FIELDCRAFT
PROFICIENCY

Australian
Air Force Cadets

Cadet / Instructor Notes

Rewrite Edition, 1st May 2007

FIELDCRAFT (FCP)

(14 Periods + 2 Days for a Bivouac)

FCP 1 Safety in the Field AL: Period(s): 1

a. State the purpose of Bivouac Standing Orders.

b. Demonstrate casualty evacuation in the field, particularly

(1) using field stretcher
(2) improvise stretcher

c. Practice using and making a field stretcher

FCP 2 Camp Craft AL: B Period(s): 2

Outline:

a. Types of camps.

b. Siting of camps.

c. Organisation of camps.

d. Camp sanitation.

e. The principles and functions of:

(1) Trench latrine.
(2) Soakage pit.
(3) Grease trap.

f. Fire precautions.

FCP 3 Map Reading AL: B Period(s): 2

Revise:

a. The definition of a map.

b. Types of maps.

c. Map titles and marginal information.

d. Topographical features.

e. Methods of topographical representation

f. Contours.

g. Scales.

h. System of grid reference.

FCP 4 Directions and Bearings AL: B Period(s): 2

a. Define a bearing,

b. State the difference between Grid North, Magnetic North and True North,

c. Describe:

(1) Use of a compass in **mils** and degrees,
(2) The use of protractor or silva compass as a protractor.
(3) The method to plot bearings, and
(4) Conversion of bearings.

FCP 5 Prismatic or Silva Compass AL: B Period(s): 2

a. Revise how to take bearings.

b. Explain how to orientate a map with a compass.

c. Explain how to determine position by re-section and inter-section.

FCP 6 Field Navigation AL: B Period(s): 2

Explain:

a. How to keep direction.

b. How to determine direction by day and night.

c. Navigation planning, topography and unmistakable objects,

d. Orders and reports,

e. How to complete a Navigational Data Sheet.

f. Estimating distance by pace and by time,

g. How to bypass obstacles and dangerous terrain.

h. Procedures and actions to be adopted when lost.

FCP 7 Basic Knots and Lashings AL: Period(s): 1

a. State the purpose for using knots and lashings. **B**

b. Demonstrate the following knots: **2**

(1) Reef
(2) Rolling hitch
(3) Round turn - two half hitches

c. Demonstrate the following lashings: **2**

(1) Diagonal
(2) Square

FCP 8 Field Exercise/Bivouac AL: 2 Period(s): 2 day

Note: This exercise is intended to provide practical experience for cadets studying FCP and should be carried out before the examination in FCP 7 so that it can be used as reinforcement to FCP 1-6.

The training program for the exercise is to focus on the areas that have been dealt with, in theory, in FCP 1-6. Each cadet must be capable of completing a Navigation Data Sheet.

FCP 9 Examination **Period(s): 1**

FCP 10 Examination Review **Period(s): 1**

FIELDCRAFT PROFICIENY (FCP)
FCP 1 - SAFETY IN THE FIELD
1 PERIOD

AAFC Country Code of Practice

1001. When operating in the field, the AAFC relies on a special code of behaviour to be exercised by all of its members. There is a very good reason for this, because when on bivouac or other field activity, we often need to camp on or pass through farm land or National Parks and Reserves. By following the 'Country Code of Practice' listed here, we are showing respect for other people's property and feelings. To contravene the code will only make you and other AAFC personnel unwelcome in the future.

a. Ask permission before using private land, a courteous request will nearly always be granted and often, the owner will be only too happy to pass on information about the area such as campsites, water and so on.

b. Leave farm gates either open or closed as you find them.

c. When crossing a fence use the gate, or if necessary, a solid post to climb over so that you don't stretch the wires.

d. Don't litter, if you can carry it in - you can carry it out.

e. Don't interfere with or disturb any livestock on the property.

f. Walk around crops - not through them.

g. Observe the fire regulations. Because these vary from place to place, check with either the CFS or the local council during the planning phase of your activity.

h. When hiking along a road, walk in single file on the right hand side, facing the oncoming traffic. At night carry a torch at the front and rear of the group.

Purpose of the Bivouac Standing Orders

1002. The Bivouac Standing Orders (BSO) incorporates the policy of SAAAFC on the subject of bivouacs and other field activities, as per HQSAAAFC Training Instructions 2/85, 4/85, 6/85 and 8/85. All SAAAFC personnel who are involved with the management or implementation of any bivouac or field activity are to be fully conversant with the requirements of BSO.

1003. The contents of BSO are as follows;

a. Introduction to the document

b. Suitability of Activities

c. Supervisory / Training Qualifications

d. Staff / Cadet Ratios

e. OA86 Activity Authorisations

f. Governing Regulations

g. Prohibited Activities

h. Medical Aspects

i. First Aid Requirements

j. Safety - General
k. Safety – Emergency Procedures
l. Dangerous Articles
m. Rubbish Disposal
n. Display of Australian Flag
o. Radio Communications
p. Fire Picquet
q. Appointment of an Anchor Person
r. Female Participation
s. Night Activities
t. Alcohol/Drug/Tobacco Consumption
u. Dress
v. Unacceptable Sexual Behaviour
w. Harassment

Lost Procedures

1004. Even with sound planning and preparation it is still possible to become lost or overdue during a bivouac or field activity. Knowing what to do if this situation arises is a vital part of planning an activity. Many combinations of factors contribute to a party becoming lost or overdue, some of these are;

a. Becoming lost;
   (i) Poor or inexperienced party leadership and planning.
   (ii) Lack of knowledge of the terrain
   (iii) Little or no knowledge of bushcraft.
   (iv) Panic.
b. Becoming overdue;
   (i) Unexpected illness or injury within the party.
   (ii) Malfunction loss or destruction of essential equipment.
   (iii) Tackling a route which is beyond the capabilities of the party.
   (iv) Delays caused by unexpected changes in weather conditions.
   (v) Changing pre-planned routes or destinations without advising authorities.

Action if Lost or Overdue

1005. An overdue group is not lost, just late and every effort should be made by the group to reach the objective and / or contact the authorities as soon as possible so that an unnecessary search is not initiated. A lost party however, must take appropriate action to assist search and rescue organisations in locating the group quickly.

1005. In order to assist search parties, the lost group should move to a prominent feature such as a clearing or high point in the terrain and then remain stationary and together. At least one

member of the group needs to be on watch at all times, day and night, so as to either call for help or alert the others to danger if necessary. Signals attract attention and should be used whenever it is thought that such might be seen by searchers. Some common forms of signalling are smoke, fires, flashing lights, torches, mirror flashes, shouting, whittling and waving flags or items of clothing. Standard signals for use with searching aircraft are in common use internationally and these are shown at Annex A.

Personal First Aid

Cuts

1006. Cuts or wounds which result in external bleeding can be classified as follows:

a. Abrasions - from direct contact with a rough surface such as gravel.

b. Incised - caused by cutting with a sharp instrument.

c. Lacerated - due to tearing by a blunt object like barbed wire or jagged metal.

d. Penetrating - caused by stabbing with a sharp pointed object such as a knife or nail.

Management of Cuts

1007. a. Abrasions;

(i) Cleanse the wound thoroughly with sterile gauze or cotton swabs soaked in either sterile or cooled, boiled water. Apply a diluted mild antiseptic to help cleanse the wound.

(ii) If no other aids are available, wash the wound with running water.

(iii) Gently apply a non-adherent dressing.

b. Incised and Lacerated Cuts;

(i) Control the bleeding.

(ii) Clean the wound as thoroughly as possible but take care not to restart severe bleeding.

(iii) Apply a sterile or clean dressing.

(iv) Seek medical aid.

c. Penetrating Wounds;

(i) Remove or cut away clothing covering the wound.

(ii) Control the bleeding by applying direct pressure to the wound.

(iii) Keep the injured area as clean as possible.

(iv) Do not try to pick out any foreign material embedded in the cut.

(v) Apply a sterile or clean dressing.

(vi) Rest the injured part in a comfortable position.

(vii) Seek medical aid.

Sprains

1008. A sprain occurs when a joint is forced beyond its normal range of movement, stretching or tearing that support the ligaments in the joint. The symptoms and signs of a sprain are as follows;

a. Pain in the area which usually becomes severe when the joint is moved.

b. Noticeable swelling and bruising which may develop quickly.

Management of Sprains

1009. Sprains are sometimes associated with fractures and if there is any doubt they should be managed as fractures. If the injury is obviously only a sprain however, the treatment is as follows;

a. Apply cold packs.

b. Apply a firm bandage to the injured joint.

c. Elevate the part.

d. Seek medical aid.

Insect Bites and Stings

1010. With the exception of the Funnel Web and Red Back spiders, the stings or bites from most Australian insects, although painful, are not life - threatening unless the casualty is allergic to the particular venom. The most common bites and stings which require first aid treatment are;

a. Bee.

b. European Wasp.

c. Tick.

d. Funnel Web Spider.

e. Red Back Spider.

Symptoms and Treatment

Bee

1011. Bee stings have a barbed end and usually get left behind in the flesh of the victim, with the venom sac still attached to the sting. A sting from a bee is immediately painful and causes the area around the sting to become red and puffy very quickly.

1012. To avoid injecting more venom into the victim, remove the sting by scraping it sideways with a knife blade and not by pinching it out. After the sting has been removed treat as follows:

a. Wipe the area clean.

b. Apply cold compresses and / or a pain relief agent such as ’Stingoes’ or similar.

1013. In cases where the victim has a history of or shows signs of allergy, such as a rash, lumps on the skin, swelling of the throat or wheezing, treat as follows;

a. Check the victim’s responses, airway, breathing and circulation.

b. Apply a pressure bandage and immobilization as for snake bite.

c. Seek medical aid urgently.

d. Periodically observe and record the pulse and breathing.

e. If the casualty is carrying medication for the allergy it should be administered immediately. Such medication must be positively identified by either the label, the casualty or a relative otherwise it should not be given.

f. Carry out EAR / CPR if breathing or circulation stops.

European Wasp

1014. This insect has only become a serious threat in some parts of Australia in recent years. The wasp doesn't leave the sting behind and may therefore strike several times causing severe pain. It is attracted to meat cooking, rotting meat and sweet drinks and can sometimes become trapped in soft drink cans. This may result in stinging inside the mouth and throat, a serious situation which can cause swelling and complete blockage of the airway. Treatment for wasp sting is as for paragraphs above.

Tick

1015. Ticks are prevalent in most parts of Australia but the species which causes paralysis in humans occurs mainly along eastern coastal regions. Ticks usually attach themselves in folds of the skin or body crevices of the victim. In most cases with humans, a tick bite will only cause discomfort or local irritation of the skin. It can however, cause paralysis, especially in small children.

1016. Symptoms of a serious tick bite are;

a. Weakness of the upper face and eyelids.

b. Weakness in the upper limbs.

c. Weakness of the muscles which aid breathing.

1017. Bites from ticks should be managed as follows;

a. If attached inside the ear cavity seek medical aid after killing the tick.

b. To kill the tick, apply a drop of turpentine, kerosene or methylated spirits directly onto the body of the tick.

c. To remove the tick do not squeeze it's body but slide a pair of tweezers or the blades of small scissors either side of the head and draw out the tick. Be especially careful, not to leave the mouth parts in the victim's skin.

d. Search the victim carefully for more ticks paying particular attention to the hair, ears, under the arms and other body crevices.

e. If the victim is a young child or the toxic effects persist, seek medical aid.

f. Do not apply pressure immobilisation.

Scorpion

1018. Australian species of scorpions will deliver a sting which, whilst causing severe pain is not normally life threatening. The symptoms of a scorpion sting are an immediate sense of burning pain, throbbing and later, numbness. Treatment is;

a. Apply a cold pack or compress over the affected area.

b. Seek medical aid.

Funnel Web Spider

1019. This spider mainly occurs around the Sydney and coastal areas of New South Wales. It inhabits rock crevices, burrows, under houses and one species is found in bushes and trees. The symptoms of a bite from this spider are intense pain initially in the area of the bite, nausea and abdominal pain, breathing difficulty, numbness and muscular weakness. Other signs include excessive saliva from the mouth, noisy breathing and coughing up of secretions,

weeping from the eyes, cold skin and shivering. Funnel web spider bite should be managed as for a snake bite and an anti venom is available.

Red Back Spider

1020. The Red back spider is usually found in dark, undisturbed places such as old logs, under the eaves of buildings and discarded tyres or iron and the like. Venom from a this spider is slow working and the symptoms are pain in the area of the bite which then becomes general, nausea, dizziness, faintness and muscle weakness or spasm. A sharp sting may be felt when the spider strikes, but this is not always the case. Other signs include profuse sweating, swelling and sweating around the bite area and a rapid pulse. Red back spider bite should be treated as follows;

a. Reassure the casualty.

b. Apply a cold pack or compress over the area of the bite.

c. Seek medical aid, an anti venom is available.

Fractures

1021. The types, causes, symptoms and treatment concerning fractures are many and varied and are much too complex to be fully covered by these notes. The most common fractures occur to the limbs and the following generalisation concentrates on that type of injury. Cadets should gain further training in the treatment of fractures.

Types of Fractures

1022. The three common types are;

a. Green-stick fracture, where the bone is cracked, usually laterally, but not broken completely through.

b. Simple fracture, the bone is broken through but has not penetrated the skin.

c. Compound fracture, where the broken bone has protruded through the skin.

Symptoms

1023. General symptoms and signs of a fractured limb are;

a. Pain swelling and deformity in the area of the injury.

b. Loss of function

c. If it is a compound fracture, bleeding.

d. Possible shock, depending on the cause and severity of the injury.

