increase in Technology. Any kind of information can be conveyed within second to the concerned. In modern warfare the organization of the army has became so complex and its mobility so enhanced that commanders and staff officers have to depend primarily upon signal communications for exercising command and control of the forces. Efficient signal communications are therefore vital.

Importance

2. Battle field activities require frequent communicating between commanders and troops to achieves the desired result. Importance of communications is becoming a imager ingredient of modern warfare and it is important in army for the following reasons:-

(a) Communicating between deployed troops and commanders.

(b) Convey the details of enemy troop movements and their activities.

(c) To change the mode of battle activities.

(d) To implement emergency instruction in battle field.

(e) To convey specific orders in terrain and snow bound area.

(f) For effective operational changes in battle field.

(g) To acquire and decipher the information and misinformation of enemy.

(h) To prepare the troops for further operational activities.

(j) To assess grounds level effect of operational activities.

(k) To improve infrastructure facilities in battle field.

(l) To carry out secure and effective communications with precaution and privacy.

(m) Communication supply of food and evacuation of casualties.

SECTION-2

METHOD OF COMMUNICATION

Introduction

1. Communication is the easy transportation and transmitting of thought, idea and action from one individual to another and his reception and understanding of the same in the same form. Human beings with their higher intellect have successfully developed and evolved various forms of communications like, sign language, voice, written script, line transmission, radio wave, space wave and highly complex digital communication forms. The human race have been able to make the unthinkable possible and made the world a smaller place in terms of communications. There are various method of communications which have been discussed in the succeeding paragraphs.

Sign Language

2. The oldest form of expression was the sign language. This would have been understood and communicated even before the various forms of written scripts were developed. In conjunction with the sign language is the body language which even today has formed a part of psychological studies.

Voice Medium

3. The development and graduation of sign to voice has also evolved, as voice is a very powerful means of communication, however this had its own disadvantages of limited reach. This was further restricted because of the loudness, pitch and ability of the speaker/ transmitter and the hearing ability of the receiver. It is also effected by other factors such as interference of surrounding sounds, noise pollution, echoing and attentiveness of the listener.

Written Script

4. Once languages were formulised and some commonality in understanding of each other had been achieved, it appears that written script made a beginning. The earliest form of written expression can be found on the rock engravings of ancient scritpures in pictorial form. This gradually developed into alphabetic form and written script.

Runners and Message Bearers

5. Once the script had been evolved, messages could be communicated from the one person to another in written form. These messages were delivered by human runners or also by means of animals like pigeons, monkeys horse, parrots etc.

Line/Cable

6. The invention of telephone by Graham Bell revolutionised the world of communications as individuals were able to speak directly to each other. The voice being passed through a mouth piece converted into electronic means and passed down on a cable / line and received at the other end and converted back into voice and heard through an ear phone.

Wireless

7. Marconi invented the wireless and discovered that sound could be transmitted by sound waves through space. He invented the Morse code for passing messages in code which were first coded into Morse code and transmitted through a transmission devise and sent into space and received at the other end by a reception device. The person receiving the message decodes it back into message form and the message is delivered. Along with this the use of radio sets were as also developed and this became the basic means of communication for the army in mobile warfare and being used in places where static means of communication is not possible.

Electronic and Digital Analog

8. The rapid development and progress in electronics brought about the concept of digital analogs, and today communication can be done by transmission and by use of digital technology with a click of a mouse.

SECTION-3

TYPES OF COMMUNICATIONS, ADVANTAGES/DISADVANTAGES

Introduction

1. There are two types of communications - Line communication and Radio communication. These are discussed in succeeding paras.

Line.

2. This is the basic means of signal communications for a force which is static. A telephone is by far the best means of signal communication between individual officers, and telegraph circuit is the best means of clearing of messages. Line communication is provided by use of field cable, permanent lines and underground or submarine cables. Use of carrier and voice frequency telegraphy equipment provides more than one speech and / or telegraph channel with one pair of line.

3. **Advantages**

(a) Reliable and practically free from electrical interference.

(b) Relatively secure.

(c) Number of circuits and message carrying capacity is more but limited only by availability of material and manpower.

4. **Disadvantages**

(a) Vulnerable to physical interference and enemy interception along the entire length of the route.

(b) Takes time to construct.

(c) Inflexible once it is laid.

(d) Expensive in men and material.

Radio Communication

5. Radio communication involves Net Radio and Radio Relay.

Net Radio.

6. Net radio is the basic means of signal communication for any mobile force. It provides facilities for the following:-

(a) Radio Telephony – Simplex, depending on the type of equipment available.

(b) Radio telegraphy for transmission of message and key conversations.

(c) Use of Tele printers over radio transmission.

7. Efficiency of net radio communication is appreciably affected by factors such as weather, terrain, power out put of the set, state of training of operators and equipment maintenance.

8. This can be operated in the High frequency (HF) or Very High frequency (VHF). VHF band is the most common form of field radio equipment in use in many armies today.

9. **Advantages**.

(a) Is vulnerable only at terminal and is therefore reasonably protected from enemy action except by a direct hit.

(b) Is very flexible, can be rapidly re-arranged in the event of regrouping.

(c) Is rapid in establishing communication.

(d) Can work on the move although range obtained will be much less than when stationary.

(e) Is economical in personnel and equipment.

10. **Disadvantages**

(a) Is inherently insecure and susceptible to enemy interception which necessitates the use of codes and ciphers with a consequent delay in clearing traffic and overall increase in operating personnel.

(b) Net radio being inherently insecure demands a considerable degree of security consciousness on the part of the users. This means adherence to standard procedure and security codes.

Radio Relay

11. Radio relay implies that a series of radio transmitters and receivers normally spaced between 20-35 Kms apart and are used to provide point signal communication. Radio relay transmission and reception at each terminal take place on separates frequencies and therefore no send/ receive switching is necessary. It is duplex link and can therefore be connected to link ordinary line circuits to telephone or telegraph exchanges.

12. **Advantages**

(a) Replace line with considerable economy of manpower and stores.

(b) It can be operated over area where for reasons of ground or enemy activity use of line may not be possible.

(c) Provides greater flexibility than line.

(d) Quick to set up and move except in mountainous country.

(e) Is vulnerable physically only at terminal.

(f) By its ability to employ multichannel equipment radio relay provides more teleprinter circuits over one link than can normally be provided over the average field cable. Thus it has much greater traffic handling capacity.

13. **Disadvantage**

(a) Liable to interception and hence insecure. Has relatively greater security than net radio, depending upon the siting and direction of the beams.

(b) Liable to interference from enemy jamming although not as much as in the case of net radio.

(c) Terrain between stations must be reasonable suitable to get a 'quasi optical path', this presents difficulty in siting.

(d) Location of terminal and intermediate stations may not suit tactical layout and may, therefore, create additional protection requirements.

(e) Can not work on the move.

(f) Slightly more expensive in men and material than in the case of net radio.

(g) Needs critical siting.

SECTION-4

COMMUNICATION MEDIA

Introduction

1. The mode of transmission is chosen depending upon the frequency and application. These can be transmission lines or propagation through free space.

Transmission Lines

2. The line is a means of guiding electric energy from one place to another i.e. transmission (Tx) to reception (Rx) or powerhouse to consumption point etc. It comprises of two conductors so arranged so as to transfer electric energy with maximum efficiency. These can be of three types namely:-

(a) Parallel Wire type

(b) Coaxial type

(c) Wave Guide type

3. **Parallel Wire Type.** Also known as open wire line. These can be used up to the frequency range of 200 MHz.

4. **Coaxial Type**. It consists of one conductor as a hollow tube and second conductor located inside it. These are used at UHF, Microwave frequency up to 18 GHZs.

5. **Wave Guide Type.** These are hollow conducting tubes of uniform cross section used for UHF transmission by continuous reflection from the inner walls of the wave guides. These are used for frequencies above 1 GHZs.

Propagation of Wave

6. The mode of propagation of electromagnetic waves (EMW) from transmitter to receiver depends upon the frequency employed . These can be of following types:-

(a) **Ground Wave Propagation**. Used for long and medium waves, limited range is 30 Kms.

(b) **Sky Wave Propagation**. Used for HF range up to 30 MHz communication, range is 100 km to 1000 Kms. These make use of ionosphere layer existing to a height of 150 -200 kms from the surface of earth.

(c) **Space Wave Propagation**. The propagation of VHF and UHF frequency takes place in straight lines. The range is limited by curvature of earth and so distance between two neighboring station is approx 50 Kms.

(d) **Tropospheric Scatter Propagation**. Also known as tropo scatter or fwd scatter propagation, extended height up to 8-10 Kms from the surface of earth.

SECTION-5

RS ANPRC-25

General Description

1. Radio Set ANPRC-25 has been manufactured by Bharat Electronics Ltd, Bangalore. This is a VHF FM Radio set which can be used for communication.

Facilities and Special Features

2. Facilities are as follows :-

(a) It is a portable set.

(b) It has RT communication facilities.

(c) Can be used on ground and man pack.

(d) Facilities of remote operating and re- broadcasting is available.

(e) Power supply can be increased with booster unit to increase the communication range.

(f) Protection from Heat and Moisture.

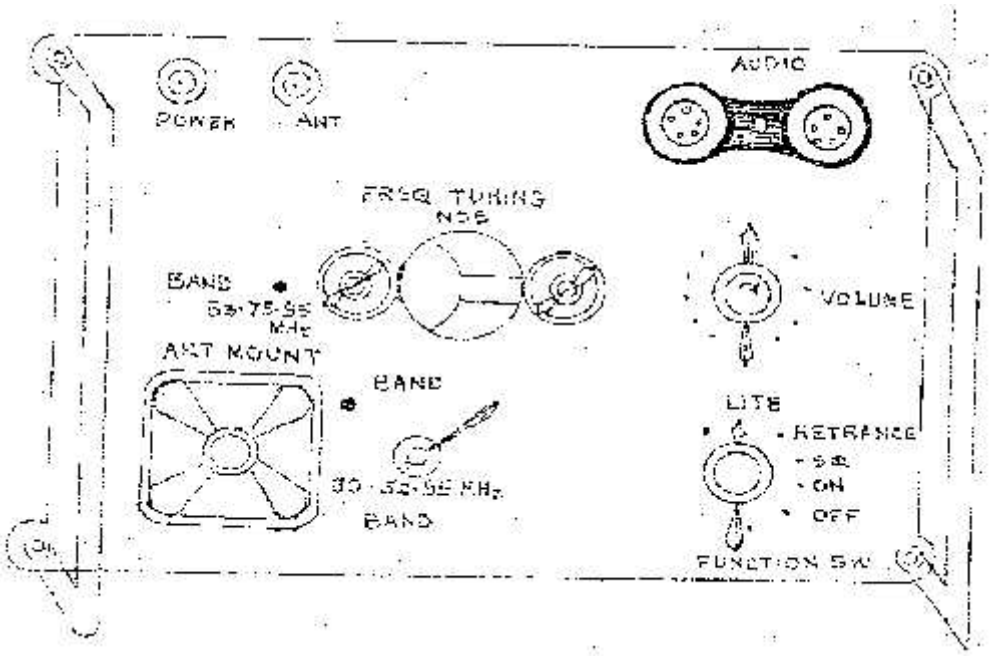
(g) VHF is pre-tuned.

(h) Suitable for Para Dropping.

(j) Compatible with RS VA and VA Mk II and VC.

(k) Range will be doubled when it is used with GPA.

(l) Can be used in all type of geographical areas.



Control Panel of ANPRC- 25 Set

3. **Weight & Measure**

(a) Measurement

(i) Radio Set - 28 cm x 10 cm x 28 cm.

(ii) Battery - 24 cm x 7 cm x 5.5 cm.

(b) Weight

(i) Radio Set - 6.10 Kg.

(ii) Battery - 1.60 Kg.

(iii) Accessories - 3.08 Kg.

(iv) Complete Station - 10.78 Kg.

4. **Frequency Range**

(a) Frequency range of this set is 30 MHz to 75.95 MHz which is fixed with two bands.

(i) Band I - 30 MHz to 52.95 MHz

(ii) Band II - 53 MHz to 75.95 MHz

(b) Its frequency range is connected with 920 channels. Channel spacing from one channel to another channel is 50 KHz.

Communication Range

5. (a) With antenna AT 892 - 8 Km.

(b) With Antenna AT 271 - 8 Km.

(c) With booster Unit - 25 Km

(d) With GPA with Booster - Range becomes double.

Power Supply Consumption

6. Battery Dry HT/LT 15/3 V IA. Life of this battery is in the ratio of 1:9 for 20 hrs, in which transmission can be done for one hour and message can be receive for 9 hrs.

Construction

7. The set is enclosed in a metal case. Bracket is provided on both sides to hold. Control panel is fixed with set case with the help of screw. Rubber gasket is provided to protect the set from dust, water and moisture.

Control

8. Control panel is shown in the figure above. The controls of this set are as under:-

(a) **Function switch**

(i) OFF : To switch off the set.

(ii) ON : To start communication

(iii) SQUELCH : To reduce the volume in absence of signal (to minimise electricity consumption).

(iv) RETRANS : For re-broadcasting.

(v) LITE : Provide light on dial.