Treatment

1024. In all cases, fracture victims should be evacuated to a medical facility as soon as possible after first aid treatment has been administered. General treatment is as follows;

a. Make the casualty as comfortable as possible.

b. Check the pulse and circulation of the injured limb.

c. Stop bleeding if there is a wound or compound fracture.

d. Splint and immobilise the injury.

e. Treat for shock if necessary.

f. Seek medical aid.

Asthma

1025. Asthma is a breathing problem where the victim has great difficulty in breathing out. It is caused by a spasm of the small air passages in the lungs, accumulation of mucus and swelling of the tissues. The casualty will show signs of distress and suffer gasping and wheezing breathing which continues for some time.

Treatment

1026. Management of an asthma attack is as follows;

a. Sit the casualty upright or leaning over a table or pillow.

b. Reassure the casualty.

c. Provide adequate fresh air.

d. If medication is carried by the casualty for this condition, it should be administered immediately. If any doubt exists as to the identification of medication it should not be given.

e. Seek medical aid as soon as possible.

GROUND-AIR VISUAL CODE FOR USE BY SURVIVORS

No.	Message	Code
1	Require assistance	V
2	Require medical assistance	X
3	No or Negative	N
4	Yes or Affirmative	Y
5	Proceeding in this direction	↑
	IF IN DOUBT USE INTERNATIONAL SYMBOL	SOS

SIGNALS BY SMALL VESSELS

I REQUIRE ASSISTANCE	BLACK 'V' ON ORANGE BACKGROUND

GROUND-AIR VISUAL CODE FOR USE BY GROUND SEARCH PARTIES

No.	Message	Code Symbol
1	Operation completed	LLL
2	We have found all personnel	LL
3	We have found only some of the personnel	++
4	We are not able to continue — returning to base	X X
5	Have divided into two groups, each proceeding in direction indicated.	
6	Information received that aircraft is in this direction.	→ →
7	Nothing else found — will continue search	N N

STANDARD AIRCRAFT ACKNOWLEDGEMENTS

Message received and understood

Aircraft will indicate that ground signals have been seen and understood by—

Day or moonlight
Rocking from side to side

Night: Making green flashes with signal lamp

Message received and not understood

Aircraft will indicate that ground signals have been seen and not understood by—

Day or moonlight
Making a complete right hand circle

Night: Making red flashes with signal lamp

PYROTECHNIC SIGNALS

Red: Singly or in succession — ship or aircraft in distress.

Green: Single green every 5-10 minutes — call for crew in distress to fire red signal from SAR aircraft or ship

Note: On seeing red signal, halve interval between green signals

FIELDCRAFT PROFICIENCY (FCP)
FCB 2 - CAMPCRAFT
2 PERIODS

Types of Camps

2001. AAFC camps will generally be in one of the four forms described below. It should be noted that for the types mentioned at items 4001 b, c and d, a radio communication network will need to be established to maintain contact between the bivouac headquarters (HQ) / command post (CP) and the various parties.

a. Standing bivouac, where a permanent camp is established and activities are conducted in close proximity to it. Cadets sleep in the camp each night and are usually catered for from the camp kitchen.

b. Mobile bivouac, this is when the group is on the move each day, for example, when patrolling. Rations are normally carried by the party and a new bivouac site is selected each night.

c. Survival bivouac, as the title implies, the emphasis is on developing survival techniques. The group is likely to be small in number and mobile for much of the time. Cadets will be living off the land and either make or find shelter as necessary.

d. Search and rescue (SAR) bivouac, usually conducted as an exercise and will again be mobile. This type of bivouac would normally consist of either a HQ or CP which may be stationary or mobile, directing SAR field parties, vehicles etc.

Siting of Camps

2002. The ideal site for a bivouac is in a clear area, large enough to accommodate the entire group comfortably. The site should be on high ground, to assist with ventilation, and gently sloping away from the camp so as to provide good drainage. Water supply should also be of primary importance when selecting a bivouac site. It should be close to a running creek / spring of clean water, or easily accessible to a mains / rainwater supply.

Organisation of Camps

2003. Organisation of camps falls into two categories, planning prior to the event and then, the conduct of the operation at the time.

Planning a Bivouac

2004. Some considerations when planning a bivouac are;

a. Timings, including departure and return, travelling time, training timetable and time to set up and clear the campsite.

b. Terrain and availability of sites.

c. Fire season restrictions on access to certain areas.

d. Access for transport into the site.

e. Medical evacuation (MEDEVAC), location and contact details of the nearest ambulance, doctor and hospital and the quickest route to each of them.

f. Emergency escape routes in case of either fire or flood.

g. Availability of adult staff members, keeping in mind the Cadet / Adult ratios.

h. Levels of training to be undertaken and qualified instructors to conduct it.

Site Layout

2005. The layout of a bivouac site will often be determined by the terrain, but the basic considerations apply regardless of this.

a. Sleeping accommodation; whether in tentage or in the open, needs to be located in a dry, well aired part of the site.

b. The eating area should not be too close to the sleeping accommodation, but not too far away from the kitchen.

c. The kitchen, or cooking space and food storage tent, are best located together, again in a well drained and ventilated area. If a wood fire is to be used for cooking, the wood pile must be located away from the fire pit and organised into wood sized for easy use, see Figure 1.

d. Latrines and ablution areas must be located down wind and downstream from the main living part of the bivouac site.

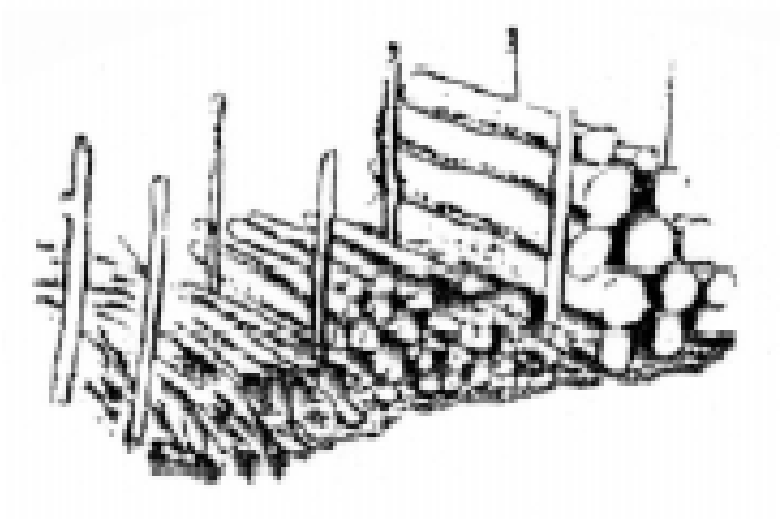


Figure 1. Layout of a Kitchen Woodpile

2006. Suggested layouts for both a bivouac site and a kitchen / food storage tent are at Annex A.

Vacating the Area

2007. Clearing the camp site at the end of a bivouac is often one part of the organisation which can easily be overlooked in the hassle of packing up. Therefore, time must be allocated for a thorough reconditioning of the area. The object is to leave the place as clean and natural looking as possible;

a. On arrival, take note of the general conditions around your particular part of the site

b. and remember to leave it like that (or better) when you are finished.

c. If you use any on site equipment (barbecue plates etc.) make sure that you leave it clean and functional.

d. Check that all tent pegs are removed from the ground, cleaned, straightened and packed away.

e. Dismantle any gadgets (tool racks etc.) and either scatter or stack the timber according to the requirements of that particular site. String and twine should be wound up and kept for next time.

f. Remove and pack up any rope lines which may have been strung up to dry clothing or air bedding.

g. Locate and pack away any small pieces of gear, such as tomahawks, entrenching tools,

h. bush saws etc.

i. Thoroughly clean, dry and pack away all cooking utensils.

j. Finally, conduct an 'emu bob'. All campers form a single rank, dress by the centre and move slowly through the entire site, picking up any litter or equipment as they go.

Bivouac Sanitation

2008. In addition to good siting and water supply, as noted above, there are two other sanitation factors. These are, the location and layout of latrines and the disposal of refuse;

a. Latrines and urinals must be sited and dug as soon as possible. They need to be located downstream from any water supply by at least 50 metres from the main camp and also away from the water itself.

b. Unattended refuse encourages flies and other animals which carry disease. All refuse should be burnt if possible and then buried. Waste water from the kitchen should be poured into a grease trap and the grease trap filter material burnt daily.

2009. The operating principles, functions and designs of latrines and refuse pits are illustrated and explained at Annex B.

Fire Precautions and Local Rules

2010. During the planning stage of a bivouac, it is essential to contact the Country Fire Authority (CFA) and / or the Local Council to check on any fire restrictions in the area where you intend to camp.

2011. Some general guidelines and a map of the State Fire Ban Districts are shown at Annex C.

2012. If the local conditions permit you to light fires, then the following precautions need to be taken around the camp;

a. Clear the ground up to 4 metres all around the fire place.

b. Use a trench type of fire place so as to prevent burning material rolling from the fire (see Figure 2).

c. Place a water bucket or knapsack spray near the fire in case of emergencies.

d. If ashes are to be removed from the fire place, they must be put into a bucket, saturated with water and allowed to cool before disposal.

e. A pre-arranged fire alarm signal should be recognised by all personnel which applies equally in a bush fire situation. All members should be numbered off and know where to report in case of a fire alarm.

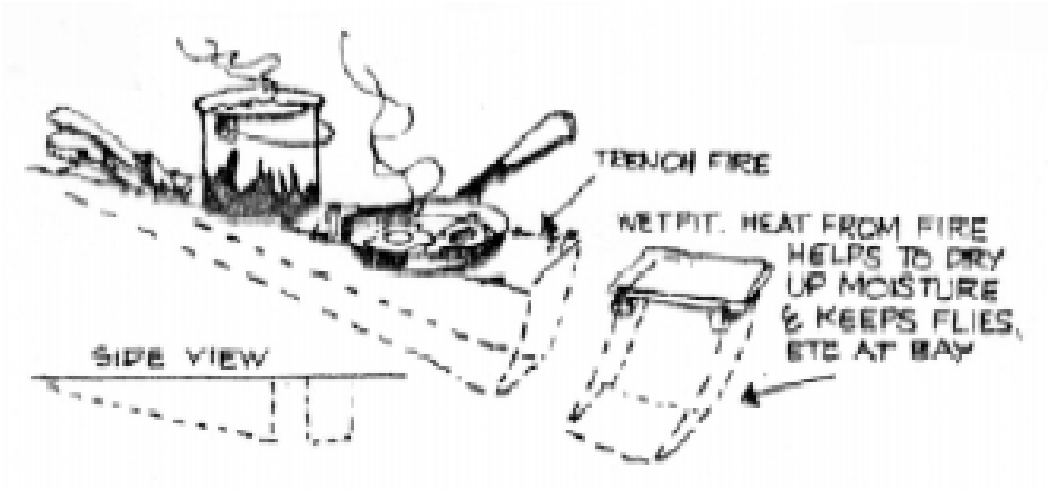


Figure 2 - Trench for a Cooking Fire

The Environmental Aspects of Campcraft

2013. When human beings camp in the bush, they will always have some impact on the natural environment. We should all strive to limit this impact by showing common sense, observing the AAFC Country Code and taking note of the following;

a. Protect and preserve native animal and plant life.

b. Where trails are laid down in the bush for public access, stick to them.

c. Take care not to damage other (non-living) natural features, like rock formations, river banks, etc.

d. Clean up thoroughly after you. Remember the Code, if you can carry it in - you can carry it out.

e. If you see anyone else being careless with the environment, either point out their mistake or report the problem to a superior officer.

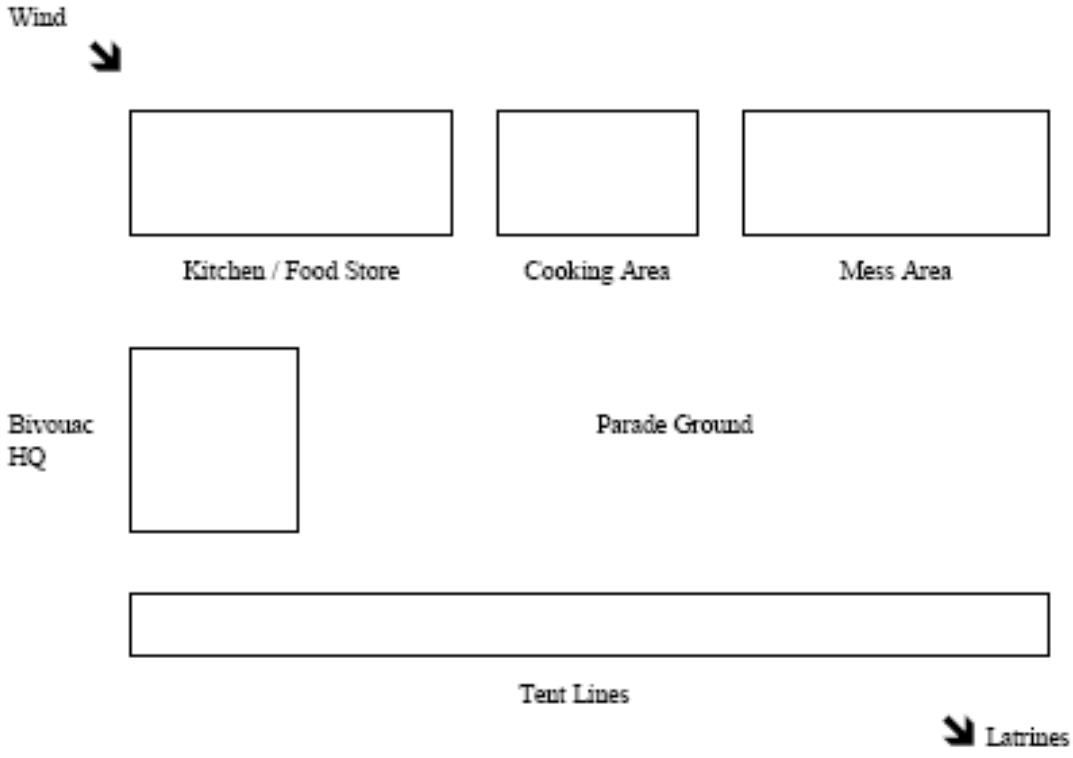
2014. The natural environment will replenish itself very well, but this takes time. We must help the natural process by causing as little disturbance as possible in the first place, then giving it the best chance for recovery after we leave.

Ration Packs

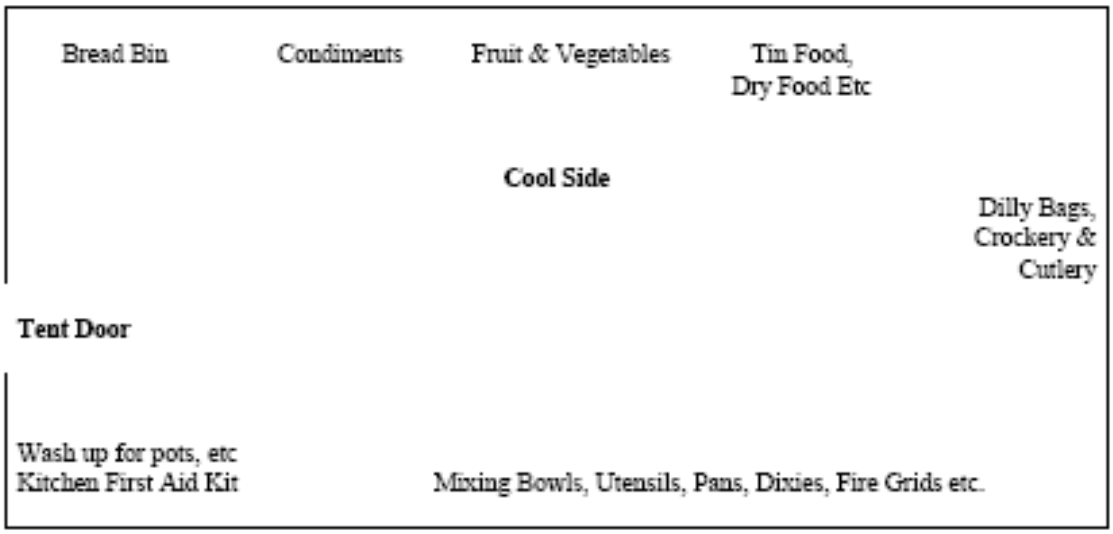
2015. There are two types of ration packs supplied by the Australian military. These are the 10 man and 1 man 24 hour packs. The type most familiar to AAFC Cadets is the Combat Ration One Man (CRP).This ration pack represents a selection of five menus (A to E) which provide a balanced diet for one person for one day. The menu selection and instructions for use are shown at Annex D.

ANNEX A TO
FCB4

BIVOUAC SITE LAYOUT

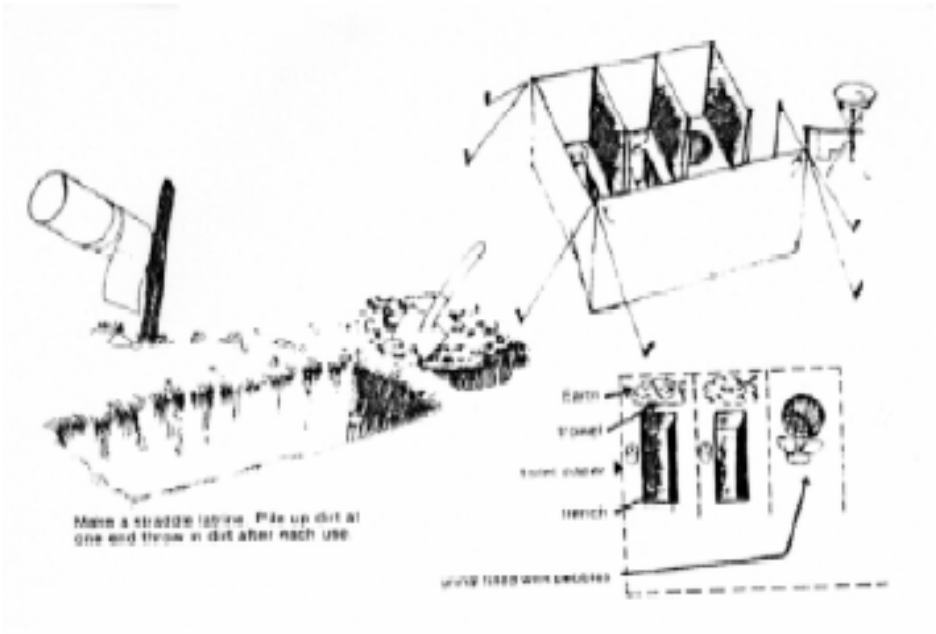


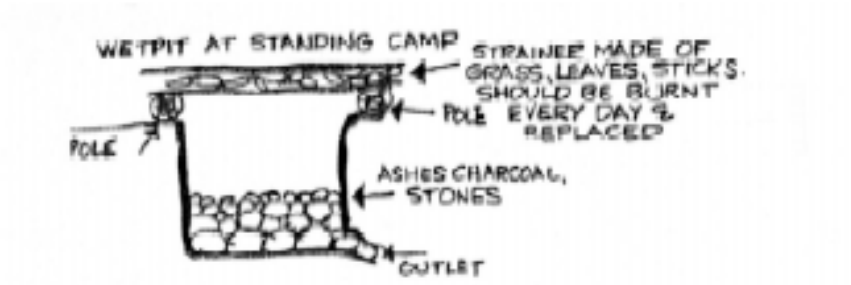
ORGANISATION OF A KITCHEN / FOOD STORE



ANNEX B TO
FCB4

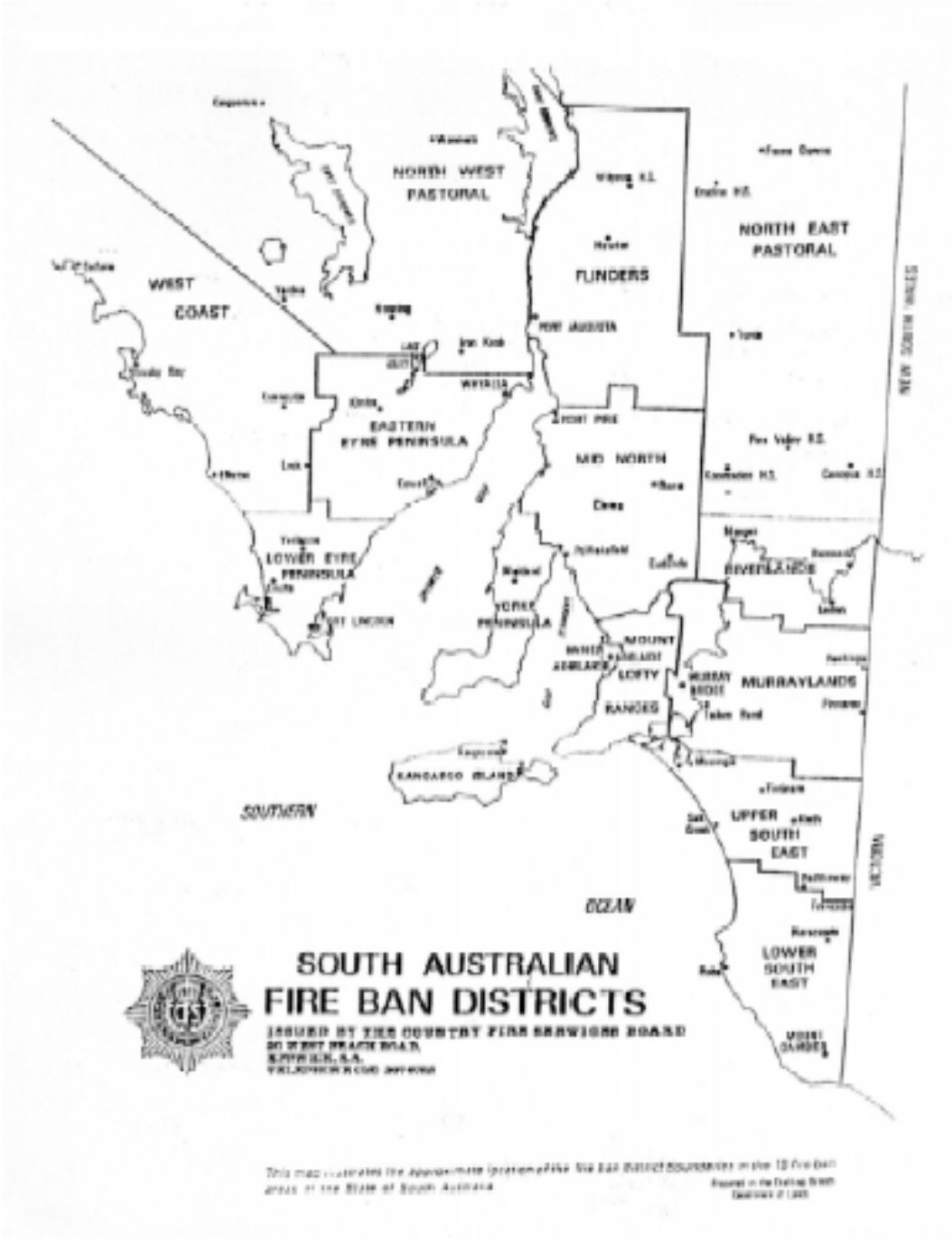
LATRINES AND REFUSE PITS





ANNEX C TO
FCB4

STATE FIRE BAN DISTRICTS



INFORMATION FOR USERS

Each pack contains two main meals, a midday snack and a number of sundry items

Nutritional Information

The Combat Ration One Man has been designed to ensure that you receive enough food and vitamins each day, therefore it is desirable that all food in the pack is eaten. If the pack contains too much food, the following information may help you decide which items you should retain:

(i) The chocolate, coffee and biscuits provide most of the vitamin B1 in the pack:

(ii) Chocolate, coffee, fruit drink power and jam all have added vitamin C.

These two vitamins cannot be stored in the body so a regular intake is needed. If you do not eat enough of these vitamins then you may lose concentration, become easily tired and wounds will heal more slowly. Condensed milk may go thick and brown. It has turned to caramel and is safe to eat. Chocolate may develop a light coloured film on the surface. It is still safe to eat. By dissolving the chocolate in sterilised hot water a chocolate drink can be made.

ANNEX D TO
FCB4

AUSTRALIAN ARMY

COMBAT RATION (ONE MAN)

CONTENTS AND INSTRUCTION SHEET

This Ration Pack is available in five menus — A, B, C, D and E. The contents in each menu differ from the menus shown in the following list. You should endeavour to have a different menu each day.

A		B		C		D		E	
Ham & Egg	1 x 150 g	Bacon & Beans	1 x 150 g	Baked Beans	1 x 225 g	Sausages & Vegs	1 x 130 g	Beef & Egg	1 x 150 g
Jam, Plum	1 x 26 g	Jam, Raspberry	1 x 26 g	Jam, Apricot	1 x 36 g	Jam, Blackberry	1 x 26 g	Jam, Peach	1 x 26 g
Curry Powder	1 x 3.5 g	Curry Powder	1 x 2.5 g	Curry Powder	1 x 2.5 g	Soup Pdr, Beef	1 x 10 g	Soup Pdr, Chicken	1 x 10 g
Beef & Vegs	1 x 227 g	Lamb & Vegs Rissoles	1 x 225 g	Beef with Gravy	1 x 225 g	Beef with Tortellini	1 x 225 g	Chicken and Vegs	1 x 225 g
Rice Freeze Dried	1 x 55 g	Rice Freeze Dried	1 x 55 g	Noodles	1 x 50 g	Potato & Onion Dehy	1 x 50 g	Noodles	1 x 50 g
Pinwheel	1 x 140 g	Fruit Gel	1 x 140 g	Pears	1 x 140 g	Two Fruits	1 x 140 g	Two Fruits	1 x 140 g
Candy, Sweet & Sour	1 x 42 g	Candy, Fruit Drops	1 x 40 g	Candy, Fruit Drops	1 x 40 g	Candy, Fruit Drops	1 x 40 g	Candy, Sweet and Sour	1 x 42 g
Cereal Block	1 x 56 g	Biscuit, Jam Sandwich	1 x 85 g	Cereal Block	1 x 56 g	Biscuit, Jam Sandwich	1 x 85 g	Muesli Bar	2 x 32 g
Biscuits, Shortbread	1 x 85 g	Muesli Bar	2 x 32 g	Biscuits, Shortbread	1 x 85 g	Muesli Bar	2 x 32 g	Biscuits, Gingernut	1 x 45 g
Fruit Juice Powder		Fruit Juice Powder		Fruit Juice Powder		Fruit Juice Powder		Fruit Juice Powder	
Orange, and	1 x 10 g	Lemon, and	1 x 10 g	Lime, and	1 x 10 g	Orange, and	1 x 10 g	Lemon, and	1 x 10 g
Orange/Mango	1 x 10 g	Apple	1 x 10 g	Orange/Mango	1 x 10 g	Apple	1 x 10 g	Orange/Mango	1 x 10 g
Chewing Gum	1 x 10 pellet	Chewing Gum	1 x 4 pellet	Chewing Gum	1 x 10 pellet	Chewing Gum	1 x 4 pellet	Chewing Gum	1 x 4 pellet
Soup Pdr Mushroom	1 x 10 g	Soup Pdr Tomato	1 x 10 g	Soup Pdr, Pea & Ham	1 x 10 g				

The following items are contained in all menus:

Biscuit, Survival	1 x 42 g	Sugar	10 x 7 g	Plastic Bowl	1 x No
Cheese	1 x 47 g	Tea Bags	2 x Nos	Toilet Paper	1 x 10 sheets
Chocolate	1 x 50 g	Instant Coffee	2 x 3.5 g	Pad Scouring with Soap	1 x No
Sweetened Condensed Milk	1 x 71 g	Salt	1 x 7 g	Plastic Sanitary Bag	1 x No
		Matches	1 x box		
		Can Opener	1 x No		

Salt and Water

There is more salt then you will normally need; however, extra salt is needed if working hard in a hot environment. Salt losses are much greater if you are unacclimatised to the heat, for example if you have just moved from a cool to a hot climate. When required, the extra salt should be taken dissolved in drinking water (not more than one quarter of a packet to a full water bottle), or sprinkled on the food.