(b) **Band Switch.** There are two position:-

(i) Band I : Frequency 30MHz to 52.95 MHz.

(ii) Band II : Frequency 53 MHz to 75.95 MHz.

(c) MHz Tuning Control : To tune the set in MHz steps.

(d) Receive/trans Frequency Dial : To show the operating frequency.

(e) Present Levers : To present two frequencies.

(f) KHz Tuning Control : To tune the steps in KHz steps.

(g) Volume control : To control the volume.

(h) Audio connecters : To connect retransmission cable or hand set.

(j) Antenna socket : To connect small or big aerial.

(k) Power connector : To provide power supply from vehicle.

Accessories

9. The following accessories are also provided along with the set.

(a) Antenna AT 892/PRC-25.

(b) Antenna AT 271/PRC-25.

(c) Battery Dry HT/LT 15/3 Volts IA.

(d) Hand Set H138/UYL Hand Set 5A or Hand set 189/GR.

(e) Retransmission cable kit CX 4656/GRC/IB.

(f) Bag Cotton duck CW 503/PRC-25.

(g) Support Antenna AB 591/PRC-25.

(h) Carrying harness ST 138/PRC-25.

Method to Close Down

10. (a) Ensure the functioning switch is kept in off.

(b) Check battery record and connect.

(c) Provide aerial.

(d) Connect Hand Set.

(e) Put on given frequency.

(f) Fix the carrying harness with RS.

(g) To send message press to talk (PTT) press the switch and announce in mike. Turn off function switch to minimise external noise.

Dismantling the Set

11. (a) Switch off function switch.

(b) Place the volume switch to zero.

(c) Remove Hand Set.

(d) Remove aerial.

(e) Separate battery and note down the record.

(f) Place dust cap.

Maintenance & Safety

12. The following points should be kept in mind:-

(a) Keep the set neat and dry and protect it from moisture. Aerial socket and plug should be clean & dry. Protect the spare battery from moisture.

(b) Ensure that the all heads are in working condition.

(c) Check the position of switches.

(d) Report the matter if there is any breakage or defect in set.

(e) Check the set by connecting it to other set.

(f) Replace unserviceable batteries by checking.

(g) Do not open the set. Gasket is placed to protect the set from dust, heat and moisture.

13. **Safety**. The following points to be borne in mind to keep the Radio set in safe condition:-

(a) Do not press the PTT switch when the antenna is detached from RS.

(b) Place the dust cap when RS is not in use.

(c) Remove dry batteries from RS if the set not in use for next 24 hrs.

(d) While removing the multi section antenna first open upper portion.

(e) Place the dummy plug on power socket when internal battery is on use.

SECTION -6

CHARACTERISTIC OF WALKIE TALKIE

RADIO SET GP 338 MOTOROLA

1. **Introduction**. Radio set GP 338 is a VHF/UHF Radio. It's frequency range is 136 MHz to 174 MHz in VHF mode and 403 MHz to 470 MHz in UHF mode and it has been divided into 8 zone with 128 channels.

Facilities

2. (a) It is portable and light in weight.

(b) Can be operated easily.

(c) It can be operated in VHF/UHF and 2 way simplex mode.

(d) 128 channel of this radio set can be preset into 8 zone.

(e) 16 channels can be preset into single zone.

(f) Frequency of this radio set can be programmed in 25 KHz channel space with the range of 12.5 to 20 KHz.

(g) Option of selective call facilities available.

(h) Call alert can be given to receiver station.

(j) Can select required zone.

(k) Start/stop facilities of scan operation available.

(l) Add/Delete from scan list facilities available.

(m) Menu key facilities are available.

(n) Provision of receiving signal strength indicator(RSSI) are available.

(o) Provision of name/Tone Tagging facility available.

(p) Provision of talk around indicator facility available.

(q) Provision of 14 character Alfa numerical display LCD facility available.

(r) Provision of clock/reminder alarm facility available.

(s) Audible alert tone indicator is provided.

(t) Seven programmable buttons are provided.

(u) Facility of emergency siren top button is provided.

(v) Battery gauge indicator facility is provided.

(w) Accessory connectors is provided with radio set.

(x) Provision of DTMF key pad (Duel Tone Mute Freq).

(y) Clock and alarm is provided.

(z) Time out timer facility is provided.

(aa) Provision of battery saver.

(ab) Power level can be adjusted.

(ac) Provision of MDC-1200 signalling encode/decode (Motorola digital code).

Weight and Measure

3. (a) Weight and measure of this radio set is as follows:-

(b) Dimension with NI MH high cap battery - 137 x 57.5 x 37.5 mm.

(c) Wight with NI MH high cap battery - 420 gms.

Frequency Range

4. Frequency of this radio set is as under:-

(a) 136 MHz to 174 MHz on VHF mode.

(b) 403 MHz to 470 MHz on UHF mode.

Communication Range

5. Communication range of this radio set is 4 to 5 Km and 20 to 40 Km with repeater.

Power Supply

6. Power supply can be provided to this radio set by the following batteries.

(a) Ni MH high cap 7.2 volt.

(b) Ni MH ultra high cap 7.2 volt.

(c) Ni Cd High cap FM 7.2 volt.

(d) Ni Cd High cap 7.2 volt.

(e) Lithium 7.2 volt.

Bty Charging Time

7. 1 hr for NI CD /NI MH batteries.

Power Out Put

8. (a) Power out put (VHF) 1 to 5 Watt.

(b) Power out put (UHF) 1 to 4 Watt.

Model (Shape)

9. This radio set has been divided into four portion.

(a) Top Panel.

(b) Side Panel.

(c) Front Panel.

(d) Back Panel.

Top Panel

10. Names and functions of the control knobs on top panel are as follows :-

(a) **On/Off Volume Knob**. This knob helps to provide power supply to radio set and to control the volume.

(b) **Channel Selector Knob**. This knob helps to apply the channel as required.

(c) **Top Button**. This button can be programmed for alert tone.

(d) **Antenna Mount**. Antenna can be fixed on it as per requirement.

11. **Side Button**. Name and functions of the large control on side panel is as under:-

(a) **Side Button 1**. This button is programmable. Radio set will work on monitoring mode on short press and in normal mode on long press of this button.

(b) **Press to Talk Switch**. Radio set will work on transmission mode when this switch is pressed and in receiving mode when released.

(c) **Side Button 2**. This button is also programmable. The radio set will work in scan mode when the switch is short pressed and will come out from scan mode when the switch is long pressed.

(d) **Side Button 3**. This button is also programmable for option mode.

(e) **Right Side Accessory Mount**. IC cable is to be connected during computer programming on this mount. The microphone is connected with air phone head . IC cable is to be connected while scrambling from palam top secrecy key . Accessory mount should be covered with dust cap when not in use.

(f) **Front Panel Programming Button**. There are a total of six buttons:-

(i) **Exit Key**. This key helps the radio set to come out from program after programming function.

(ii) **Up Key**. This key helps to step up the programme by one step.

(iii) **Menu Select Key**. Helps to select the menu.

(iv) **P-1 Key**. This key helps to lift up the programme by one stag.

(v) **P-2 Key**. This key is used for scrolling and progammes on menu mode.

(vi) **P-3 Key**. To give right move to cursor and to provide space while editing.

12. **Front Panel Key Pad**. This is an alpha numeric key pad. There are 10 keys on this pad from 0 to 9 figure. One key star and one extract key. Every key is functions in multi roll. So every key is marked as A to Z. During programming frequency selection, preparation of secrecy key, recording phone number etc can be done with the help of this key pad. It is used while filling the radio ID.

13. **LCD Display**. This is a 14 character LCD display window and 14 types of indicators are displayed.

14. **Back Panel**. The battery is fixed on this back panel of radio.

Equipment and Accessories

15. (a) Radio GP 388 Motorola.

(b) 7.2 volt Lithium and NI MH high cap battery.

(c) Spring action 2" belt clip.

(d) Antenna.

(e) Tri chemistry Rapid rate charger.

(f) Multi unit battery charger.

(g) Base mount antenna with 5 mtr RF cable.

(h) Ear phone head set microphone.

(j) Water proof canvas carrying pouch for GP 338 Radio.

(k) UHB.

SECTION -7

LINE COMMUNICATION

Introduction

1. Ten/ fifteen telephone sets are connected with an exchange. The range of communication is from 8 to 10 Kms. The telephone cables are laid on the ground and various formations provided communication through a magneto exchange.

2. The telephone sets are 'L', 'F', 'J' , 'EE, 8B'. The following are common to all telephone set :-

(a) **Parts**

(i) Leather case with carrying strap.

(ii) Generator handle.

(iii) L1 and L2 Terminals.

(iv) Hand Set.

(v) Microphone and Receiver.

(vi) Pressial switch.

(vii) Cord.

(viii) Terminals for hand set.

(ix) Socket for Hand set.

(x) Cable switch for CB Exchange.

(xi) Battery Compartment.

(b) **Function of a Telephone Set**

(i) It works on magneto signaling.

(ii) Calling is done by magneto.

(iii) CB calling and clearing is done.

(iv) It provides speech communication.

(v) It works in all weather conditions.

(c) **Power Supply.** 3 Volt DC obtained from 2 torch cells, connected, in series having 1.5 Volts is used.

(d) **Make.** These are made of iron. Tele set's EE, 8 B and F are kept in leather cases. Tele Set 'L' and 'J' in iron boxes.

(e) **Tests**

(i) **Bell Test** – Short the line terminals L1 and L2 and turn the generator handle, the bell will give a sound.

(ii) **Hand set Test**. Connected the Bty, Press the pressial switch and blow into the microphone, blowing sound should be heard in the ear phone.

(iii) **Out going Test**. Connect another telephone with the telephone, ring up from one end and talk to the other Speech from one another should be heard.

(iv) **Generator Test**. Lay two fingers on L1 and L2, turn generator handle, and a shock would be felt.

Practical Connecting Up

3. Take two telephones sets. Keep one telephone at one place and the other a distance. Connect L1 and L2 terminal of both telephones with a wire. Tell the cadets to ring up. The bell of the other telephone should ring.

SWITCH BOARD TELEPHONE 15 LINES

General

1. This switch Board has been designated to operate in field /Operational area with either magneto, CB, CBS or auto exchanges and has the following facilities.

(a) 15 Lines can be provided.

(b) Can work with either magneto, CB, CBS or auto exchanges.

(c) Has got both internal and external ringer.

(d) Two exchanges can be linked up to provide 30 line facility.

(e) A lamp indicator has been provided to warn the operator about an in coming call.

(f) A ringing visual indicator has been provided.

(g) Facility exists for night alarm.

(h) Apart from the dry battery, power source can be provided by secondary battery also.

(j) Lighting facility for the switch board is provided by means of specially designed lighting unit.

Power Supply

2. The power supply is both internal and external.

(a) Internal Battery Dry 1.5 Volt No 6X6 Cells provide a total 9 Volt voltage.

(b) External Battery secondary portable lead acid 6 Volt has been divided for internal supply into two parts.

(i) 6 Volt for Ring Relay.

(ii) 3 Volt for Speech and buzzer.

Dimensions

3. The dimensions of the 15 Line switch board are given below:-

(a) 3 A – 49.8 cm X 39.2 cm X 19.8 cm.

(b) 3 B - 50.5 cm X 39.5 cm X 21.3 cm.

(c) Weight – 22 Kgs. Dial unit weight 1 KG.

Design

4. The switch board for safety has been packed in a synthetic case and to protect various instruments for damage the switch board has a lid which opens in two parts. To protect it from dampness and dust a rubber gasket seals the packing material.

Consumption of Electricity

5. The consumption of electricity for different functions is:-

(a) 220 mA for ringer at 6 V DC.

(b) 30 mA for indicator at 6 V DC.

(c) 180 mA for night lamp at 6 V DC.

(d) 30 mA for Night Alarm buzzer at 3 V DC.

Name of Parts and Their Functions

6. The switch board has been divided into two parts i.e. front panel and back panel.

7. **Front Panel**. On opening the front lid the panel is visible. The controls fitted in it are as under:-

(a) **SPK/Ring Back forward Key**. Used to ring the caller/ subscriber. To ring the caller the position of the SPK key is "back" and to ring the subscriber the position is "forward".

(b) **Ring Ext/Ring Int.** To ring the caller is pressed downwards. In case internal ringer is not working external ringer is used but the position of the key will be set on external.

(c) **Circular Hand Set Connector 4 Ways**. The socket is utilized for operating the hand set by firstly plugging it in and then tightening it like a screw.

(d) **Coupling Key**. Is utilized when two exchanges are linked up.

(e) **Cord Test Jack**. To check the cord of a unit this jack is used.

(f) **Light on /off switch**. For night use.

(g) **Ring Indicator lamp**. Reveals to the operator that the ring is being received by the subscriber by glowing.

(h) **Speak/Monitor Key**. Has three positions of speak, normal and monitoring. During attend, the call key position is in SPK. To monitor the call key position is on MON. When the call is through, key is in normal position.

(j) **L E D (Light Emitting Diode)**. LED is of red colour and it indicates incoming calls.

(k) **Jack**. Is used to insert the plug.

8. **Back Panel**. Is visible after opening the back lid. The controls are as under:-

(a) **Subscriber Line Terminal**. Utilised for joining outside lines. A total 30 pairs of lines can be joined.