DO NOT TAKE EXTRA SALT UNLESS YOU DRINK PLENTY OF WATER. IT IS HARMFUL TO TAKE EXTRA SALT WITHOUT EXTRA WATER.

It is essential that you drink plenty of water. Heat and exercise cause dehydration and loss of thirst. You should drink plenty of water if you are sweating heavily, even if you don't feel thirsty.

Water Sterilisation

You must regard all water not obtained from a Water Point as contaminated and it should be sterilised before drinking by boiling or using sterilisation tablets.

The water must not be used for any purpose for at least 30 minutes after adding the water sterilizing tablet. This is the time required for the tablet to kill and germs present. After 30 minutes the water may be drunk, or used to prepare food or beverage.

Improvements

Any suggestions regarding improvements to ration packs should be directed to:-

FIELDCRAFT PROFICIENCY (FCP)
FCP 3 - MAP READING
2 PERIODS

Introduction

3001. Map reading is the extraction of the information shown on the map; knowing the relationship of the ground to the map and the map to the ground and knowing what the map means. However to make full use of a map it is necessary to be able to give and to read grid references, to take bearings and to measure distances.

3002. The purpose in instructing cadets in map reading is to enable them to find their way about the countryside and to recognise features on the ground and on the map, to enable them to understand the information given on the map so that they can picture the ground even though they have not seen it, and to enable them to transmit and receive quickly and accurately, information concerning positions, directions and movement of personnel.

3003. The map contains a wealth of information that is not apparent to the untrained user. For example, a cadet trained and experienced in map reading can, by studying the map:

a. visualise the shape of the ground;

b. determine the height of hills and mountains;

c. select points of observation and estimate those that will be able to be seen from that point;

d. calculate the gradient of any particular slope;

e. determine roughly the density of timber or scrub in any area;

f. identify by type and relate roads and tracks, bridges, houses, post offices, schools, churches and factories to the ground.

Definition of a Map

3004. A map is a representation of part of the earth's surface drawn to scale on a flat surface showing natural and artificial features.

Type

3005. A map is a simplified picture of the ground. Simplified because a map is much smaller than the actual area it covers on the ground and also a large amount of detail on the ground is not necessary on the map. The type of maps used by the cadets of the AAFC will most frequently be Military Maps. These are topographical maps that show a variety of natural features such as hills, valleys, lakes, rivers, buildings, transmission lines, etc. A map shows the ground as seen from above, and so features on the ground look more like a map if they are viewed from an elevated position, such as a hilltop or from an aircraft.

Map Titles and Marginal Information

3006. On the margin around the map is given information that will be needed when the map is being used. Neither the layout, nor the items of information will necessarily always be the same, as they vary with different editions and different scales of maps. The information includes the title, edition and map number that are necessary when ordering the map and passing grid references. Also essential for effective use are the scale, contour, interval, legend of topographical features, magnetic variation, date of survey and titles and numbers of adjoining maps.

Topographical Features

3007. The natural features of the landscape such as hills, mountains, valleys, plains, rivers, etc, are known collectively as its topography, whilst each one is known individually as a topographical feature.

3008. The more commonly encountered features which the student should know both on the ground and on the map are as at Annex A together with a contour plan of each feature.

Methods of Topographical Representation

3009. A map is drawn on a flat surface whereas the ground it represents is a three dimensional object. Some method must be found to represent this third dimension, the relief of the ground. To be a proficient map reader you must first and foremost be capable of visualising the shape of the ground from the information supplied on the map.

3010. The ways of representing relief on a map are:

a. hill shading,

b. layer tinting,

c. hachures,

d. contours,

e. form lines, and

f. spot heights.

The method usually employed in Australian Military Survey maps is a combination of contours and spot heights with hill shading.

3011. Hachures They are short lines drawn in the down direction of the slope. Fine hachures far apart indicate gentile slope, and heavy and close together indicate steep slope. This method is not used within Australia.

3012. Hill Shading This shows by depths of shading (using a pattern of dots) the pattern of physical features. This is produced by assuming a bright light is shining across the map from one direction, usually from north-west or north-east, so that one side of the hill is in the shade while the other side is in the light., This gives a vigorous idea of relief. Hill shading obscures other detail to a certain extent. Contours are often used with hill shading to provide a means of measuring accurately height with slope.

3013. Layer Tinting Layer tinting is the colouring of the map between certain contour layers, and as a method of showing relief is not used on Australian Military Maps.

3014. Spot Heights They are definite points shown on a map with the exact height above mean sea level printed against them. On hachured and shaded maps they give the only exact information as to height contained on the maps. For showing exact heights of features that lie between contour lines they are invaluable. Usually spot heights are marked by a dot, but where the point was very accurately surveyed and used for survey is called a major control point (formerly a trig point) and marked by a triangle, while the circle is a minor control point. Vertical height is measured from a datum which is mean sea level at Sydney. A Bench Mark is a permanent mark usually cut in a wall or metal plate attached to a wall, these marks are heights which have been specially fixed by levelling and even more accurate than a major control point. When marked on a map it means the height of the mark and not the ground on which it stands.

Contours

3015. The use of Contour lines is the most usual way of showing the shape of the ground on modern maps. This is done extremely well when the contour lines are used in conjunction with hill shading. Contours make an attempt to give visual illusion of relief. They are entirely conventional but once the convention is understood a general idea of the country can be got very quickly without detailed study of the map, and heights and slopes at any point can be read or calculated from the map.

3016. A contour is an imaginary line on the, surface of the ground at the same height above mean sea-level throughout its length. If a person were to walk round a hill at a certain level, going neither uphill or down, that person would be following a contour for that level. His path drawn on a map would be a contour. If this would be repeated a number of times, each time the person moving to a point 20 metres vertically higher than the previous circuit, then these paths when drawn on a map would give a contoured plan of the hill with vertical interval of 20 metres.

3017. The shape of the contour line indicates the shape of the ground. Imagine again a person walking around a hill at successive levels. Where the slope of the hill is gentle the path will be a considerable distance horizontally from the previous path below. Where the slope is steep, the paths will be much closer together. If that person comes to a spur and keeps straight on, would have to climb to go over it. To remain on the same level as the rest of the path that person would have to turn away from the hill. When coming to the end of the spur must then turn inwards towards the hill. In the same way, where there is a spur the bend in the contours points out away from the top of the hill, and where there is a re-entrant the contour bends will point towards the hill.

3018. Each topographical form, such as a col, cliff or knoll produces its own particular pattern of contour lines, except for a re-entrant (valley) and a ridge, where the pattern is similar. Annex A shows examples of typical forms of topographical patterns together with the type most likely to be encountered. A knowledge of these patterns is an essential part of map reading, and cadets must be able to find and identify contour lines and features. The patterns formed by a re-entrant and a spur are the same. It is necessary to determine the slope of the land to distinguish between them. A spur points away from the high point, while a re-entrant points towards it. A re-entrant usually has a watercourse marked across its contours at the point of greatest curvature, a spur never does.

3019. These are the most important things to remember about contour patterns:

a. a. contour lines spaced close together mean steep slopes;

b. b. contour lines spaced far apart mean gentle slopes;

c. c. when contours are evenly spaced the slope is uniform. No natural slope is perfectly uniform, and such slopes will always have small undulations;

d. d. when the spacing of the contours is closer together on the lower slopes than on the higher slopes the slope is convex;

e. e. when the contours are further apart on the lower slopes than the higher, the slope is concave;

f. f. meandering contours at varying distances apart, but never very close, mean undulating ground;

g. g. gently curving contours indicate a country of rounded slopes. As the country becomes steeper the contours come closer together, as it becomes more rugged the curves become less regular.

Contour Interval

3020. On a map each contour is drawn at a specific height above sea level and every contour is the same vertical distance above the one below. The difference in vertical height between contours is called the Vertical Interval (VI).

3021. The heights of the contours are written into the contour lines at intervals along their length. Depending on the density of the lines, the height is usually written on every second contour lines. For example, with contours 20 metres apart the height will be written on 400, 440, 480 and omitted on 420 and 460. The contour lines for the even hundreds e.g. 400, 500, 600 are printed as heavier lines. The figures are printed in such a way that they read correctly when the reader is looking up hill. This helps to determine the direction of the slope in flattish country and provides a quick way of distinguishing between contour patterns of a spur and that of a re-entrant.

Scales

3022. When used in connection with a map, a scale is the ratio that the distance between two points on a map bears to the horizontal distance between the same two objects on the ground. The reliability of maps depends partly on their scale. Even more the amount of detail that can be shown depends on the scale. A 1:250000 map shows details of towns and major roads whereas a 1:25000 would show details of house, roads, tracks, river and creeks and most all fine detail. Annex B shows the differences between scales.

3023. Generally speaking maps with a scale of 1:50000 give all the detail that is ordinarily needed for map reading and cover a fairly wide area.

3024. Scales may be expressed in three ways:

a. by a statement in words, eg. 1cm to 1km; 2cm to 1Km;

b. by a representative fraction (RF) written either as a fraction or expressed as ratio eg. 1:50000 means that one millimetre of length or one centimetre or one inch or one unit of length on the map corresponds to 50,0000 of the same units on the ground;

c. by linear scale. This is a line or several lines, usually at the bottom of the sheet suitably divided so that a distance on the map can be converted quickly and accurately to miles, kilometres or nautical miles depending on the graduation of the scale.

3025. The scales used on the more modern Australian Military Maps are: 1:25000; 1:50000; 1:100000 and 1:250000.

3026. Distance between two points on the ground can be calculated by measuring the distance between the same two points on the map, multiplying by the denominator of the RF and dividing by the appropriate conversion figure as shown below:

a. the distance between two points on a 1:50000 map is 5.81cm,

   what is the corresponding distance on the ground?

   Distance on Ground = 5.81 x 50000, 100= 2905 metres.

3027. To measure the distance in a straight line between two points on a map, lay the straight edge of a piece of paper against the two points and at each point mark with a tick. Then lay the piece of paper along the appropriate line with the right hand mark against one of the

primary divisions and left hand opposite the secondary divisions. The distance is then the distance to right of zero plus the fraction left of zero.

3028. To measure a distance that is not straight, such as along a winding road, two methods may be used. A piece of cotton may be laid (not stretched) along the road and then the cotton transferred to the scale line. The second method uses a piece of paper in a similar way to that described above. The road is considered to be made up of a number of straight sections. Lay a piece of paper along the first section, put a tick at the commencing point and at the point where the road swings away from the edge of the paper. Taking care not to move the position of the second tick on the road, pivot the paper about the second tick, until the next section of road is along the edge of the paper. Keep repeating this process until the finishing point is reached. The total distance then is recorded as a straight line between the first and last tick, and can be measured on the linear scale.

System of Grid Reference

3029. One of the essential requirements of a map is that the user must be able to give a quick and accurate reference to the position of any point on that map. The method of doing this employed on the Australian Military Map series is called the Australian Grid System. The position of a point on the map is indicated by a six figure number which is called the Grid Reference. On any one map sheet every point has a grid reference that is difference from the grid reference of all other points.

3030. This requirement is met on Military maps by the use of a series of lines drawn on the map running both north-south and east-west, and being parallel to one another. These lines are numbered from 00 to 99 for each 100km square and are at a fixed distance apart - namely 1000 metres.

3031. Those lines that run north-south are numbered from west to east, and called EASTINGS. Those lines that run east and west are numbered from south to north and are called NORTHINGS.

3032. The four figure grid reference will indicate one grid square, that is, a square 1000 metres by 1000 metres and is achieved by the following steps:

a. follow the vertical line (Easting) which forms the left hand edge of the square, either up or down to the margin of the map or until you find a two figure number (grid number) on the map and write the number down;

b. next, follow the horizontal line (Northing) which forms the bottom of the square and write those two grid numbers after the first two.

3033. In order to locate a specific point on a map more accuracy is required and the six figure grid reference is achieved as follows:

a. locate the grid square which contains the object or feature to be indicated and divide the square into tenths vertically and horizontally;

b. follow the steps as for the four figure grid reference but this time add the extra numbers first after the two numbers for the easting and then after the two for the northing.

3034. In the example shown at Annex C the reference at the square containing the object marked "P" would be written down G.S.2909. The "G.S." denotes, that it is the grid square

being indicated. The object marked "P" would be written as G.R.297095. The "G.R." stands for grid reference and means that a specific feature is to be located.

3035. Remember, the eastings are always measured by moving from left to right across the map and are always the first three figures of the grid reference. The northings are always measured from the bottom upwards and are always the last three figures of the grid reference.

Use of the Romer

3036. To read or plot a six figure grid reference accurately a romer may be used. This is simply a piece of cardboard graduated in divisions of 100M appropriate to map scale. This is then employed to measure the third figure of the eastings and northings.

3037. To use the romer, place the point of the corner on the position to which the reference is being given, making sure that the edge of the scale is parallel to the sides of the square. Read the easting first on the map cuts, the scale on the top edge of the romer. Read the northings next where the northing on the map, cuts the scale on the right edge of the romer.

Annexes

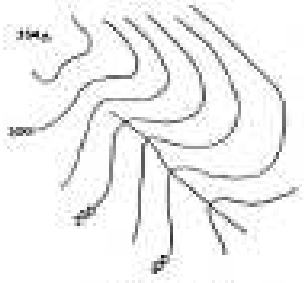
A. Typical Forms of Topographical Patterns

B. Map Scales

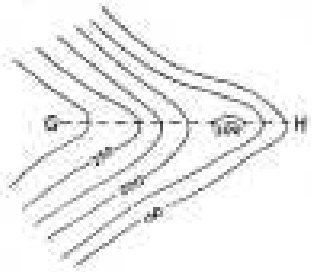
C. Example of Grid Reference

TYPICAL FORMS OF TOPOGRAPHICAL PATTERNS

Rugged country

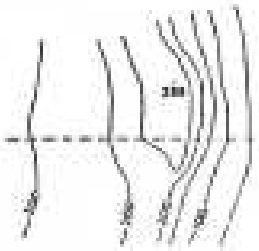


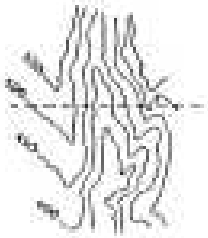
Rolling country



Spur and re-entrant