(b) **External Ringer Output Terminal**. Is put on the terminal when external ringer is required to be used.

(c) **Earth Terminal**. Used to earth the switch board.

(d) **Battery Switch**. Has two position External and Internal. Internal Battery is used as power supply when the position of the switch is on INT and in case external battery is used the position is on EXT.

(e) **Twin Jack Assembly**. Two jacks are used when two exchanges are coupled. One jack for coupling the exchange and the other for fitting the dial unit.

(f) **Parking Jack**. To Park auto call (available only in switch board 3 B)

Essential Equipment to make the System Viable

9. To make the system functional the following equipments is required:-

(a)	Switch Board	-	1 (one)
(b)	Hand Set 5 A	-	1 (one)
(c)	Braided copper lead	-	1 (one)
(d)	Cell dry 1.5 Volt No 6	-	6 (six)
(e)	Dial Unit telephone 1 A	-	1 (one)
(f)	Pin earth small	-	1 (one)
(g)	Adjustable web strap	-	1 (one)
(h)	User hand Book	-	1 (one)

Supplementary Accessories

10. The supplementary accessories are:-

(a)	Power ringer	-	1 (one)
(b)	Telephone set	-	1 (One)
(c)	Patch Cord 70 cm	-	1 (one)
(d)	Cell dry 1.5 Volt No 6	-	6 (six)
(e)	Battery secondary lead acid 6 Volt	-	1 (one)

Functional Check

11. After setting up the switch board, the following functional checks are to be carried out :-

(a) Check the operator's lighting unit by switching ON the toggle switch marked 'LIGHT'.

(b) Check that the COUP SW is in appropriate position (i.e. put on when internal telephone is used).

(c) Check the operator's telephone circuit by putting any one spk/mon key to SPK position and by blowing into the microphone and listening to the side tone.

(d) Check all the SPK/MON keys, in turn by putting them to 'SPK" position, blowing into the microphone and listening to the side tone.

(e) Test all the cords /line circuits, in turn by plugging into cord test jack in the operator's unit and pressing down the Ring key. Indicator diode lights up if the cord /line circuits are all right in the relevant line-cum cord unit.

(f) Check the night alarm circuit by switching 'ON' the toggle switch parked 'NA' when performing the test mentioned under sub para (e) above. The buzzer shall Buzz.

(g) Test each extension for correct functioning by ringing them. Ringing visual indication confirms outgoing ring. When the subscribers answer, ask them to ring back, the LED should glow. If the subscribers answer and if the speech and ring are through both ways it proves correct functioning.

TELEPHONE SET FIELD 5A/5B

General

1. This is light weight instrument which when used on cable WB-1 (twisted) has an optimum range of 30 Kms with a line loss of 40db 'L' position 20 %.

Characteristics and Functions

2. The telephone set Field 5A/5B has the following functions and advantages:-

(a) Facility exists for installing a autodial and hooking with an auto exchange.

(b) Facility for line test exists.

(c) A device has been installed in the micro phone for noise cancellation.

(d) In H position the range of the telephone is increased considerably.

(e) Facility exists on the both 5 A/5 B for remote operating.

(f) Made of superior magneto and can function with CB/CBS exchanges.

Power Supply and Consumption.

3. It is powered by 2 X 1.5 Volt No 3 cells or 3 V external batteries and the power consumption of set 5 A is 20 mA and set 5 B is 15 mA. It can receive and sent signal waves with a bell due to generator.

Dimensions

4. The sets are made of nylon fabric and designed to fit a soldiers pouch. The dimensions are given below:-

Type	Length Cm	Width Cm	Height Cm	Weight Kgs
5A	22.5	8.0	11.6	2.35
5B	23.0	9.5	11.5	2.50

Parts and Function

5. The name of parts and their functioning are given below:-

(a) **Hand Set.** It is linked with the main body

(b) **Cradle**. Has been designed to function with CB- CBS exchange. On lifting of the hand set from the cradle a ring is heard at the CBS exchanges.

(c) **Line Terminal**. They are two in number and are used to join the outside lines with that of exchanges.

(d) **HLR Switch**. This is a system which has three position of High, Low and Remote.

(e) **Battery Compartment**. Is used to store and link 2 X1.5 V Cells.

(f) **TLR Screw**. 5 A - A total of 6 screws utilized when in use for auto dial or magneto exchange. This facility is not available with Telephone set 5 B.

(g) **Method of Line Test**. Put the R position on system switch (HLR switch) and put the hand set on the cradle. Link the line to be tested with the terminals and rotate the generator handle.

(h) **Broken Line**. If the line is broken the following will take place during line test :-

(i) Generator handle will move freely.

(ii) Bell will not ring.

(iii) Speech communication will not take place

(j) Short circuit can be detected by the following during line test:-

(i) Generator handle will move stiffly (Hard).

(ii) Bell will not ring.

(iii) Speech communication will not take place.

(k) **Earth**. In case of earthing during line test the generator handle will move a bit, will ring with pauses and communication will be faint.

Maintenance

6. Maintenance of the set has to be carried out daily and on weekly basis.

(a) **Daily Maintenance**

(i) Clean and protect from dust and dirt.

(ii) Check hand set and Generator for breakages.

(iii) Check batteries for leakage.

(iv) Check switches and cord.

(b) **Weekly Maintenance**

(i) Check battery voltage, if below 2.5 Volt, Change the battery.

(ii) Carry out function test.

Difference between Set 5 A and Set 5 B

7. The main difference between Set 5 A and Set 5 B is given below:-

	Telephone Set 5 A	**Telephone Set 5 B**
(a)	Small in size	Large in size
(b)	Light in weight	Heavier
(ci)	Auto call can be attached	Auto call can not be attached
(d)	Bell is tubular type	Bell is Gong type
(e)	CB Loop resistance is 200, 250, 300.	CB Loop resistance is from 200 to 350
(f)	TRL switch exists	TRL switch does not exists
(g)	Threaded type of line terminal	Push type line terminal

EXCHANGE MAGNETO : OPERATING PROCEDURE AND PRACTICAL WORKING

Setting up

1. To set up the Exchanges :-

(a) Place the switchboard on a level surface, preferably not on the ground, It is important that the apparatus is leveled to ensure that the indicator shutters operate when a subscriber calls.

(b) Unscrew and raise the front and rear lids. See that each plug rests in its appropriate storage socket, i.e. the hole immediately above the cord.

(c) Connect the cord marked TELE at the back of the switchboard to the operator's telephone set. Lock the front lid in the required position by means of the knurled nut at night.

(d) Connect the braid to the EARTH terminal and to the earth pin provided.

(e) Connect the pairs of incoming telephone lines to the pairs of line, terminals at the back of the switchboard.

(f) If earth return circuits are used, connect the line to the upper terminal of a pair of terminal and earth the lower terminal.

(g) If necessary, moisten the earth around the earth pin to ensure a good earth.

(h) Better results will be obtained if each of the lower terminals is brought to a separate earth. Earth pins in this case should be widely spaced to reduce cross talk.

(j) If required, connect the buzzer and 3 volt battery connected in series to the terminals marked 'Alarm' at the back of the switch board.

(k) Release the indicators by sliding the guard strips upwards as far as possible.

2. **Packing.** When closing the switchboard, make sure:-

(a) The guard strip is lowered over the drop indicators.

(b) All plugs are inserted in their appropriate storage sockets and are pushed in. To facilitate storage of cords, divide them into two approximately equal group, one on either side of the centre of the switch board, place the loops of the left hand group towards the right hand side and the loops of the right hand group towards the left hand side.

(c) The earthing braid is neatly wound round the brackets.

(d) All fixing screws are tightened securely.

CONNECTING AND PUTTING THROUGH SINGLE AND MULTIPLE CALLS : PHRASES TO BE USED WHILE OPERATING

Phrase used while operating

1. The following phrases are used while operating the exchange:-

(a) " Number please , Sir".

(b) " You want number …….. Sir".

(c) " Sorry , Sir Number is engaged , Sir".

(d) " I will ring you back , Sir".

(e) " Call for you from …… Speak up, please".

(f) " Have you finished . Sir".

Normal Call or Single Calls

2. The following procedure is followed while putting through Single Calls:-

(a) Insert the operator's plug into the line jack under the indicator, the shutter of which has fallen. This restores the shutter. Give the name of the exchange.

(b) The subscriber then ask for the required connection. Repeat the demanded numbers to satisfy the caller that it has been heard correctly.

(c) Transfer the operator's plug into the line jack of the wanted number and call by turning the generator handle briskly several times.

(d) After the wanted numbers as above, put the plug connected to that line half way into the caller's line jack. On hearing a reply, push this plug firmly home and say, "You are through, Sir". As soon as conversation starts, take the operator's plug out of the line jack of the wanted line. No clearing signal can be received unless this is done.

(e) On receiving the clearing signal (the falling of the shutter associated with the caller or the called) (no matter which subscriber is the first to ring off), insert the operator's plug into the line jack below the fallen shutter (Thus restoring the shutter) and say, " finished please ? - finished please?"

3. If nothing is heard remove the plugs from the line jacks of the connected subscribers. If it appears that conversation has finished but the subscribers have forgotten to clear, insert the operator's plug in the wanted subscriber's line jack and listen. If conversation is still in progress remove the plug; if nothing is heard say as in sub para (e) above . "finished please" ? etc and clear down if there is no reply.

Multiple Calls or Bunching

4. The following procedure would be followed for putting through multiple calls.

(a) A Subscriber wishing to be connected to several lines at the same time calls the exchange and asks for the required numbers. An in sub- para 2 (a) above, insert the operator's plug into the line jack under the shutter which has fallen and give the name of the exchange. Repeat the demand and ask the subscriber to wait till the connections are made.

(b) Insert the operator's plug into the line jack of the first wanted number and call by turning the generator handle briskly several times. Immediately after calling,put the plug connected to this line half way into the caller's line jack and say "Multiple call for you, sir. One moment please". But do not push the plug home.

(c) Transfer the operator's plug to the line jack of the next number to be called. After calling, put the plug connected to this line half - way into the line jack of the last number that was called, and on hearing reply, say, as before, "Multiple Call for you, sir, One moment please".

(d) Repeat this for each of the wanted numbers until the last one has been told "Multiple Call for you, sir", after which push all the plugs home and say. "You are through sir".

(e) As soon as communication is satisfactorily established, remove the operators plug from the line jack of the last number called. No clearing signal can be received unless this is done.

(f) On receiving a clearing signal, plug into the line jack under the fallen shutter and ask, "Finished please" etc. If there is no reply remove all plugs from the line jacks concerned.

(g) If it appears that the conversation has finished but the subscribers have forgotten to clear insert the operator's plug in the jack of the last subscriber called and listen. If conversation is still in progress remove the plug; if nothing is heard say " Finished please" etc and clear down if there is no reply.

SECTION -8

LATEST TRENDS AND DEVELOPMENTS

Introduction

1. The field of communication has seen rapid growth during the last century, beginning with the discovery of radio telephony by MARCONI and GRAHAM BELLS the development has been speedy. Various forms of communication media have been discovered. The medium of space has acquired special importance and communication are been carried out using various layers of the atmosphere.

Troposcatter

2. **Troposcatter.** The lower layer of the atmosphere below 15 KM height, is called tropospheric region. Communication carried out in this layer use the principle of troposcatter. In this system micro waves are transmitted in the UHF and SHF Band to achieve Radio Communication over the horizon covering a range between 70 KMs to 1000 KMs .

Application of Troposcatter

3. (a) It is used for long range point to point communication.

(b) Ideal for rugged terrain / otherwise desert, mountain sea, etc .

(c) It has the following channel capacities:-

(i)	Voice	- 24 channel
(ii)	Telegraph/ Telex	-32
(iii)	Data	- 03

MODEM (Modular-Demodulator)

4. This device is used to convert computer generated output (Digital signals) that can be transmitted on a telephone line. Modem are required at both the sending and receiving computers.

FAX

5. This is common short form of FACSIMILE which is one of the memory type electronic mail and message systems with the following advantages:-

(a) Can transmit graphics as well as alphanumeric information (letters and numbers).

(b) Reduce time and eliminates transmission error.

(c) Can transmit information in any vernacular language.

(d) Use any transmission medium eg telephone, line, micro radio wave .

TELEX

6. This is the abbreviated form of TELEPRINTER EXCHANGE. As cable used in this type of communication devices to connect two such instruments it restricts its range of operation.

7. **Advantage**

(a) Re-generative repeaters in a network can increase range, however voice signal can not be re-generated.

(b) Can be used over a telephone network

(c) Can receive messages when unattended.

(d) Message is recorded in a printer form.

8. **Disadvantages**

(a) The Equipment is costlier than a telephone set.

(b) Key in error due to the need for a human operator to send-receive message.

(c) Lack of privacy since any one can read the printed out put.

Satellite

9. An object which revolves around another larger object whose motion is primarily and permanently determined by the force of attraction of the body is known as a satellite. Before the space age, planets and moons were the only known satellite. On 4th October 1957 the first man made satellite called the SPUTNIK was launched by the erstwhile USSR since then more complex and versatile satellites have brought about a revolution in the field of communications.