Spur with knoll

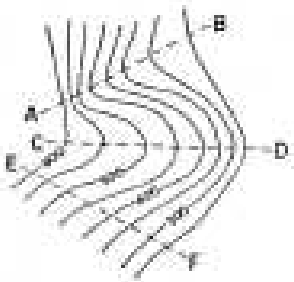




Escarpment

Ravine

Ridge with a col



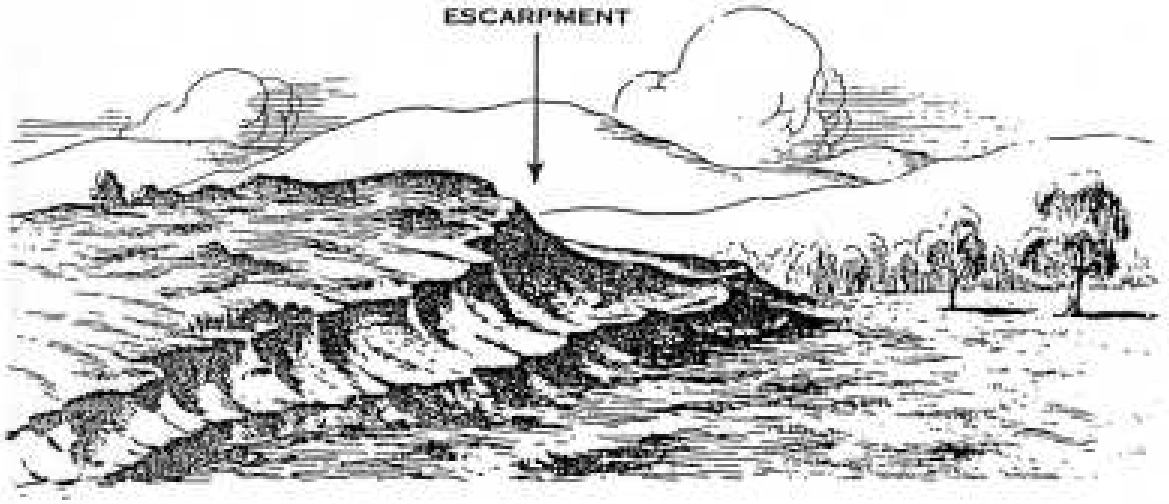
Section CD - Convex slope

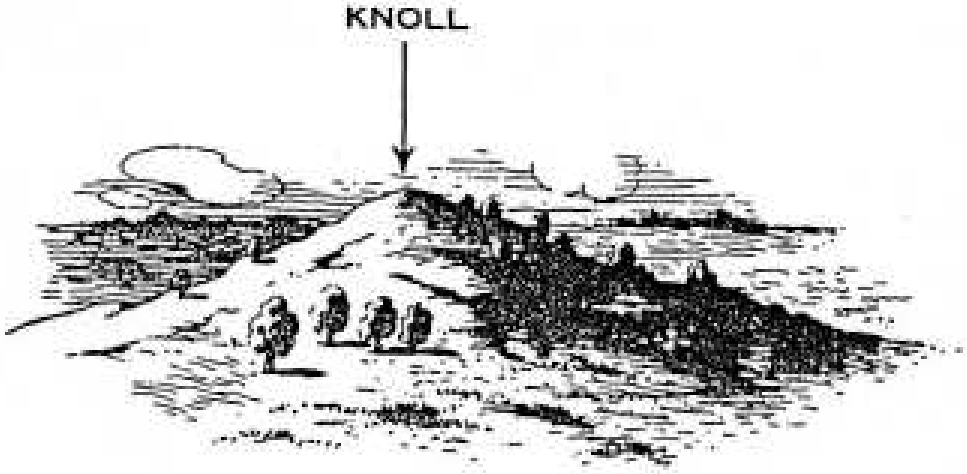
Section EF - Uniform slope

Section AB - Concave slope

ANNEX A

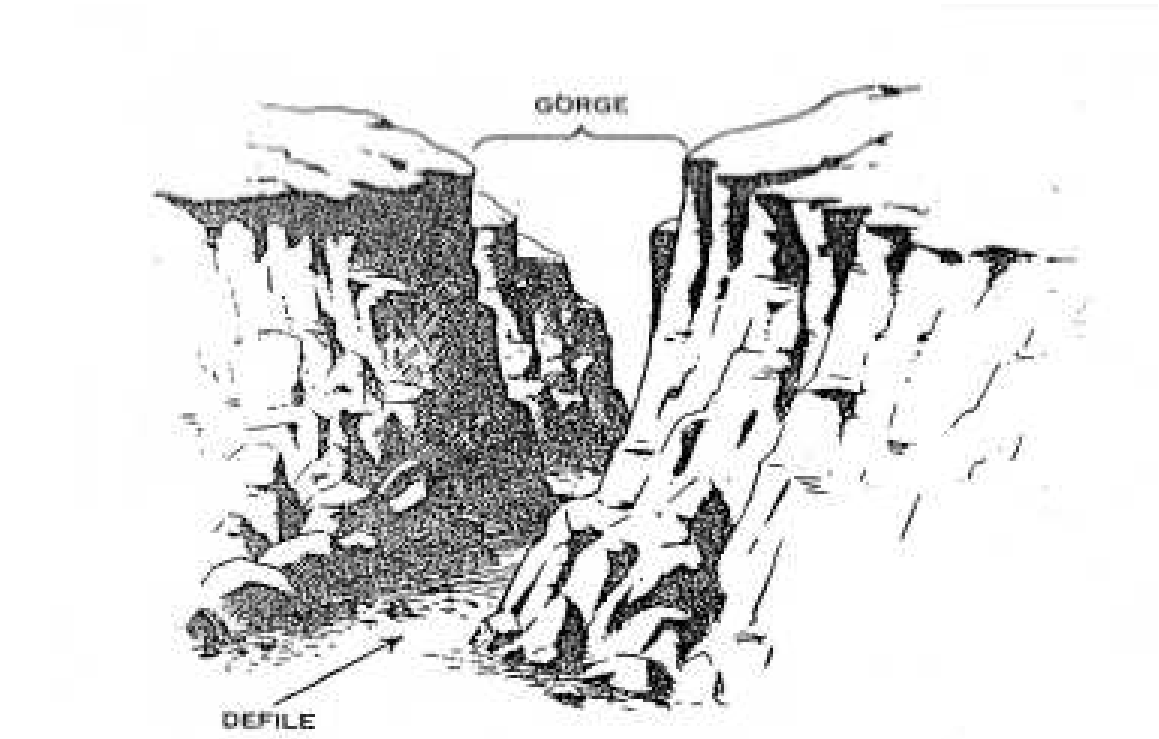
TOPOGRAPHICAL FORMS

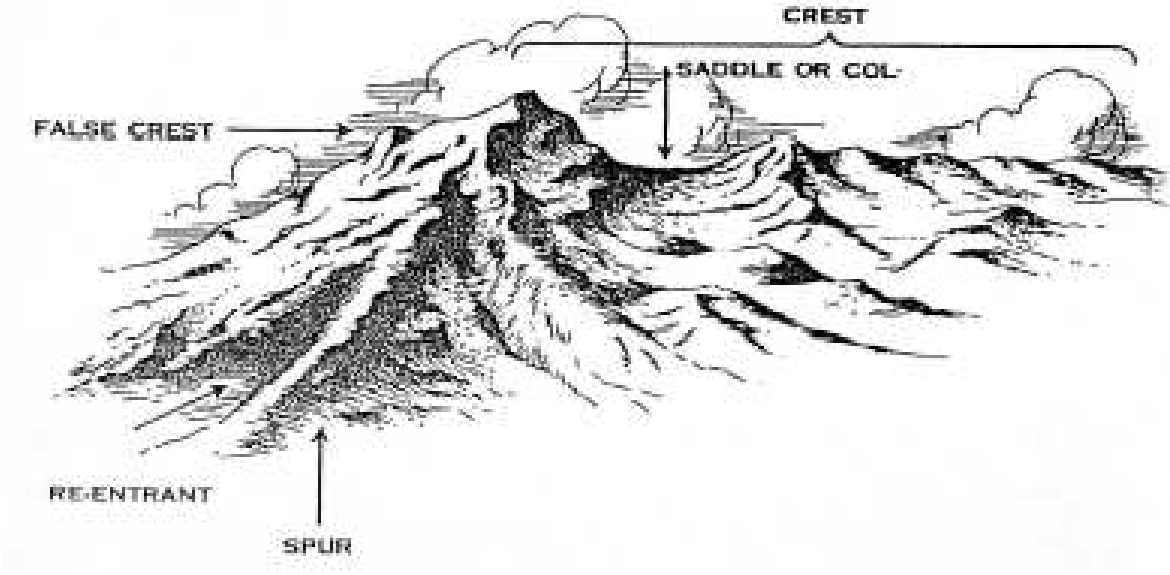




ANNEX A

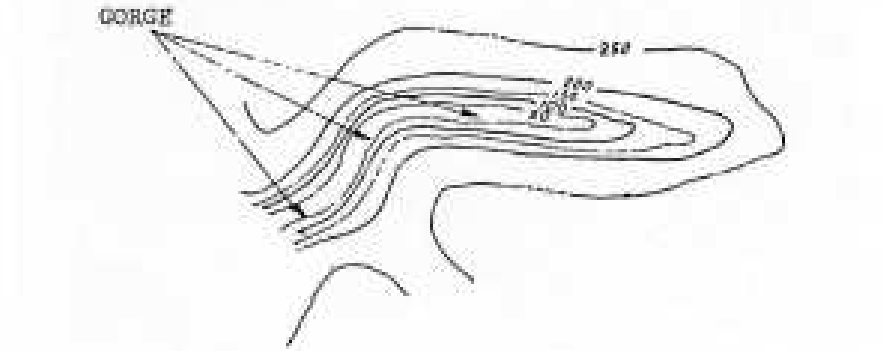
TOPOGRAPHICAL FORMS

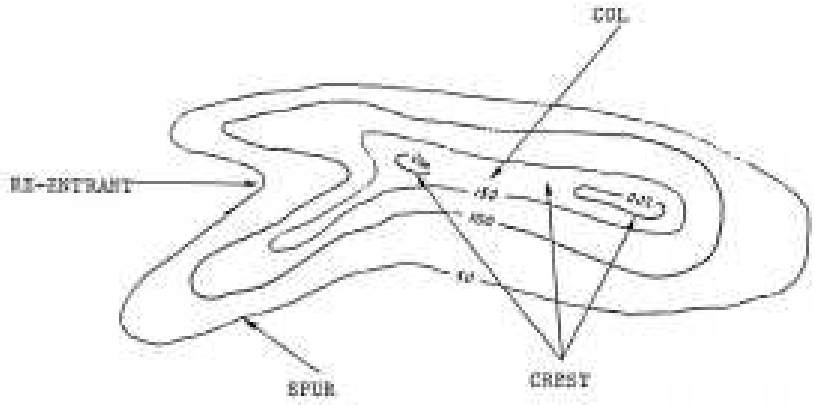


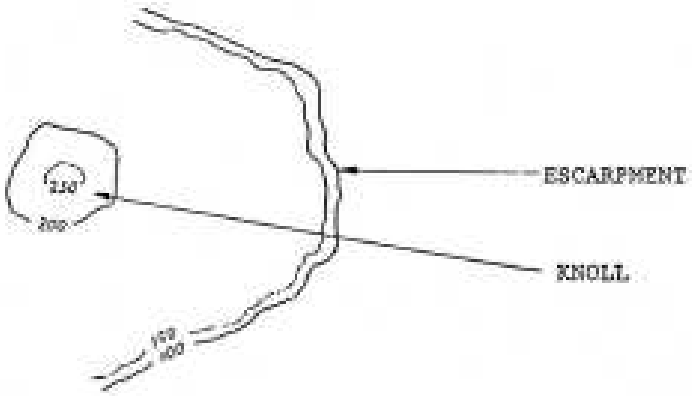


ANNEX A

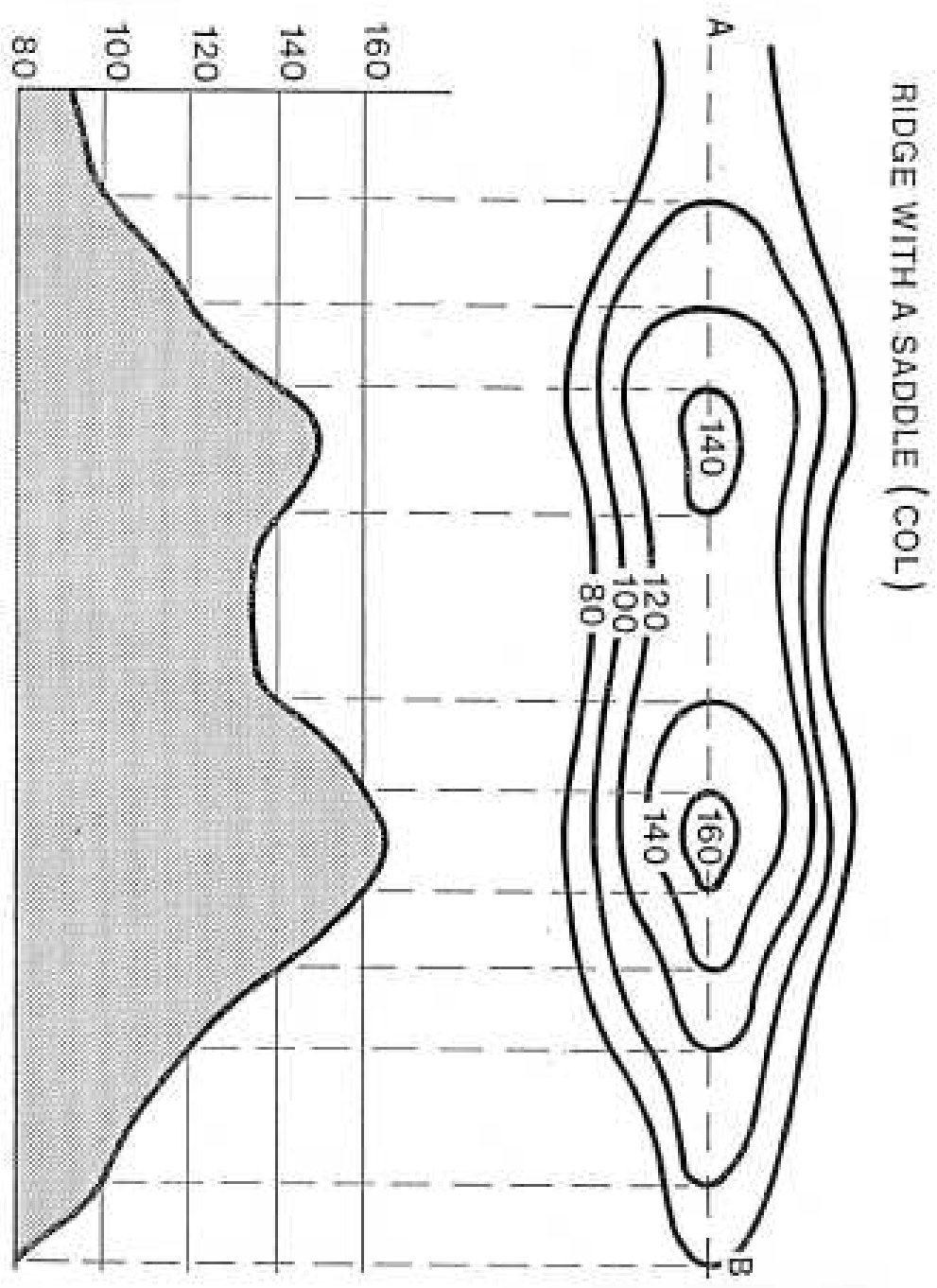
TOPOGRAPHICAL FORMS IN PLAN





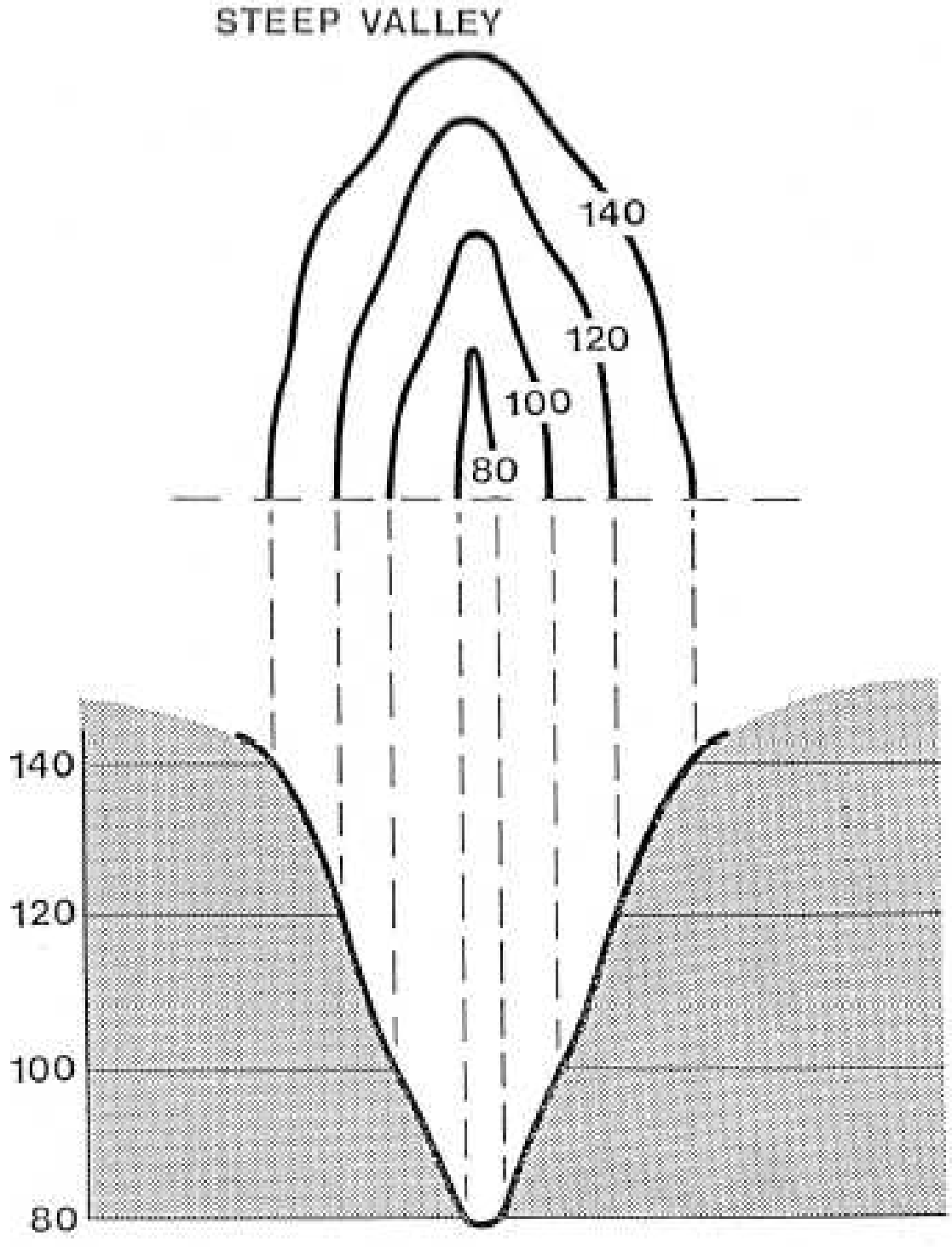


ANNEX A

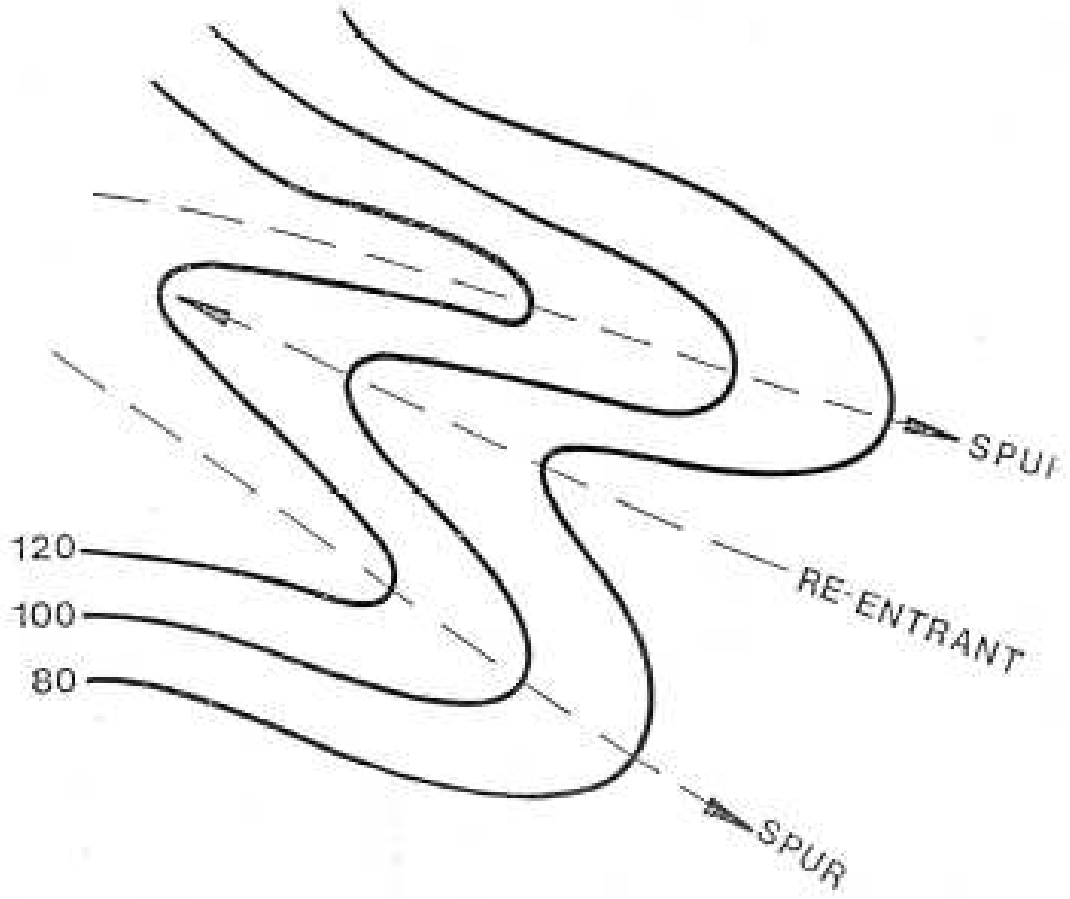


RIDGE WITH A SADDLE (COL)

ANNEX A

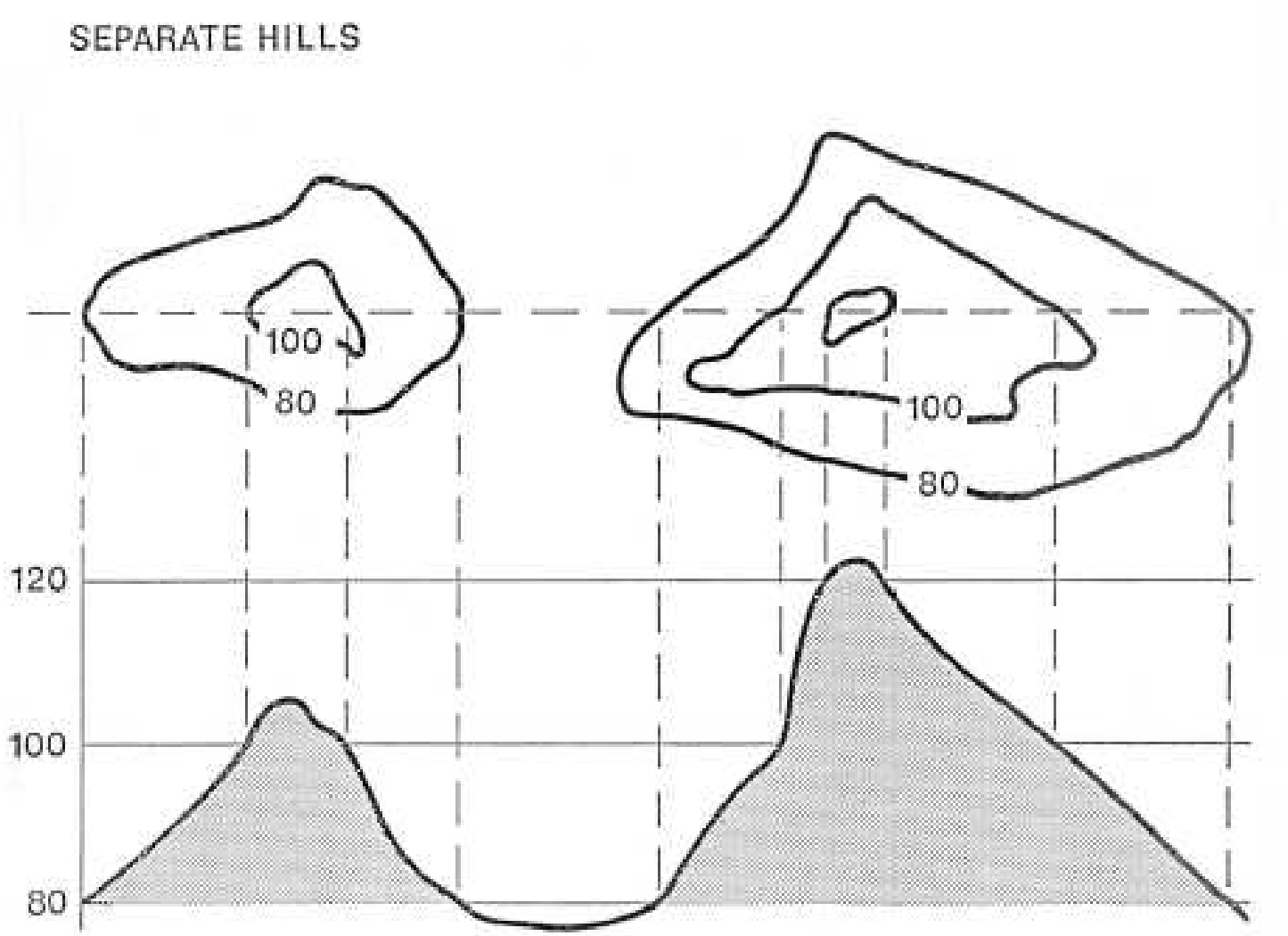


SPURS WITH RE-ENTRANT

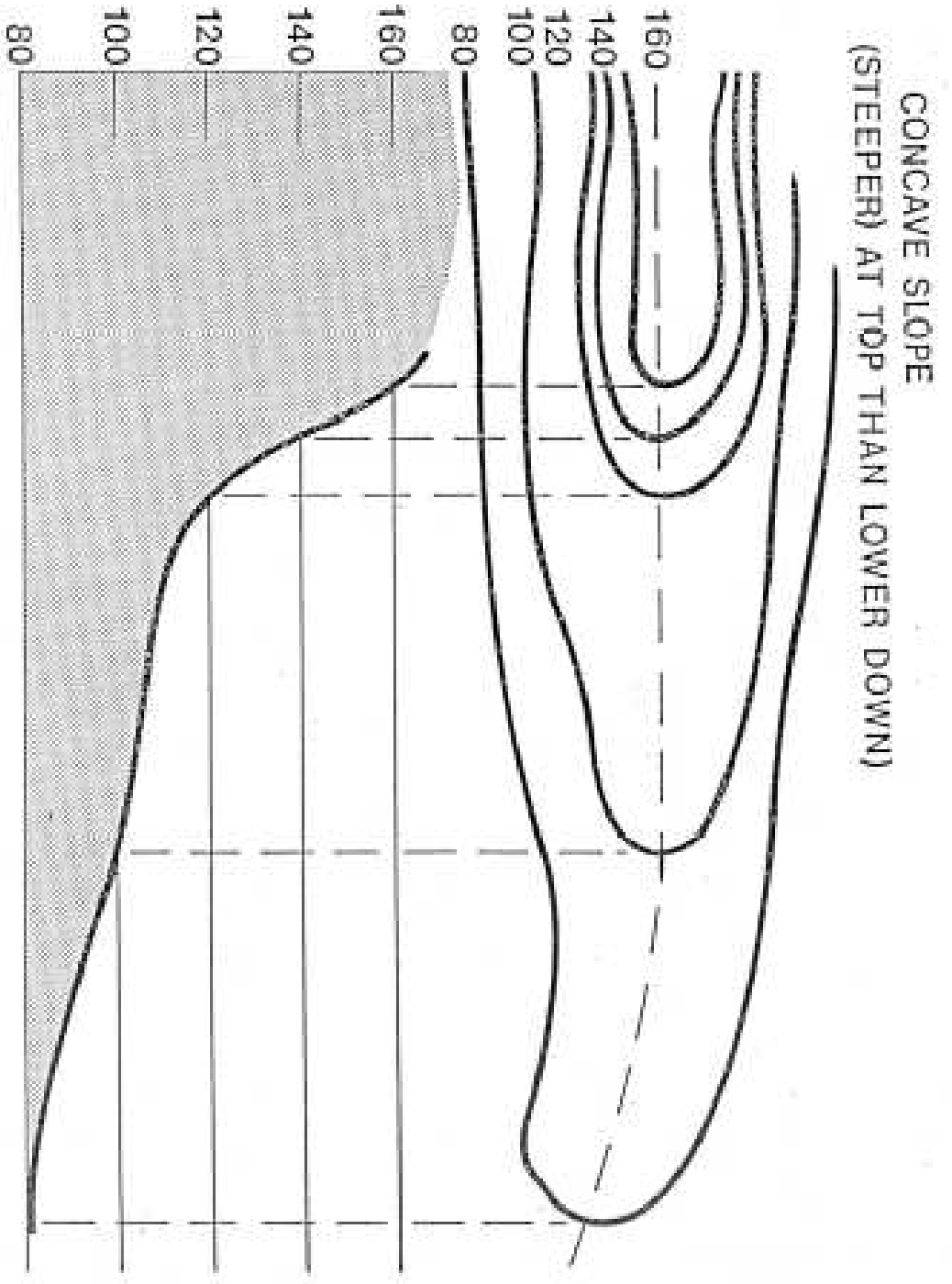


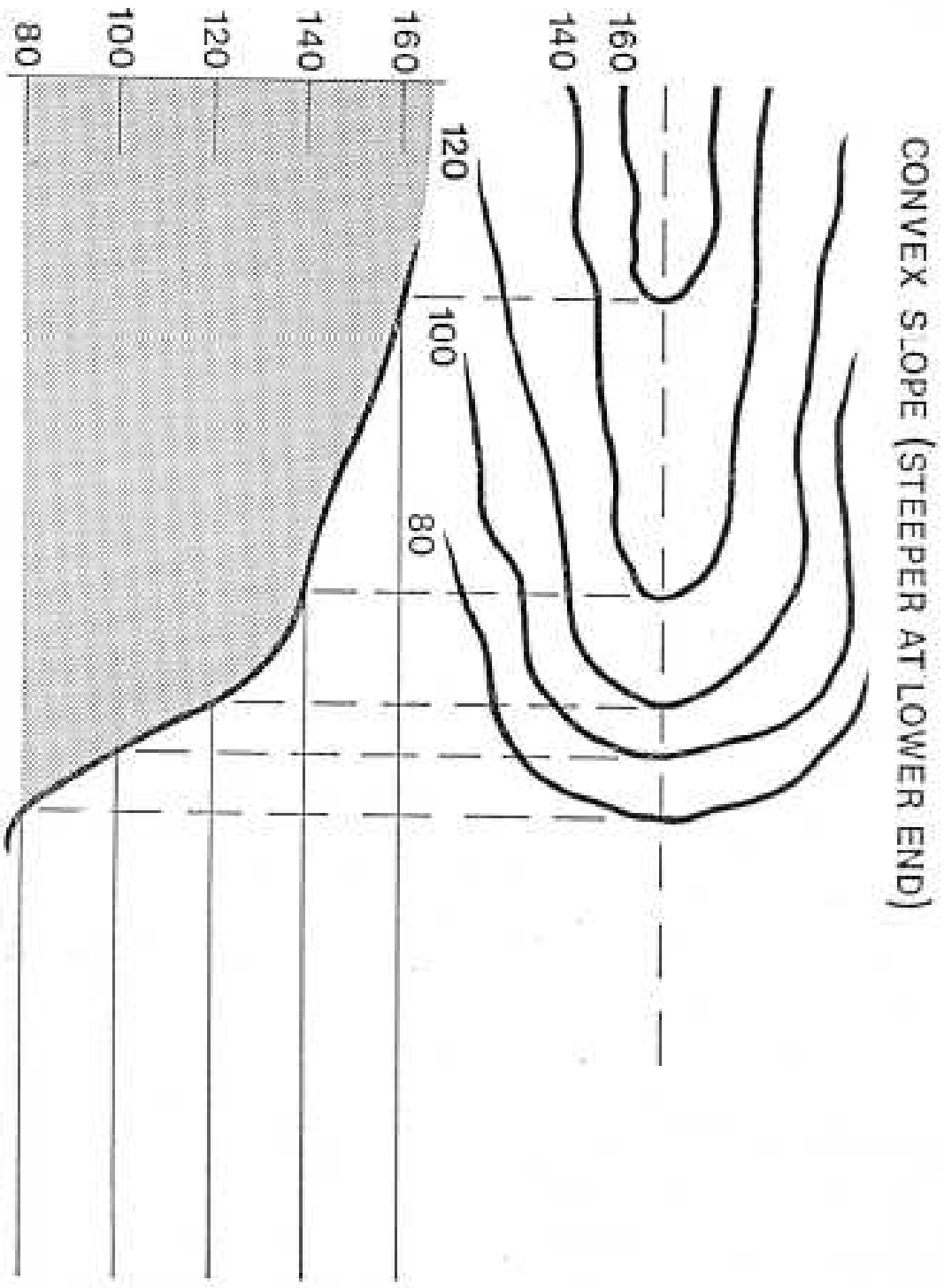
ANNEX A

SEPARATE HILLS



ANNEX A

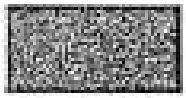

80
100
120
140
160
80
100
120
140
160
CONCAVE SLOPE
(STEEPER) AT TOP THAN LOWER DOWN)


80
100
120
140
160
120
100
80
140
160
CONVEX SLOPE (STEEPER AT LOWER END)