10. **Type of Satellite.**

(a) Weather Satellite.

(b) Scientific Satellite.

(c) Communication Satellite.

(d) Navigational Satellite

(e) Military Satellite.

Optical Fibre Communication

11. Hollow tube made of corning glass with an outer protective coating of rubber/ plastic etc are what constitutes optical fiber. These fibers are very delicate and small in diameter.

12. **Advantages**

(a) It has wide band width carrying different types of info from low speed voice signal to high speed computer data.

(b) Less power requirement.

(c) Small cable size.

(d) No repeater station required.

(e) No electromagnetic interference.

13. **Disadvantages**

(a) Jointing problem.

(b) Channel dropping not possible.

(c) More expensive.

14. Based on number of modes which can be propagated through the febricity are classified as Single Mode or Mono Mode and Multi Mode optical fibers.

Computer System

15. Strictly speaking a computer is any calculating device. The name is derived from a Latin word "Computer" meaning to reckon or compute. However, the term computer has come to mean a special type of calculating machine having certain characteristics.

16. **Advantages**

(a) Speed of process and calculations.

(b) Accuracy of process and calculation once the programme is proved.

(c) Persistence - It will continue on the same job until the end, always working in the same way, each and every day.

(d) Mass storage of data.

(e) The ability to handle large volume of data.

17. **Disadvantages**

(a) Data loss if machine malfunctions.

(b) Back up hard data still required to be maintained.

(c) Constant power source is required.

Internet

18. Millions of computers all over the world are interlinked through telephone lines, satellites, submarine cable and optical fiber network. This World Wide Web (www) is what is called the "Internet" it provides an instant trouble free and cheap means of communications. Internet is therefore a collection of individual data networks connected

together in such a way that data can be exchanged back and forth between networks widely separated. The present form of the internet evolved from early beginning made by the US Defence Department about 20-25 years ago. Electronic Mail, Web- Browsing and Voice Mail are the main facility of internet.

Cell Phone

19. Cellular radio network was first introduced in 1980, it provides a mobile subscriber access to the global telephone network. It is a rapidly expanding technology with high rates of obsolescence.

20. **Advantages**

(a) More subscriber and traffic capability.

(b) No perceptible difference between mobile and fixed subscribers.

(c) Better quality of service.

(d) Miniaturization using very large scale integration (VLSI) technology which enables ever decreasing size and weight of the hand set.

(e) Higher speed of data exchange.

(f) Can be used in an integrated mode with computer network.

Multimedia

21. It is a computer technology that displays information using a combination of full motion video animation, sound graphics and text with high degree of user interaction.

Video-Conferencing Systems

22. These provide the full benefits of face to face communication with sound, graphics and simultaneous transmission of data. The system enables people widely separated geographically to inter- act without having to meet at one place.

Videophone

23. It is a system that enables us to transmit an image via digital tele network, making visual contact possible over great distances, apart from transferring speech.

24. **Facilities**

(a) Can transmit speech as well as colour video.

(b) Conduct of video conferences.

(c) Called subscriber is seen on the monitor.

(d) High quality of voice.

(e) Speed of sending/ receiving can be adjusted by the user.

(f) Map over-lays can be transmitted.

Information Technology

25. Information Technology or IT for short, refers to the creation, gathering, processing, storage, presentation and dissemination of information, and also the processes and devices that enable all this to be done. IT stands firmly on the hardware and software of a computer and the telecommunications infrastructure. Computers, as we all know, have been in existence for over 50 years. For many of these years, they had been primarily used for information processing. It is well known that year-by-year, computers are becoming more and more powerful both in terms of their computational speeds and also their capacities for storing of data. What has made the big difference in recent years is not the fact that individual computers have dramatically improved in their capabilities, but that all those information islands are being connected by digital highways made possible through the use of the telecommunications infrastructure by the computers, which, which largely explains why the internet and the WWW have begun to play such a significant role in our use of computers.

CHAPTER-VII

OBTACLE TRAINING

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SECTION-1

OBSTACLE COURSE

General

1. The aim of obstacle training is to instill self-confidence and generate team spirit in the cadets by teaching them to successfully cross obstacles individually and as team members. Obstacle training is very important for the NCC cadets as it infuses courage, patience in them and makes them physically fit. Initial training is given to cadets in PT dress, and later on with packs and weapons.

TYPES OF OBSTACLES

2. **Straight Balance**. It is a wooden beam, which is 1 ½ ft above ground level, having 3" width 4" breadth, & 12 ft in length. In this cadet has to walk on the obstacle and balance himself with his arms.

Straight Balance

2. **Clear Jump**. The obstacle is wooden beam 2 ½ ft from the ground. Cadet has to jump over this wooden beam without using any part of the body.

3. **Zig Zag Balance**. It has a structure of wooden beam 30 ft in length, with 3 inch width and 1 ½ ft above the ground and is constructed in a zig-zag manner. The Cadet has to negotiate the obstacle similar to straight balance.

Zig Zag Balance

4. **High Wall**. The cemented wall is 6 ft in height, 12 ft in length. Cadet has to run, jump and set his one hand on the wall and then push his body upwards and jump over the other side.

High Wall

5. **Double- Stride Jump**. The obstacle is composed of two ditches each of approximately 6-8 ft in length, 4-5 ft wide and 3-4 ft deep separated by a small gap of approx 9-12 inch. The cadet have to jump across the two ditches by jumping over the first ditch, placing one foot on the gap and jumping across the second ditch.

Double- Stride Jump

6. **Right Hand Vault**. This wooden structure is 3 ½ ft above the ground. The cadet is required to jump over the obstacle using the right hand as support on the beam.

7. **Left Hand Vault**. It is similar to right hand vault . Cadet has to take support of wooden beam with left hand and jump across.

8. **Ramp**. It is a slant, which is 15ft in length. 18 ft in width and 4 ½ ft in height. One has to run from a distance and on reaching the top cadet has to take a long leap.

Ramp

9. **Gate Vault**. This is a wooden structure which has two beams at height of 3 ft and 5 ft respectively, both 18 ft long. One has to cross the gate by holding upper beam with both hands and by putting one's feet on 3 ft gate and jump across.

Gate Vault

CHAPTER-VIII

HOME NURSING

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SECTION-9	Operation: After Care, Dressing of Wounds
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SECTION -1

INTRODUCTION TO HOME NURSING

Introduction

1. Nursing plays a very important role in the recovery of a patient. While the doctor prescribes a course of treatment, it is the nurse who actually translates it into action. It is on the efficient nursing of the case that the whole success of the treatment depends.

2. A large number of people have to be nursed at home either because their sickness is not so severe or because on being discharged from hospital they convalesce at home. It is here that skill in home nursing comes in. A girl cadet trained in home nursing can be an asset to a family as she can by her care keep a patient's condition from deteriorating and can nurse him back to health. Thus home nursing can be defined as functioning of a person, with all the efficiency and qualities of a nurse, in one's own home, taking care of the establishment and reducing the intensity and the frequency of sickness to the barest minimum.

Qualities of a Nurse

3. A good nurse must possess the following qualities:-

(a) **Honesty and Truthfulness**. A nurse should be honest to her profession. She should confess her mistake whenever she makes any, and not risk the life of the patient by hiding it.

(b) **Sympathy and Understanding.** A good nurse should deal with the patient with understanding and sympathy. She should sympathetically appreciate the pain and suffering of the patient.

(c) **Cheerfulness, Gentleness and Willingness.** A cheerful nurse reduces the sufferings of the patients to half. Her gentleness reduces their pain and discomfort. Her willingness and eagerness to help is instrumental in making them bear their troubles with a smiling face. "A warm smile may be more therapeutic than a dose of medicine".

(d) O**bedience and Discipline.** A nurse should have self discipline and should obey the orders of the doctor and carry them out without argument.

(e) **Observant.** A Nurse should observe the minutest details of the patient's condition. If there is the slightest change in the patient's condition, she should immediately report it to the Doctor. She should also observe whether the hospital equipment is functioning properly or not.

(f) **Tact and Sense of Humour**. A tactful nurse can deal easily with the patient who becomes irritable due to disease. Her sense of humour also helps her in bearing the hardships of her profession cheerfully.

SECTION -2

THE ROLLER BANDAGE AND ITS APPLICATION

General

1. Rollers bandages are made of various materials and are of various lengths and width according to the part on which they are applied.

(a)	Bandage for Finger	-	1" wide
(b)	Bandage for Head and Arm	-	2 ½"
(c)	Bandage for Trunk	-	6"
(d)	Bandage for Leg	-	3 ½"

General Rules for Application

2. The rules for applications are:-

(a) Face the causality.

(b) Hold the head of the bandage in the right hand.

(c) Apply the outer side of the free end to the part and where possible lock it in position by a superimposed turn.

(d) Bandage firmly from below upwards and from within outwards over the front of the limb.

(e) Apply the layer of the bandage so that it covers neither too tight nor too loose.

(f) When completed secure the bandage by a safety pin or adhesive strapping.

Method of Application

3. There are three methods of applying the roller bandage:-

(a) **The Simple Spiral.** This is only used when the part is of uniform thickness, for example , finger or wrist. The bandage is carried out in a spiral direction.

(b) **The Reverse Spiral.** This is used in bandaging those parts of the limbs where there is varying thickness. This is made by a number of spiral turns in which the bandage is reversed downward upon itself at each circuit of the limb.

(c) **The Figure of 8**. It is used for bandaging in the neighborhood of a joint such as knee or elbow. This is applied by passing the bandage obliquely round the limb alternately upward and downwards, the loops resembling the figure of '8'.

SECTION -3

THE SICK ROOM:PREPARATION, CLEANING, LIGHTING AND VENTILATION

General

1. The sick room should be that room of the house which is away from all noise and through which there is no passage. However, it should have a bathroom and lavatory close by. It should face South or South-West.

Preparation

2. A sick room should not have too many things. However, it should be comfortably furnished. There should be a comfortable bed, a bed side table, two chairs and one easy chair. A cupboard for keeping equipment should also be there. A wash basin with jug of water, soap, nail brush and towel must be arranged on a stool or small table. If possible a curtain stand may be arranged. A waste paper basket should be kept at a convenient place.

Cleaning

3. Dirt and dust are depressing to a sick person and retard his recovery. Moreover, these are the biggest source of illness as they harbour germs of various diseases. Hence due importance should be given to the daily cleaning of the room. The following points should be kept in view:-

(a) All cleaning work should be done without disturbing the patient after the toilet is over and the bed remade.

(b) Light furniture should be removed before the room is swept and dusted. After dusting, each piece should be wiped with a weak solution of disinfectant and then polished with dry cloth.

(c) Dusting should be done with a damp cloth. The floor should be cleaned after scattering damp tea leaves so that dust does not rise.

(d) At night, flowers should be removed from the vases and fresh flowers arranged in the morning.

Lighting

4. The light should not fall direct on the face of the patient. It should come from behind or the sides. There should be a shaded lamp on the side of the patient. There

should be another shaded light for the nurse, so placed, that she can do her job without disturbing the patient. A well protected light can quite serve the purpose.

Ventilation

5. Fresh air is essential for human existence. One of the important processes of living is inhalation and exhalation. The dirty air exhaled by the breathing process is replaced by clean, fresh air inhaled by nostrils. The foul breath breathed out gets mixed up with fresh air and is to be separated so that fresh air is available for the breathing process to continue.

6. **Cross Ventilation**. Ventilation means the availability of pure, fresh air in abundant quantity. It also means bringing inside a house or a place of work plenty of sunlight. This is done through doors, windows and open spaces. For a good flow of air, there should be doors and windows in opposite directions exactly facing each other and at the same level. To be considered a well ventilated house the various doors and windows should face the direction of the sun light so that sunlight flows in, in ample quantity to drive away all moisture and darkness. Lack of fresh air, darkness and moisture cause many dangerous diseases such as tuberculosis and rickets.

7. **Wide Streets with Open Spacing**. Besides cross ventilation in the house there should be open space around the house also. Congested localities cannot have proper flow of fresh air.

8. **Effects of Stagnant Air**. Effects of impure air on health are terrible. If there is no flow of fresh air, temperature would rise and humidity increases. This would produce headaches, drowsiness, nausea, loss of appetite, depression and a tendency to catch cold quickly. There would be diminished resistance to infectious diseases and people would become dull and incapable of concentration. Poor ventilation results in rickets in children. Tuberculosis is caused when there is over crowding and insufficient ventilation. It is one of the common communicable diseases in India. The bacteria of Tuberculosis is passed from the patient to a healthy person through sputum or through droplet infection. Dark and crowded houses help in the spreading of diseases.

9. **Cleaning of Air Through Trees**. In the process of breathing, dirty gases are exhaled. The environs of cities get polluted because of a large number of factories emitting smoke and harmful gases. Smoke is discharged by trains, trucks and buses also. To lessen this pollution, trees should be planted in large numbers. Trees help in the process of purifying air.

10. **Effects of Heat**. Good ventilation means that not only should there be plenty of air but also the temperature of the air should be comfortable. It should not be full of foul smell or smoke. Moist air gives rise to diseases. If the air is hot it causes exhaustion, nausea and headache. Heat stroke also may take place. Hence during summer, air should be kept flowing through cross ventilation and cooling measures adopted.

SECTION -4

PULSE , RESPIRATION AND TEMPERATURE TAKING AND RECORDING

General

1. The patient's quick recovery depends very much on the efficient routine care by the nurse. Daily routine should be planned according to the patient's habits and followed regularly unless some sudden change in the patient's condition requires some adjustment.

Pulse

2. **Pulse**. The pulse is the heart beat and is most commonly felt at the radial on the point of the wrist . The average pulse rate is 72 beats per minute. In case of infants, is 100 to 140 beats per minute and in case of children 90 to 100 beats per minute.

3. **Taking Pulse**. The rate of the pulse changes with the change in emotions and while doing exercise. To count pulse, the patient should be made to sit down in bed. The arm must be relaxed and in a prone position. To take pulse, the tips of the first three fingers should be laid down on the radial artery at the base of the palm. The index finger should be nearest to the palm of the patient's hand. The thumb should be placed at the back of the hand. The pulse can be easily felt. Count beats in a minute keeping an eye on the second's hand in your watch.

4. The result should be immediately entered in the pulse column of the TPR Chart.

Respiration

5. The inhalation and exhalation of a person is called respiration. It is rhythmical and quiet. The normal rate is 15 to 20 times a minute and can be counted by the heaving of the chest. It changes according to age.

(a) Infants 30-40 per minutes.

(b) Children 24-28 per minute.

(c) Adults 15-20 per minute.

6. **Exercise and Emotional State Increases Respiration**

(a) To check respiration correctly, count while keeping the fingers on the pulse so that the patient is not aware of it.

(b) Any difficulty in breathing must be reported immediately.

(c) While counting respiration, note rhythm, rate and depth of respiration.

Temperature

7. **Temperature**. The normal temperature of a man is between 97^0 and 99^0 F. There is slight $½^0$ F variation between the daily temperature in the morning and evening. The lowest temperature is between 2 AM and 4 AM.

8. **Measuring Temperature**. It is important to know how to measure temperature. The body temperature is taken by the clinical **thermometer** which is a device consisting of a bulb containing mercury and a glass tube which has a white bank to reflect the tiny mercury band. The range of the thermometer is 95^0 F to 110^0 F. The degrees are indicated by black lines. A figure is written after every 5^0. An arrow indicates the normal level of temperature i.e 98.4^0 F.

(a) Normal temperature by mouth is 98.4^0 F or 37^0 C.

(b) By axilla or groin it is 1^0 F lower than by mouth.

(c) By rectum, it is 1^0 F higher than by mouth.

(d) Fahrenheit is changed to centigrade by the formula

$F-32^0 \times 5/9 = C$

9. **Method.** Keep the bulb of the thermometer pressed under the armpit or beneath the tongue or in the groin for 2 minutes. Take the reading and record in the temperature column of the TPR Chart

Recording of TPR Chart

10. The TPR Chart is a morning and evening record of the patient's temperature, pulse and respiration with some other details such as the number of times the patient had motions and the amount of urine passed. This helps the doctor in learning about the latest condition of the patient at one glance.

SECTION -5

OBSERVATION OF THE SICK: SIGNS AND SYMPTOMS TO BE NOTED

Reports

1. The most important duty of the nurse is to give a correct account of the condition of the patient to the doctor. Her report should be based on detailed observation and not on assumptions. She should not take any risks and must go on writing down all her observations regarding the following:-

(a) **Appearance of the Patient**

(i) The colour of the skin whether pale, flushed blue or yellow.

(ii) Whether moist or dry, hot or cold, smooth or rough, covered with rashes, bruises or discoloured.

(iii) If any swelling or oedema.

(iv) If pain, its place and duration.

(v) Facial expression and other signs of discomfort.

(b) **Temperature, Pulse and Respiration**. Take temperature, pulse and respiration twice a day or four times a day or eight time a day, as desired by the doctor and maintain TPR Chart.

(c) **Stools**

(i) Frequency and whether it shows constipation or diarrhoea condition.

(ii) **Colour**

(aa) Normal brown.

(ab) Clay coloured which shows obstructive jaundice.

(ac) Black shiny which shows bleeding from the stomach or duodenum.

(ad) Full black which shows effect of medicines like iron.

(iii) **Composition.** Presence of abnormal material as blood, pus, gall stones, worms, undigested food. Specimen of stool is to be left for the doctor to see in a well covered container.

(d) **Urine.** In case of urine the following should be observed:-

(i) **Frequency**. Increased frequency, is due to inflammation of the bladder.

(ii) **Quantity**

(aa) Urine output is reduced in fever, in conditions of dehydration and in a acute nephritis.

(ab) Urine quantity is increased in case of diabetes and inflammation of the kidneys.

(iii) **Colour Abnormalities**

(aa) **Red** – Due to presence of a lot of blood.

(ab) **Dark Greenish Brown** – Due to presence of bile.

(ac) **Smoky** – Due to some blood being present.

(ad) **Orange, Green or Blue** – Due to presence of some drugs.

(iv) **Deposits.** If the urine is allowed to stand, the following may be observed:-

(aa) A sandy deposit white or pink.

(ab) A whitish cloud showing mucous.

(ac) A thick greenish deposit due to pus.

(Early morning specimen should be kept in a clear, covered , glass bottle).

(e) **Cough and Sputum.** Report on it must state:-

(i) Amount.

(ii) Colour.

(iii) Whether expectorated easily or with difficulty.

(f) **Vomit**

(a) Quantity.

(b) Time in relation to food.

(c) Whether it causes pain or relieves it.

(d) Material vomited such as blood.

SECTION -6

FEEDING A HELPLESS PATIENT

1. While feeding a helpless patient, the bed and the side table should be properly and neatly arranged. The nurse should give full attention to the patient so that patient does not feel that he/she is being hurried through a meal.

(a) **Feeding a Patient on Fluid Diet**. The mouth of the patient should be washed and wiped. If the patient can sit up, the fluid can be given in a cup or in a glass. If the patient wants to take fruit juice with a straw he/she should be given that. But it should be ensured that the straw is absolutely clean. If the patient can not sit up, he/she should be fed with a feeding cup or a feeder. The bed clothes should be protected by placing a clean napkin beneath the patient's mouth. The nurse should place her left arm, under the first pillow to raise the patient's head slightly. The flow of the fluid should be regulated so that too much of it does not flow into the patient's mouth. One mouthful should be given at one time pausing to allow her time for chewing. Feeding can be done with a tea spoon also. In case of jaw injuries, a small rubber tube is attached to the spout of the feeding cup and then put between the teeth. The patient should be given small quantity to swallow at one time. After feeding the patient, lips should be wiped with a clean towel.

(b) **Feeding with Solid Food.** Food should be served in an attractive manner arranged attractively on a side table. One dish should be brought at one time .The food should be served hot. It should be put in a plate in the kitchen before bringing to the patient. Patient should be fed with a spoon. As soon as food is finished the plate should be removed.

SECTION-7

MEDICINES AND THEIR ADMINISTRATION

1. A Nurse has to take great care with medicines. She should fully understand the doctor's prescription and keep the medicines well labelled and properly stored. There should be three separate shelves of a cup board, one for lotions, one for medicines and the third one for poisons.

2. All poisonous lotions should be marked "for external use only". No unlabelled medicine should be ever used. All stale lotions should be thrown in the sink, as they undergo change and may turn dangerous. In hospitals the key medicines should be kept locked.

3. A nurse should know the symbols often used in prescriptions, such as:-

(a) **Measuring Liquids:**

1 minim (m)	=	One drop
60 Minims	=	One drachm
8 drachms	=	One ounce (2 table spoonfuls)
20 ounces	=	a pint (o)

(b) **For Measuring Solid Drugs:**

GR	=	Grain
1 GR	=	60 mg
30 GRs	=	1 Ounce
GRMS	=	Grams

(c) **Abbreviations Most Commonly Used :**

Aq	=	Water
Aq Distt	=	Distilled water
Liq	=	Liquid
Mist	=	Mixture
IV	=	Intra muscular
Sc	=	Subcutaneous

Ol	=	Oil
Pulv	=	Powder
Tict	=	Tincture
Ung	=	Ointment
Aa	=	Of each
Ac	=	Before food
Pc	=	After food
Ad Lib	=	Liberally
Alt days	=	Alternative days
OD	=	Once in a day (24 hours)
BD	=	Twice a day
TDS	=	Three times a day
QID	=	Four times a day
CM	=	Tomorrow morning
RS	=	At bed time
ON	=	Tomorrow night
SOS	=	If necessary once
STAT	=	At once
OM	=	Every morning
PRN	=	Whenever required
PR	=	Per rectum
PV	=	Per vagina

Administering Medicines

4. Proper administration of medicines is most important, as on it depends, the very life of the patient. Hence if there be any doubt the doctor should be asked to clear it. Guess should not be used. The following points should be kept in mind while giving medicines:-

(a) **While Giving Liquid Medicines**

(i) Check the label with the prescription. If handling a new medicine read the instructions carefully.

(ii) Shake the medicine well.

(iii) Put your thumb near the correct marking of dosage on the medicine glass. Hold the glass in level with the medicine bottle. Pour

away from the label so that it does not become illegible. Replace the cork immediately.

(iv) Read the instructions once again before actually giving the medicine to the patient.

(v) Take the medicine on a tray with a glass of water and spoon in case the medicine requires stirring. If the medicine has a bitter taste, give the patient some sweet drink.

(vi) Put the medicine bottle in the correct place.

(vii) Never pour back any unused medicine, throw it away.

(b) **Other Medicine**.

(i) In case of pills, tablets, capsules and powder, remember that a pill has a sugar coating and a capsule has a gelatine coating and hence can be easily swallowed with water. Tablets if not swallowed by the patient may be crushed and put on the back of the tongue for swallowing. Powder must be poured at the back of the patient's tongue and water poured in his mouth.

(ii) Iron mixture should be given with straws so that the teeth are not stained. If the patient is not too weak, he/she should be asked to clean his/her teeth.

SECTION -8

FEVER, INFECTION, DISINFECTION AND SPECIFIC INFECTIOUS DISEASES

Fever

1. Whenever there is an inroad of disease germs in the body, due to some infection, it raises its temperature to put up a fight against the invasion. The state of more than normal temperature is called 'Fever'.

2. The normal temperature of the body is 97^0 F to 99^0 F. The temperature above 99^0 causes pain, restlessness, headache and body ache. Moderate temperature from 99^0 F to 103^0 F is called Pyrexia. High temperature from 103^0 F to 105^0 F is called High Pyrexia. Very high temperature over 105^0 F is called Hyper -Pyrexia. Fever may be:-

(a) **Constant**. In this the temperature remains the same all the 24 hours as in pneumonia and scarlet fever.

(b) **Intermittent.** The temperature rises very high and falls very low. It appears when there is severe infection.

(c) **Remittent Fever.** This is a very high fever. It rises more than 1^{0} during 24 hours. It is found in case of tuberculosis and sepsis.

(d) **Irregular.** It has no set pattern of rise and fall of temperature.

Infection

3. The spreading of germs of a disease from a sick person to a healthy person is called infection. There are various ways in which infection take place, such as:-

(a) **Through Air.** Disease germs spread from a sick person to a healthy person when the sick person breathes out foul germs and fit person inhales it. The germs are harboured by the healthy person till they multiply and become strong enough to show symptoms of the disease. Diseases like tuberculosis and influenza spread in this manner.

(b) **Through Water.** Water gets contaminated when patients of a disease wash into it their faeces, urine, sputum and vomit. These germs are carried by rivers and streams and sink into wells, ponds and lakes. When this water is used by healthy persons for washing and drinking, the germs remain dormant in his body till his resistance becomes poor and he falls victim to diseases. Cholera, enteric fever, dysentery, typhoid and jaundice spread in this manner.

(c) **Through Insects.** Germs of various diseases are carried by insects. The anopheline female mosquito, house fly, sand fly, fleas, ticks all act as carriers of disease. The mosquito, sand fly, fleas and ticks bite a patient, take the germs of the diseases in their blood, harbour them till they find a healthy man to bite and pass on the germs into his blood, till after a period, the healthy person also starts showing signs of the disease. Malaria, plague and sand fly fever, all spread like this. Insects like the housefly sit on the excreta, vomit and sputum of patients of various diseases, get the germs in their wings and legs and then sit on the food which is to be taken by healthy persons. In this manner they pass the infection to those who eat it. Cholera, diarrhoea, dysentery, jaundice, typhoid spread in this manner.

Disinfection

4. It means destroying the disease germs through various methods. It is to break the chain of infection. The following are the important disinfectants:-

(a) **Physical Agents**

(i) Light.

(ii) Heat - both dry and moist.

(b) **Chemical Agents**

(i) Gases.

(ii) Liquids.

(iii) Solids.

Physical Agents

5. The physical agents are:-

(a) **Light**. Sunlight is nature's most effective and powerful germ- killer. The ultra-violet and blue–violet rays kill the germs. This is the reason why the clothes of a sick person should be spread in sun.

(b) **Dry Heat.** Fire is the other important purifier. It kills germs by burning. All heaps of refuse can be burnt and the place can be disinfected. A hot iron can disinfect the clothes by being applied to the seams which require disinfecting.

(c) **Moist Heat.** Moist heat is used for disinfecting in two ways i.e. by boiling and by steaming. Boiling kills germs very rapidly. Drinking water can be purified by boiling. Linen and crockery also can be disinfected by boiling. All the hospital equipment such as surgical instruments and trays are disinfected in this manner. Steam is also used for sterilizing all hospital linen and dressing and bandaging equipment. Sterilizing drums and autoclaving chambers are used for letting steam penetrate through holes and sterilize large stocks of linen, gloves and dressing material such as bandages, cotton gauze etc.

Chemical Agent

6. The chemical agents are:-

(a) **Gases.** These are used for disinfecting building and ships etc. The room should be totally sealed for successful disinfecting, Formaldehyde gas is a very powerful germ killer. Chlorine is used for water purification.

(b) **Liquids.** Formaline 40 % solution becomes a good disinfectant. Phenyl and Cresol are other disinfectants. The usual strength is 1 percent but, for quick action, 2 ½ or 5 percent solution may be required. Carbolic Acid is another powerful disinfectant. This is used for surgical purpose. Potassium permanganate solution is good for 'pinking' well to kill cholera germs.

(c) **Solids.** Lime is a very good disinfectant for lime washing of wells, for sprinkling in dust bins and spreading outside bathrooms and lavatories in camps.

SECTION - 9

OPERATION: AFTER CARE, DRESSING OF WOUNDS

General

1. Post operative nursing is as essential as pre–operative care. Very clean and hygienic conditions are required to help in quick healing of the wound and for keeping it from turning septic. The patient is to be protected against acute pain by giving him timely analgesics, morphine or pethidine as per doctor's instructions

Dressing of Wounds

2. The following should be done to help in quick healing of wounds and keep them from turning septic:-

(a) The hand should be properly washed so that the infection is not caused while the wound is being dressed. Sterilized gloves should be worn.

(b) Everything that is used while dressing the wound should be properly sterilized so that the wound does not get infected.

(c) All dressing material should be taken out of the autoclaving drum and kept in sterilized packing. It should not be touched by hand. Soiled dressing should be thrown properly in a covered waste bin and not allowed to be on the floor as this causes foul smell and makes the patient very uncomfortable. It also causes severe infection and creates serious problems for the operated person.

(d) The wound should be cleaned with proper solutions. Very strong lotions would damage the tissue and the healing process would get very slow.

(e) Fresh air and sunshine assist in the quick recovery of a patient. These should be available to him in plenty. However, he should not feel too warm and uncomfortable.

(f) Bandages should be so applied that they do not constrict the part which is operated upon. There should be no obstruction to the free circulation of blood so that the healing process is not restricted.

(g) Proper diet should be given to the patient. Sufficient quantity of vitamin C must be ensured for quick healing.

(h) The patient should be made to feel fit and kept cheerful.

SECTION -10

POISONS AND FIRST AID

General

1. Any substance which, if taken in large quantity causes damage to the human system or may cause death, is called poison. Poisons may be in the form of chemicals, solid or liquid or can be in the shape of gas.

Means of Poison Intake

2. (a) Poisons can be swallowed by eating or drinking.

(b) Poisons enter the system by breathing in the form of fumes or smoke.

(c) Poisons enter the body through injections or through bites such as snakes or rabid dogs. Poison can be:-

Type of Poison

3. (a) **Corrosive**. Acids and alkalies such as sodium hydroxide, nitric acid, sulphuric acid, potassium hydroxide. These burn lips, throat, food passage and cause severe pain.

(b) **Irritants**. These are poisons which cause vomiting and diarrhoea. These are arsenics and mercury etc.

(c) **Stimulants.** These affect the nervous system. These are intoxicants and alcoholic drinks. They cause convulsions and depression of the nervous system.

(d) **Depressors.** These like opium obstruct the vital functions of the body.

First Aid

4. The first aid in such situation is to:-

(a) Arrange to remove the patient to hospital immediately.

(b) Note down the name of the poison if the empty bottle is there. Preserve if there is any remaining portion of the poison.

(c) Keep in some container any vomited matter, if it is there.

(d) If the patient has not taken any corrosive matter induce vomiting.

(e) If he is unconscious lay him with head turned to one side keeping his tongue out. If his respiration is failing, give artificial respiration.

(f) If the patient is conscious and the poison which he has taken is known, the following steps may be taken:-

(i) If he has taken some acid give him some alkali such as chalk, milk of magnesia and baking soda water.

(ii) If it is alkali give him 2 table spoonful of vinegar or lime juice water. Make the patient drink plenty of water or give something to drink such as milk or barley water or raw eggs.

(iii) If the patient has taken some disinfectant like cresol, carbolic acid or sleeping tablets like luminal, give two table spoonful of common salt with water or raw eggs.

(iv) In case of opium and morphia poisoning, give a few crystals of potassium permagnate in a tumbler of water and make the patient vomit.

(v) If there is gas poisoning, move casualty out of the room having gas. If the breathing is obstructed give artificial respiration. The domestic antidote for poisoning is a mixture of tea powder or burnt toast and milk of magnesia mixed in equal portion.

CHAPTER-IX

INTRODUCTION TO INFANTRY WEAPONS

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CHAPTER-IX INTRODUCTION TO INFANTRY WEAPONS (SD ONLY)	
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SECTION-1

CHARACTERISTICS OF 7.62MM SLR, AMN, FIREPOWER, STRIPPING, ASSEMBLING AND CLEANING

CHARACTERISTICS OF 7.62MM SLR, AMN, FIREPOWER

1.	Calibre		-	7.62 mm.
2.	**Length**			
	(a)	With short butt	-	1126.50mm (44.35in).
	(b)	With normal butt	-	1139.20mm (44.85 in).
	(c)	With long butt	-	1151.90mm (45.35in).
	(d)	Length of rifle with bayonet	-	1397.00mm (55 in).
3.	**Weight**			
	(a)	Rifle only	-	4.4 kg.
	(b)	Rifle with full mag	-	5.1 Kg.
	(c)	Rifle with full mag and bayonet	-	5.392 kg.
	(d)	Bayonet	-	0.283 kg.
	(e)	Empty Mag	-	0.255 kg.
	(f)	Full mag	-	0.709 kg.
5.	**Range**			
	(a)	Effective range	-	275 m (300 yds).
	(b)	Sight range	-	200 yds to 600 yds.
6.	Sight Radius		-	533.40 mm (21.77in).
7.	No of Grooves		-	06 (Six).
8.	Pitch		-	1 turn in 304.8mm (12 in).
9.	Twist of Rifling		-	Right Hand.

Amn (Cart SA Ball 7.62mm)

10.	(a)	Calibre	-	7.62mm.
	(b)	Weight of cart	-	23.07gm ± 0.65 gm.
	(c)	Length of cart	-	71.16mm ± .76mm (2.80-0.03 in).
	(d)	Weight of bullet	-	9.33 ± 0.13 gm (144 ± 2 gm).
	(e)	Powder charge	-	NC Powder.
	(f)	Muzzle velocity	-	815m/2700ft ± 30 ft/S (at 27.43m(90ft from muzzle).
	(g)	Wt of cart case	-	10.89 gm.
	(h)	Wt of propellant charge	-	2.85 gm.

4. **Rate of Fire**

	(a)	Normal	-	5 rds per min.
	(b)	Rapid	-	20 rds per min.
	(c)	Faster than rapid	-	60 rds per min.
11.	System of operation		-	Gas operation.
12.	Mag capacity		-	20 rds.

STRIPPING, ASSEMBLING AND CLEANING OF 7.62MM SLR

Introduction

1. Rifle is the basic weapon of an infantry soldier and therefore it is the responsibility of the soldier to keep the rifle in serviceable condition. Rifle is a reliable weapon. It fires accurately in all kinds of weather and terrain. It is a gas operated, air cooled and semi automatic weapon.

Preparation

2. (a) Ensure rifle is empty.

(b) Put safety catch on 'S' and remove the mag.

(c) Cock the rifle. Rifle should not be stripped without cocking. If rifle is stripped without cocking hammer plunger may fall down.

(d) Press the stud and remove the bayonet, then remove the sling. Ensure back sight is at the rear most position and leaf is lowered.

Equipment

3. Rifle, mag, bayonet, scabbard, sling, oil bottle, pull through, cleaning kit box and drill cartridge.

Sequence

4. Prior to stripping following measures are to be taken to check the chamber:-

(a) Take left foot to front, simultaneously throw the rifle in front of the body with right hand and hold hand guard with left hand and pistol grip with right hand, muzzle facing up at an angle of 45°.

(b) Ensure safety catch is on 'S' and cock the rifle. For cocking, open cocking handle and pull it behind. Secure holding opening catch with left hand and then take left hand on the hand guard.

(c) Turn the rifle to the left and check ejection slot for empty mag and chamber.

(d) On order,pull cocking handle to the rear and then leave it to move forward. Put safety catch on 'R' and press the trigger.

Stripping

5. (a) **Gas Plug and Piston**

(i) When cut portion of gas plug is facing upward- press the gas plunger with drill cart or combination tool and turn gas plug in clockwise direction so that gas plug is separated from the block.

(ii) When cut position of gas plug is facing downward- press the gas plug while opening to prevent gas plug from jumping and falling.

(iii) Remove piston and spring. Separate piston from piston spring by turning movement of piston spring.

(b) **Slide and Breach Block**

(i) Hold hand guard firmly, muzzle facing downward.

(ii) Pulling body locking catch rearward and pressing butt downward, strip the rifle.

(iii) When rifle is stripped in this position do not press trigger without securing hammer to prevent trigger mechanism to develop fault.

(iv) Remove body cover by pulling it backward.

(v) Hold return rod and pull backward. To prevent breach block from falling keep your finger underneath.

(vi) Keeping return rod towards own side, turn slide upside down. Fit the breach block to the slide. With the help of right hand fingers, lift breach block from front side and separate breach block while pressing rear part of the firing pin with thumb.

(c) **Firing Pin and Extractor**

(i) While pressing rear portion of firing pin, remove firing pin from returning pin. Remove the firing pin.

(ii) Fix combination tool pin in the plunger hole of the rear of extractor. Hold breach block firmly and pull combination tool rearward so that extractor claw comes out. Remove extractor and spring.

(d) **Arctic Trigger**

(i) Take kneeling position.

(ii) Ensure safety catch is on 'S'.

(iii) With the help of combination tool open the screw of piston grip and separate trigger.

(iv) Turn trigger guard inward and fix in the piston grip.

(v) Tighten the screw with combination tool.

(vi) After removing trigger guard, rifle to be used safely.

(viii) To reassemble repeat sequence in reverse order.

Assembling

6. (a) **Extractor and Firing Pin**

(i) To assemble extractor, hold breach block in the similar manner as it was held for stripping. Press plunger with the help of combination tool, fix extractor and spring in the slot. Gradually release pressure from the plunger. Ensure extractor is fixed correctly.

(ii) Fix spring on top of firing pin and insert the firing pin from rear of breach block. Now, while pressing firing pin spring, fix firing pin retaining pin.

(b) **Breach Block and Slide**

(i) Hold slide upside down, lift breach block from right hand and insert the other part of firing pin in slide hole. Fix breach block while pressing backward.

(ii) Lift rifle, muzzle facing downward, hold slide and breach block from right hand. Keeping the fingers below breach block, insert them in the body and fix the body cover.

(iii) Ensure safety catch is on 'S'. Assemble the rifle.

(c) **Piston and Gas Plug**

(i) Fix piston spring on the piston.

(ii) Insert piston and spring in the cylinder and fix gas plug while pressing. With help of drill cart or combination tool press gas plunger and turn gas plug in anti clock wise direction so that cut portion comes up. Remove pressure from plunger and ensure gas plug is assembled.

Cleaning

7. (a) **Cleaning Material**

(i) Pullthrough.

(ii) Oil bottle.

(iii) Combination tool.

(iv) Gas regulator key screw driver.

(v) Cylinder/Chamber cleaning brush.

(vi) Rifle cleaning brush.

(vii) Graphite grease tube.

(viii) Chindi.

(b) **Daily Cleaning**

(i) After ensuring rifle is empty, strip the rifle. Remove extractor and mag only if they are dusty or wet.

(ii) Fix cleaning brush or combination tool and clean the chamber.

(iii) **Barrel Cleaning**

(aa) Open the pullthrough.

(ab) Fix 10x 5 cm chindi in the center loop. Close the rifle and insert the pullthrough from breach side and pull it out from muzzle side. Ensure chord does not rub the flash hider. Repeat this action several times till such time the barrel is clean.

(ac) To check base, open the rifle and look from muzzle side to check dirt in the grooves.

(ad) Using 10x 3.75 cm chindi, oil the barrel with help of pull-through.

(iv) **Cylinder Cleaning**. Insert pullthrough from the top with chindi size 10x 5 cm. Holding pullthrough from either end, clean the cylinder.

(v) **Cylinder Oiling**. Using 10x5 cm chindi oil the cylinder.

Cleaning of Rifle Parts by Using Brush and Oil

8. (a) After cleaning slide and body cover fix them in the rifle and assemble the rifle.

(b) Clean gas plug, piston rod, and spring and assemble them.

(c) Clean flash hider, bayonet, barrel, fore sight, gas block, gas regulator, sling swivel and hand guard. Also clean outer side of body, cocking handle, safety catch, trigger, trigger guard, butt frame, joint pin, magazine catch, holding opening catch, back sight, carrying handle, pistol grip, butt lever and butt plate.

SECTION-2

SLR : FILLING, EMPTYING OF MAGAZINE, SIGHT SETTING, LYING POSITION , HOLDING, AIMING AND FIRING

SLR : FILLING, EMPTYING OF MAGAZINE, SIGHT SETTING

Aim

1. To fill magazine (mag), set sight and empty mag.

Filling of Mag by Hand

2. Check mag before filling. Inspect the mag for any damage to the body and check the tension of the mag spring. Hold the mag in such a manner that the larger side is facing

outward. Clean the rounds to be filled, take the rounds in such a manner that rim is facing towards the larger part of the mag and align the round and push it inside the mag. Count each round filled. Generally 20 rounds are filled in the mag however, only 15 rds are filled in desert terrain.

Filling of Mag by Filler

3. A filler is also provided with the help of which rounds can be filled quickly and with ease in the mag.

Emptying of Mag

4. To empty the mag, use a pointed object / charger clip. Press alternate rounds and rounds will come out. Continue till all the rounds are taken out.

Setting Sight

5. The back sight has 3 to 6 figures marked on its side which indicate a range for 300 to 600 yds. When the sight is pulled completely behind, the range is 200 yds. In order to increase or decrease the range, press the catch and move the slide in such a way that the required range marking is seen behind the slide. Generally the sight should be set on 200 yds.

Loading and Unloading of Rifle

6. When the filled mag is fixed to the rifle and safety catch is on 'S' the rifle is considered to be loaded. When rifle is cocked and live round is in the chamber and safety catch is on 'R', the rifle is considered as ready. When the mag is empty and there is no round in the chamber and the safety catch is on 'S' the rifle is considered as empty.

Actions on Orders for Loading Mag

7. On order load, put your left foot in front and slightly left, simultaneously with the right hand throw the weapon in front and centre of the body in such a way that left hand is on hand guard and right hand is holding the weapon at the pistol grip, index finger on the trigger guard and rifle at approximately 45° angle. Ensure safety catch is on 'S'. Open your pouch, remove empty mag and keep it in the pouch. Take out filled mag from the pouch and while inspecting it attach it to the rifle. Close pouch button and hold front guard with the left hand.

Ready

8. On orders of 'Ready' or when target is visible, cock the rifle and ensure that the round has entered the chamber. Put safety catch on 'R' and index finger on the trigger.

Make Safe

9. Remove index finger from the trigger. Put safety catch on 'S'. Remove the mag, open pouch and put the mag in the pouch. Turn the rifle slightly to the right and pull the cocking handle to the rear. Ensure that the round from the chamber has come out. Let the

cocking handle move forward. Put safety catch on 'R' and press the trigger. Put the safety catch on 'S' and mount filled mag. Pick up the round, clean it and fill it in the other mag.

Unloading

10. On orders of 'unload', complete the action of 'make safe'. In the end instead of filled mag put empty mag on the rifle.

LYING POSITION AND HOLDING

Lying Position

11. Step out the left foot in marching position. Throw the rifle with the right hand and hold the hand guard of the rifle with the left hand. Taking support of the right hand, lie on the ground. Points to be seen in this position are:-

(a) Right foot toe, left elbow and target should be in one line.

(b) Flash hider should not touch the ground.

(c) Body position should be slightly at an angle to the target.

(d) Legs should be open as per body comfort and inner heels should be touching the ground.

(e) Carrying handle should be at its place to prevent interference in aiming and ejection.

(f) Hold hand guard with the left hand and pistol grip with the right hand, keeping index finger outside the trigger guard. Take the rifle as far forward so that it can be brought easily to the shoulder.

(g) To stand up, pull rifle backward with left hand, close left foot, taking support of the right hand stand up and take the rifle to 'baju shastra'.

Holding

12 **Left hand.** Keep the rifle between the thumb and the index finger of the right hand. Hold should be comfortable and pull the rifle slightly backward. The rifle should be in line of the target. If the target is high then pull the left palm to own side, the muzzle will get raised. If the target is low take action vice versa. Keep the left hand straight and left elbow under the magazine as much possible. If you feel uncomfortable the rifle will shake and the hold will become loose.

13 **Shoulder.** Hold the butt firmly in the gap of right shoulder to lessen the recoil effect. During firing the rifle will remain firm at the shoulder.

14 **Right Hand.** Hold pistol grip with right hand firmly. To fix the butt of the rifle firmly to the shoulder, push the rifle backward with right hand. Keep the index finger on the trigger in such a manner that it can work independently.

15 **Right Elbow.** Right elbow should be slightly right and ahead of the body. By this both shoulders are straight and firing position is balanced.

16 **Head.** Keep the head on the butt in such a way that it is slightly to the left and downward. Ensure that the rifle is not pressed with the head. Cheek should be pressed to the butt. Every firer should bear in mind that position of the head on the butt should be the same. Eye should be at the same distance from the back sight aperture. Do not rest the cheek bone on the butt.

17 **Breathing.** If we breathe normally rifle will move with the movement of the chest. Therefore, take a long breath before the fire and hold the breath. Then aim and fire. Ensure breath is not held for more than 8 seconds, within this time the trigger should be pressed.

SLR AIMING AND FIRING

Method of Good Aiming

18. Close one eye.

19. See the target through the aperture and select the point of aim.

20. Align the foresight to the point of aim.

21. Ensure sights are straight and tip of the foresight and point of aim are seen through the centre of the aperture. (Hold the rifle straight, close one eye, look at the foresight through the centre of the aperture. Align centre of the target and tip of foresight through the centre of the aperture).

22. **Types of Fire**

(a) Deliberate.

(b) Snap shooting.

(c) Rapid fire.

23. **Deliberate Fire.** Firing at enemy position after seeing the flash or smoke of enemy fire is called deliberate fire. Deliberate fire is also carried out at the range.

(a) On order of ‘fire’ keep safety catch on ‘R’ and take aim.

(b) Keeping control on breath, with good aim and without any movement of rifle press the trigger.

(c) Follow through every round fired. After fire, hold rifle firmly for a few seconds, by doing this firer will know the difference between the place of hit and point of aim on the target.

(d) Release the pressure from the trigger and bring the rifle down.

(e) Again take the rifle to the shoulder and fire at the rate of five rounds per minute. During firing count the balance rounds in the magazine in your mind.

(f) On order of 'stop', separate index finger from the trigger. Bring the rifle down and put the safety catch on 'S'. If necessary change the magazine and close pouch button.

(g) On order 'Go on' put safety catch on 'R' and continue firing.

24. **Snap Shooting.** In this, firing is carried out on the targets that appear for a few seconds. Snap shooting fire is similar to deliberate fire except that all actions are carried out fast and there is very less time between sighting of target and fire.

25. **On Order 'Line Position, Bhar, Range and Ready'**

(a) On order 'Samne Dekh', put safety catch on 'R' and look for the target in the area.

(b) When the target is observed, take aim fast and fire two rounds continuously.

(c) When the enemy drops down or hides behind cover, stop firing and be ready to fire again.

(d) 'Stop' and 'Go On' and counting of round is carried out as in deliberate fire.

26. **Rapid Fire.** When a large number of rounds are fired continuously with speed it is called rapid fire. This fire is also like snap shooting fire, difference is that in this more number of rounds are fired. Firer should be capable to fire more than 20 rounds in a minute effectively.

(a) On order 'Samne Dekh', put safety catch on 'R' and observe the area.

(b) On order 'Rapid Fire' fire accurately with speed on the target.

(c) Continue firing till the time enemy is completely destroyed.

(d) On order 'Stop Go on' action and counting of rounds is to be carried out as in case of deliberate fire.

(e) During 'rapid fire' when there is a break in firing, cool the rifle. To do this pull the cocking handle behind and fix holding opening catch. The live round will come out from the hot chamber. It will enable cool air to enter the chamber and the bore of the rifle. To continue fire, pull cocking handle slightly behind and let it move forward.

SECTION-3

CHARACTERISTICS OF 5.56MM INSAS RIF, AMMUNITION , FIREPOWER, STRIPPING, ASSEMBLING AND CLEANING

CHARACTERISTICS, AMMUNITION AND FIREPOWER

1.	Calibre		-	5.56mm.
2.	Length of Rifle without bayonet		-	960mm.
3.	Length of Rifle with bayonet		-	1110mm.
4.	Length of Barrel		-	464mm.
5.	**Weight**			
	(a)	Fixed butt with empty mag	-	3.6 kg.
	(b)	Fixed butt with loaded mag	-	3.69 kg.
	(c)	Empty mag	-	90 gms.
	(d)	Full mag	-	340gm.
	(e)	Bayonet	-	305 gm.
6.	Effective Range		-	400 mtr.
7.	Sight Radius		-	470mm.
8.	Muzzle velocity		-	900m/s.
9.	Principle of operation		-	Gas Op.
10.	Penetration		-	3mm at 700m.
11.	Mode of fire		-	Single shot & three round burst (TRB).
12.	**Rate of Fire**			
	(a)	Normal	-	60 rds/min.
	(b)	TRB (Three Round Burst)	-	90 rds/min.
	(c)	Intense	-	150 rds /min.
	(d)	Cyclic	-	600 to 650 rds/min.

Type of Amn

13. (a) Ball Rd.

(b) Tracer Rd.

(c) Blank Rd.

(d) HD Cart.

STRIPPING, ASSEMBLING AND CLEANING

Introduction

14. 5.56mm INSAS rifle is the basic weapon of a soldier. It is the responsibility of the soldier to take care of his weapon. Stripping, assembling and cleaning of this weapon is very easy. If a soldier maintains the weapon properly it will produce good results.

Removing Mag

15. Hold the mag with left hand and press the mag catch to the front with thumb and remove the mag.

Stripping Assembly Cover

16. Cock the rifle and keep the change lever on 'S'. Press lever locking retainer with left hand and press the retainer to the front with right hand thumb. When retainer moves to the front, it is free from locking retainer. Now, lift the assembly opening cover and move to the front.

Stripping of Recoil Spring

17. While pressing retainer make the recoil spring assembly free from the guide and move it out.

Stripping of Piston Extension Assembly

18. Hold rear portion of piston extension and while pressing it downward, remove it from the rifle.

Stripping of Breach Block

19. Hold piston extension with left hand turning it upside down and with the right hand, slide out the breach block from the recess.

Stripping of Firing Pin

20. Remove locking pin with the help of drift. Firing pin will come out.

Stripping of Extractor

21. Drift tool is used for stripping of the extractor. Press the extractor with the left hand thumb. Then press access pin with pointed portion of the drift. Access pin will come out. Now remove the extractor and spring from its recess.

Stripping of Gas Plug and Project Sight

22. With the help of drift, remove the pin fixing gas plug and while pressing gas plug remove the gas block. Now the projector sight will also get removed.

Stripping of Hand Guard

23. The front edge of hand guard is in the cup near the gas block. Straighten the pin locking and remove it with the help of drift. Shifting the cup towards gas block, remove the hand guard.

Stripping of Mag

24. While pressing retainer dimple remove bottom plate. Remove retainer spring and the platform.

Assembling of 5.56mm INSAS Rifle

25. Assembling of the rifle is carried out in reverse sequence of stripping as under :-

(a) Assembling of mag.

(b) Assembling of extractor and firing pin.

(c) Assembling of hand guard.

(d) Assembling of piston extension and breach block.

(e) To insert piston extension assembly in gas cylinder and bracket.

(f) To insert recoil spring assembly in piston extension.

(g) To insert piston extension assembly and recoil spring in body housing.

(h) To close cover assembly and loading of retainer.

(j) Fix mag.

Inspection after Assembling of Rifle

26. (a) Remove mag.

(b) Move change lever to ‘R’.

(c) Cock the rifle.

(d) Ensure piston extension has completely moved forward.

(e) Move change lever to ‘S’.

(f) Try to press trigger, it will not get pressed.

Cleaning of 5.56mm INSAS Rifle

27. Items required for cleaning are :-

(a) Oil bottle with oil.

(b) Brush cleaning bore.

(c) Brush cleaning chamber.

(d) Pullthrough.

(e) Rod cleaning barrel.

(f) Tool adjusting for sight / rear sight.

(g) Tool removing repair case.

(h) Chindi.

(j) Drift.

Rifle Parts to be Oiled

28. (a) Complete breach block less its face.

(b) Mag catch.

(c) Trigger mechanism.

(d) Rifle spring assembly.

Rifle Parts Not to be Oiled

29. (a) Barrel.

(b) Cylinder gas.

(c) Plug gas.

(d) Piston extension assembly.

(e) Mag platform site.

30. Field strip the rifle and clean its parts. Clean bore with pullthrough and chindi. Oil the bore. Oil brush cleaning cylinder, and clean cylinder gas. Clean cylinder with pullthrough and chindi. Gas affected parts like breach block, piston, extension and firing pin to be cleaned carefully so that gas fouling is completely removed.. After cleaning, parts requiring oil to be oiled with a piece of cloth. .Do not rub hard outer surface of the rifle with soaked oil.

SECTION-4

CHARACTERISTICS OF 7.62MM LIGHT MACHINE GUN (LMG) AMMUNITION , FIREPOWER, STRIPPING, ASSEMBLING AND CLEANING

CHARACTERISTICS ,AMMUNITION AND FIREPOWER,

1.	Calibre		-	7.62mm.
2.	**Weight**		-	
	(a)	Gun IA	-	9.242 Kg.
	(b)	Gun IB	-	9.185 Kg.
	(c)	Gun IC	-	9.865 Kg.
	(d)	Barrel Assembly	-	2.721 Kg.
3.	**Length**			
	(a)	Gun	-	1130mm (44.45 inch).
	(b)	Barrel Assembly	-	621.25mm (24.25inch).
4.	No of Grooves		-	06 (Six).
5.	Pitch of rifling		-	Turn in 304.8mm.
6.	Twist of rifling		-	Right Hand.
7.	**Type of Sight**		-	
	(a)	Fore sight	-	Adjustable blade type.
	(b)	Back Sight	-	Aperture graduated.
8.	Sight Radius		-	744.447 mm.
9.	Sight range		-	200 to 2000 yds.
10.	System of operation		-	Gas
11.	**Rate of Fire**			
	(a)	Normal	-	28 rds (One mag) per min.
	(b)	Rapid	-	112 rds (four mag) per min.
	(c)	Cyclic	-	450 – 500 rds per min.

12. **Effective Range**

(a)	On bipod	-	500 yds.
(b)	On tripod	-	1000 yds.

13. **Magazine**

(a)	Type	-	Box type.
(b)	Capacity	-	30 rds.
(c)	Being filled	-	28 rds.
(d)	Weight empty	-	396.89gms.
(e)	Weight filled	-	1.106 kg.

14. **Mounting Tripod**

(a)	Weight	-	13.6 Kg.
(b)	Height with legs spread	-	26.5 inch.
(c)	Traverse	-	21° right to left.
(d)	Elevation	-	19°.
(e)	Depression	-	42°.

7.62MM LMG STRIPPING, ASSEMBLING AND CLEANING

Introduction

15. 7.62mm LMG is the basic weapon of the infantry. It is gas operated and can fire burst and single shot. It is a simple and sturdy weapon. Handling of this weapon is easy and it has effective fire range upto 500 yds mounted on bipod and 1000 yds mounted on tripod.

Preparation

16. (a) Open magazine opening cover.

(b) Pulling cocking handle backward with the right hand, cock LMG and move the cocking handle forward. Open ejection opening cover with the left hand.

(c) Ensure there is no round in the chamber and there is no stoppages in the body.

(d) Shift change lever to 'A' or 'R'. Press trigger. Close mag opening cover with right hand and ejection opening cover with left hand.

(e) Check pouch, drill cart and mag for any live round.

Stripping and Assembling

17. **Piston Group**

(a) **Stripping**

(i) Open mag opening cover with right hand and ensure moving parts (chalwale purje) are ahead.

(ii) Push body locking pin from left to right

(iii) Pull the butt so that return spring rod comes out of the body.

(iv) Keeping return spring rod to left pull cocking handle to rear with jerk and move it forward.

(v) If piston does not move to rear in this manner then put th finger in the ejection slot.

(vi) Now remove the piston and the breach block.

(vii) Pull the breach block slightly behind and separate piston.

(b) **Assembling**

(i) Ensure registered No of breach block and piston are same.

(ii) Keep breach block over the piston.

(iii) Ensure body locking pin is completely open.

(iv) Keeping returning rod to one side insert piston group in the body and ensure breach block is completely adjusted over the piston.

(v) Ensure piston group is completely inside the body. Push the butt to the front and close the body locking pin.

(vi) Cock the LMG. Shift change lever to 'A' or 'R' and press trigger to check if piston group is joined properly.

Barrel Group

18. (a) S**tripping**

(i) Keep LMG straight and move carrying handle up.

(ii) Press barrel nut catch and lift it up to maximum limit.

(iii) With the help of carrying handle remove barrel from body. Ensure that while doing this action, rear part of the barrel is not damaged.

(iv) Gas regulator has four positions and every position has a mark to its left side. Smallest mark is along with smallest hole whose number is 1.Biggest hole is numbered as 4. On top of gas block there is a zero mark. Gas regulator should be set on mark 3 for LMG to fire effectively.

(b) **Assembling**

(i) Set gas regulator.

(ii) Ensure mag opening cover is completely closed and barrel nut catch is moved up.

(iii) Insert barrel in the body without applying force.

(iv) Close barrel nut catch and ensured it is locked.

(v) Slide carrying handle downward.

Butt Group

19. (a) **Stripping.** Hold the body and pull the butt rearward.

(b) **Assembling.** Hold the body and holding pistol grip insert it in the recess.

Body and Bipod Group

20. (a) **Stripping.** Hold the bipod and turning the body slightly to the left remove it from the bipod sleeves.

(b) **Assembling**. For assembly complete the action in reverse order.

Cleaning

21. (a) Using single pullthrough clean and oil as it is carried out for rifle.

(b) Join the brush with cylinder cleaning rod and wrap 4" x 4" chindi and clean from muzzle end. For oiling cylinder use 4" x 4" chindi with single pullthrough.

(d) Assemble the LMG and then cock the LMG to check if all parts are working.

SECTION-5

TECHNICAL DATA OF INFANTRY WEAPONS

84 mm RL

1.	Stands for	-	84mm Rocket Launcher Carl Gustav.
2.	Calibre	-	84mm.
3.	Origin	-	Swedon.
4.	Make	-	Breech loaded, mechanically operated recoilless wpn.
5.	Funtional principles	-	Breech loaded and precussion fired.
6.	Recoil Principle.	-	Recoiless.
7.	**Weight**.	-	16.1 Kg.
	(a) Wt of telescopic sight	-	1.1 Kg.
	(b) Wt of mount	-	0.8 Kg.
	(c) WT of RL	-	14.2 Kgs.
8.	**Length**	-	113 cms.
9.	**Range**.		
	(a) HEAT		
	(i) Mov Tgt	-	400m.
	(ii) Sty tgt.	-	500m.
	(b) HE	-	1000m.
	(c) Smk	-	1300m (15 mtr width).
	(d) ILL	-	2100m (Illuminates 400mx500m

area).

10.	Rate of fire		-	6 Rds per min.
11.	Back blast		-	15m (at 45° angle).
12.	**Muzzle Velocity**			
	(a)	HEAT	-	310m per sec.
	(b)	HE	-	240m per sec.
	(c)	Smk	-	240 m per sec.
	(d)	ILL	-	260m per Sec.
13.	Sight Radius		-	296mm.
14.	Armour Penetration (HEAT Rd)		-	400 mm (40 cms).
15.	**Amn**			
	(a)	HEAT rd.		
	(b)	HE rd.		
	(c)	SMOKE rd.		
	(d)	ILLUMINMATION rd.		
	(e)	TPT (Target Practising Tracer)rd.		
	(f)	9mm sub calibre.		

Grenade No 36 HE

1.	Approx weight		-	700 gm.
2.	Tube launching Mk-I		-	127 gm.
3.	Length of tube launching		-	15cm (6 inches).
4.	**Range**		-	50-150 m.
	(a)	Killing Area	-	8 m (9 Yards) radius from point to burst.
	(b)	Casualty Area	-	135m (150 yards) radius from point to burst.

(c) Danger Area - 270m (300 yds) radius from point to burst.

5. 4 sec fuze can be thrown by hand from 20-30m (25-35 yds).

6. 7 Sec fuze is fired from gren launcher 3A fitted on 7.62mm SLR with the help of tube launching NK-I.Air burst can be fired by using a 4 sec fuze with gren effective against enemy in open.

7.62mm AK-47 Rifle

1. Calibre - 7.62mm.

2. **Length**

(a) Full Length - 870mm.

(b) Butt folded - 645 mm.

3. **Weight**

(a) Empty rifle - 3.15 Kg.

(b) Filled Rifle - 4.6 Kg.
(c) Empty Mag - 322 gm.

(d) Filled mag - 827 gm.

4. Effective Rg - 400 mtr.

5. Grooves - 4 (right side).

6. Sight radius - 378mm.

7. Muzzle velocity - 715 m/sec.

8. Mag capacity - 30 rds.

9. **Rate of fire**

(a) Single shot - 40 rds/min.

(b) Burst of fire - 100 rds/min.

10. Principle - Gas selective fire.

11. Locking system - Rotating bolt (Front locking).

30mm Automatic Grenade Luncher -17(AGL-17)

1. Calibre - 30mm.

2. **Weight**

   (a) Launcher - 18 Kg (without sight).

   (b) Mount - 12 Kg.

   (c) Weight of Barrel is 2 Kg and it can be detached from the Launcher.

3. **Range**

   (a) Direct - 1700m.

   (b) Indirect - 1700m.

4. **Rate of Fire**

   (a) Normal - 50 Gren/Min.

   (b) Rapid - 100 Gren/Min.

   (c) Cyclic - 350 to 400 Gren/Min.

5. Max elevation - 67°.

6. Max Depression - 14°.

7. Max Traverse - 26°.

8. Rifling - 16 Grooves(rt twist).

9. **Amn**

   (a) Gren ka wazan - 350 gm.

   (b) Cart Case ka wazan - 75 gm.

   (c) Gren ki Lambai - 132.8mm.

   (d) Cart case ki lambai - 28mm.

10. **Sight – PAG-17**

    (a) Sight ka wazan - 1 Kg.

    (b) Sight with case - 3.5 Kg.

	(c)	Magnification	-	2.7 times.
	(d)	Field of view	-	13.
11.	**Amn box**			
	(a)	One belt	-	10 Gren.
	(b)	One amn box	-	Contains 3 belts.
			-	Capacity – 30 gren.
				Filled - 29 gren.
12.	Muzzle velocity		-	185m sec.
13.	Killing area		-	7m all round from pt of burst.

7.62mm Gun Machine 2A Medium Machine Gun

1.	Calibre		-	7.62mm.
2.	**Weight**			
	(a)	Total	-	24.4 Kg.
	(b)	Gun	-	10.2 Kg.
	(c)	Tripod	-	14.2 Kg.
3.	Effective Range		-	1800 mtr.
4.	**Rate of Fire**			
	(a)	Normal	-	100 rounds per minute.
	(b)	Rapid	-	200 rounds per minute.
	(c)	Cyclic	-	600-1000 rounds per minute.
5.	Belt capacity.		-	235 rds.
6.	**Traverse**			
	(a)	Free traverse	-	360° (6400 miles).
	(b)	Controlled traverse	-	11°.
7.	**Elevation**			
	(a)	Free elevation	-	33°.

(b) Controlled Elevation - 5°.

8. **Muzzle Velocity** - 815mtr/sec or 2700 ft/sec.

9. **Beaten Zone**

(a) At 600 mtr - 100 mtr x 1 mtr.

(b) At 1000 mtr - 75 mtr x 2 mtr.

(c) At 1800 mtr - 50 mtr x 4 mtr.

10. **Safety Angle** - 60 mils.

106 mm Recoil Less Gun (RCL)

1. Calibre - 106mm.

2. Weight - 219 Kg.

3. **Rate of fire**

(a) Normal - 1 rd/min.

(b) Rapid - 1rd in appx 6 sec.

4. **Range**

(a) Max Range - 7500m (Indirect).

(b) Max rg - 2000m (Direct).

(c) Stationary Tgt - 1100m.

(d) Moving Tgt - 800m.

5. **Muzzle Velocity**

(a) 106 Rcl gun - 502 m/s.

(b) Spotter rd - 533 m/s.

6. Armr Penetration - 40 to 50cm.

7. **Misc**

(a) 15 min cooling pd after every 5 rds is essential.

(b) A.50 spotter rif is coaxially mtd on the gun for obtaining rg and lead of a tgt.

(c) Amn used - HEAT.

81mm Morter

1.	Calibre		-	81mm.
2.	**Weight**			
	(a)	Mortar without sight	-	40.6 Kg
	(b)	Sight with case	-	4.7 Kg.
3.	**Rate of fire.**			
	(a)	Slow	-	6-8 bombs/min.
	(b)	Normal	-	9-11 bombs/min.
	(c)	Rapid	-	12-20 bombs/min
4.	**Range**			
	(a)	Min rg	-	90m.
	(b)	Max rg	-	5000m.
5.	Danger Area		-	90m all round from pt of burst.
6.	Killing Area		-	5.5m all around from pt of brust.
7.	**Safety Distance**			
	(a)	Flank	-	200m.
	(b)	Over head	-	250m.
8.	Muzzle velocity		-	305m/sec.

Anti Tank Guided Misile Launcher (FAGOT)

1.	**Range**			
	(a)	Max	-	2500m.
	(b)	Min	-	75m.
2.	Penetration		-	90° angle of impact - 46cm. 60° angle of impact - 23cm.
3.	Hit probability		-	90% to 96%.

4.	Generation	-	Second.
5.	Guiding system	-	Semi automatic command to line of sight (SACLOS).
6.	Rate of Fire	-	3msl per min.
7.	Crew	-	3 (Three).