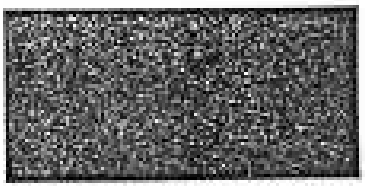
ANNEX B

MAP SCALES

SCALE 1/100,000

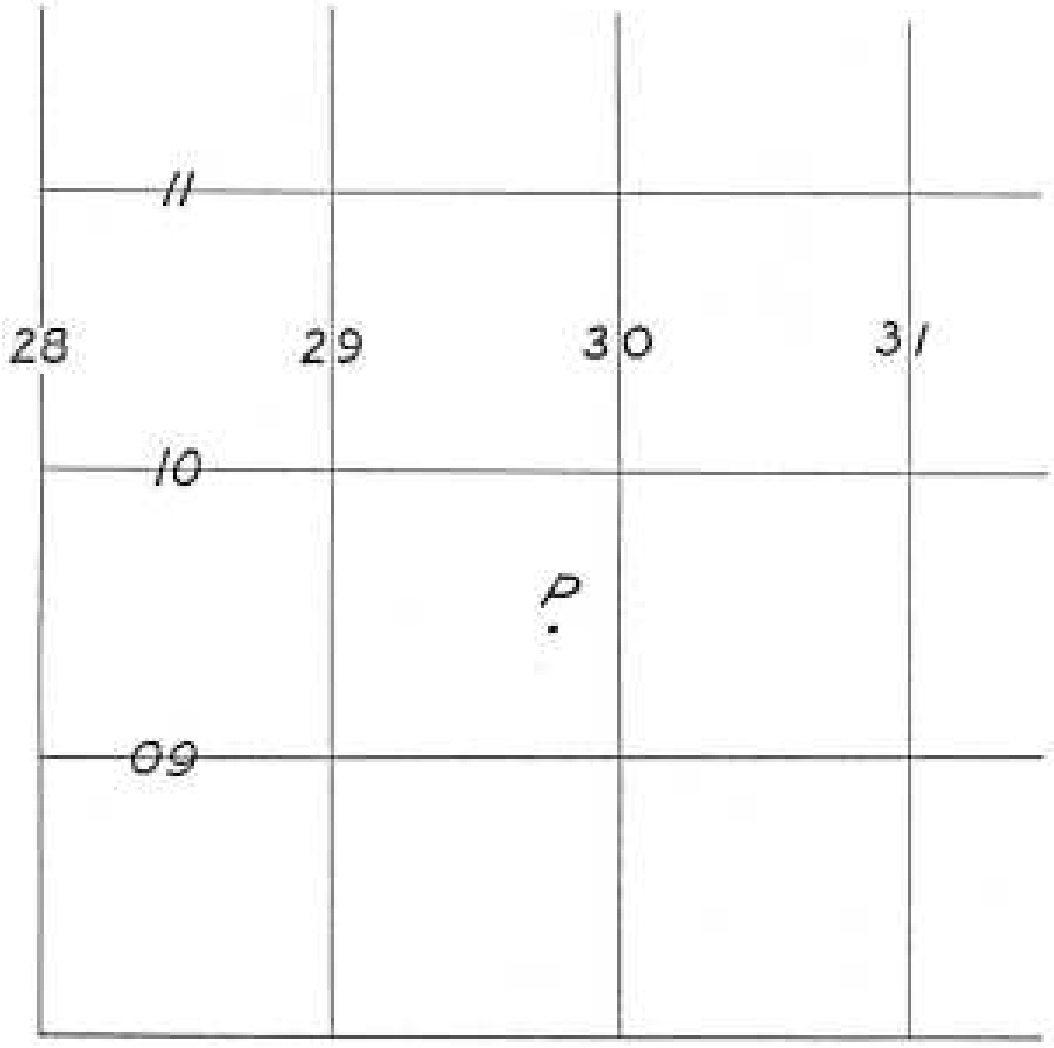


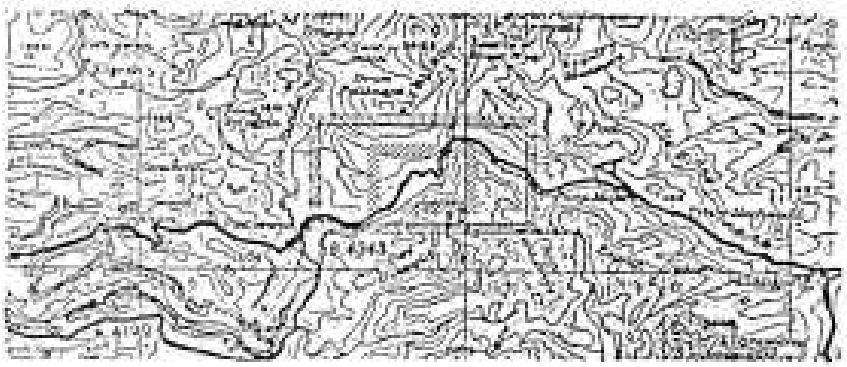
SCALE 1/50,000



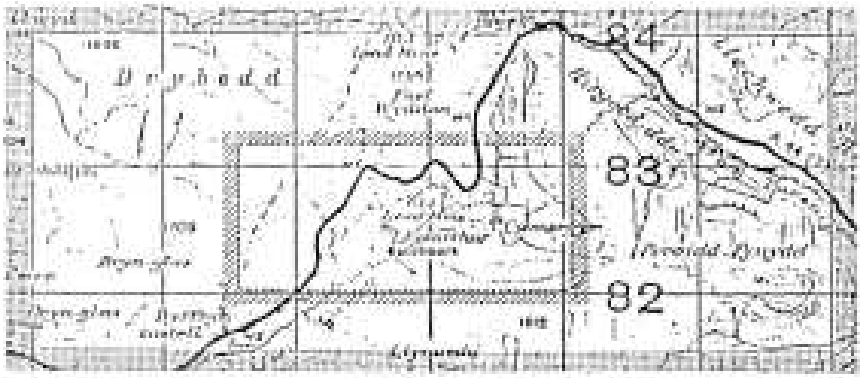
ANNEX C

EXAMPLE OF GRID REFERENCE

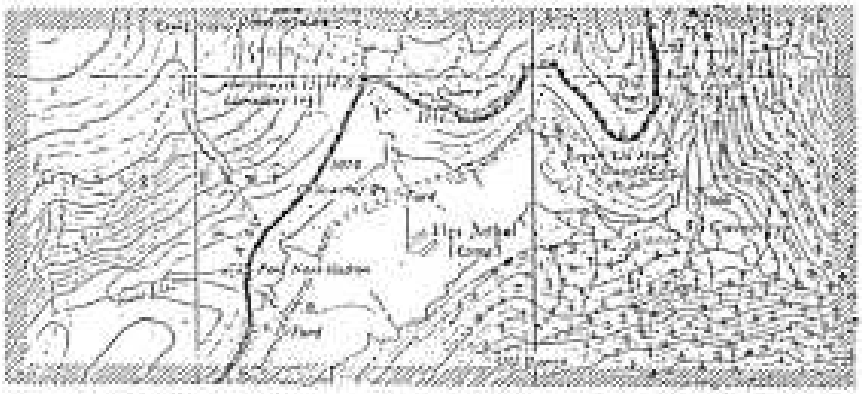




(a) Quarter inch to one mile



(b) One inch to one mile



(c) 1:25,000 (About 2½ inches to one mile)

FIELDCRAFT PROFICIENCY (FCP)
FCP 4 - DIRECTIONS AND BEARINGS
2 PERIODS

Direction

4001. When indicating the direction of one point from another it is normal to express it as a bearing. Bearings are always measured clockwise from a known zero line. The map reader must make it quite clear what source of reference he/she is using.

4002. The three main sources of reference are:

a. True North;

b. Magnetic North; and

c. Grid North.

Bearings

4003. A bearing is the horizontal angle measured clockwise that a line drawn through object and observer makes with a fixed zero line. Bearings that are measured from a zero line which points:

a. towards true north (its source of reference) are known as true bearings,

b. towards magnetic north are known as magnetic bearings; magnetic bearings are used when working with the compass and all bearings measured with the compass are magnetic;

c. towards grid north are known as grid bearings. The north-south grid lines are the obvious zero lines when plotting or calculating bearings on a map.

True North

4004. True North is the direction from the observer to the North Pole.

4005. Meridians are imaginary lines drawn on the surface of the earth from the North Pole to the South Pole and are true north-south lines and are termed Meridians of Longitude. These lines at different places on the globe are not parallel except at the equator, as all meridians converge towards the poles. This presents a problem in the manner of devising a system of reference for use on maps and so an artificial north was calculated and called Grid North.

Grid North

4006. Grid North is the direction of the north-south grid lines on a map.

4007. When devising a grid system for a series of maps to cover a defined area, a central meridian within that area is selected as a datum line and all other grid lines are drawn parallel to that. This means that only one grid line points true north and that is the meridian upon which the grid system is based. The variation between other grid lines and true north direction is known as **convergence**.

4008. Convergence is quoted as an angle on all maps and must be taken into account when calculating true bearings from the map.

Magnetic North

4009. Magnetic North is the direction indicated by the north seeking pole of a freely suspended magnetic needle, influenced only by the earth’s magnetic field.

4010. The difference in direction between Grid North and Magnetic North is expressed as an angle and is known as the Magnetic Variation. The Magnetic North Pole moves slightly from year to year and in 1948 was located at the Prince of Wales island in the far north of Canada. Details of annual change are given in the marginal information of all maps. Annex A shows the relationship between all three bearings.

Lines of Equal Magnetic Variation

4011. On small scale maps such as WAC charts (Air Navigation Maps) there are slanting lines across the sheet, each marked with figures of an angle in degrees and minutes. These lines of equal magnetic variation, are called isogonals. They are put there because on a small scale map covering a wide area, the magnetic variation differs appreciably in different parts. Isogonals do not, as is sometimes supposed, themselves point in the direction of Magnetic North.

Service Protractor

4012. The service protractor is used for drawing and measuring bearings on a map whereas the compass is used for taking bearings on the ground. The protractor is engraved with a number of map scales in common use. These are convenient when measuring distances directly from the map. Three sides of the front face are graduated in MILS. The arrow in the centre of the fourth edge (zero edge) is the point that all angles are measured. Annex B shows the layout of a Service Protractor. There are two sets of figures with these graduations, an outer and an inner set. The outer set reads from 0 to 3200 MILS and the inner set reads from 3200 to 6400 MILS. All readings are made clockwise, the outer set of figures for use east of the north-south lines, and inner set for readings west of the north-south line.

Degrees Protractor

4013. This is a common school type protractor either semi-circular or circular and is used similarly to the mills protractor to gain bearings and directions in degrees from 0^{o} to 360^{o}.

Measurement of Bearings

4014. In order to measure the bearing of one point from another, follow this procedure:

a. join the two points with a light pencil line (do not use ink or ball point pens);

b. if the point to which you are measuring is east of the one you are measuring from, place the protractor with the arrow of the zero edge on the point you are measuring from so that the protractor is east of that point, and ensure that the zero edge of the protractor is parallel to the north-south lines;

c. now read the bearing which is where the pencil line cuts the graduations, using the outside set of figures;

d. where the point being measured to is west of the point you are measuring from, the protractor is placed so that the graduations are west of the north-south line. Read the bearing using the inside set of figures;

e. if the two points being measured are close together, it may be necessary to extend the pencil line so that it will cut the graduated edge of the protractor.

Plotting of Bearings

4015. In order to plot a bearing onto a map from a given point follow this procedure:

a. if the bearing is less than 3200 MILS, place the protractor with the arrow on the point you are measuring from so that the graduated edge is east of this point and the zero edge is parallel to the north-south grid line;

b. with a pencil, mark a small dot on the map at the bearing required;

c. join the dot and the point you are measuring from with a fine pencil line;

d. extend this line for the required distance;

e. if the bearing being plotted is greater than 3200 MILS then the protractor is placed so that the graduated edge is west of the point being measured from the zero edge again parallel to the north-south grid lines.

4016. All bearings measured from a map are grid bearings, and all grid bearings can be plotted onto a map. Annex C shows the method of using the Protractor.

Conversion of Bearings

4017. Usually Grid North, True North and Magnetic North do not coincide; there is an angular difference between them. Bearings of one kind can be converted to bearings of another by the addition or subtraction of the angular difference. Grid bearings may be converted to either True Bearings or Magnetic Bearings and vice versa.

4018. The angle between Grid North and Magnetic North is call Magnetic Variation which may be zero, east or west depending on the position of the Magnetic Pole in relation to the True Pole from the observer's position. If Magnetic North is East of Grid North then Magnetic Variation is East and vice versa. Annex D shows the effect of Magnetic variation over part of the world.

4019. The angle between True North and Grid North is called the Angle of Convergence. This angle is usually very small and for most purposes may be ignored.

4020. On Military maps the Grid Variation and Angle of Convergence are shown by means of a diagram in the marginal information.

4021. A bearing measured by a compass is a Magnetic Bearing. Before it can be plotted on the map it must be converted to a Grid Bearing. A bearing measured on a map is a Grid Bearing and must be converted to a Magnetic Bearing before it is used with the compass.

Practical Conversion

4022. When converting bearings it is always wise to draw a rough diagram including all the relevant information for the calculation. Without the aid of a diagram it is easy to make errors by adding when you should subtract and vice versa. When you have had practice and mastered the conversion then and only then may the diagram be put aside.

4023. With a Magnetic Variation east to convert a Magnetic Bearing to a Grid Bearing, it is necessary to add the Variation to the Magnetic Bearing obtaining a Grid Bearing. To convert a Grid Bearing to a Magnetic Bearing subtract the Variation. This is true for a variation East and vice versa for a variation West.

Accuracy

4024. Convergence Angles and Magnetic Variation angles are taken to the nearest Degree or MIL. Accuracy to less than 20 MILS is seldom achieved in compass and map work and is usually not necessary.

Back Bearings

4025. A bearing gives the direction of a line from an observer to a point of observation. A back bearing gives the direction from the point of observation to the observer.

4026. Clearly the difference between the bearing and the back bearing is 3200 MILS. If the bearing is less than 3200 MILS, to find the back bearing add 3200 MILS to the bearing, or if the bearing is more than 3200 MILS then subtract 3200 MILS. Back bearings are most commonly needed for finding position.

Annexes

A. Relationship of Bearings

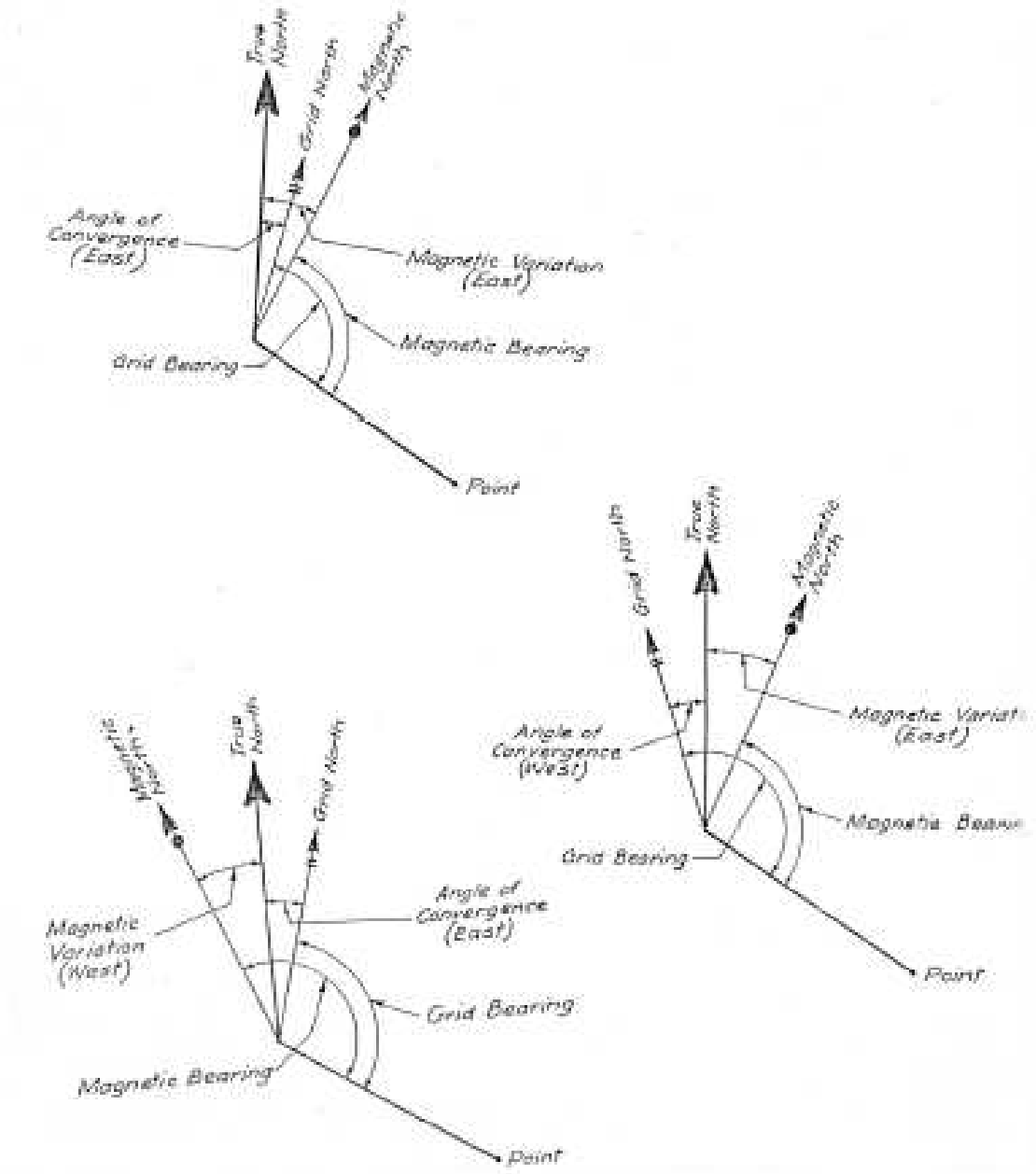
B. Service Protractor

C. Use of Protractor

D. Magnetic Variations

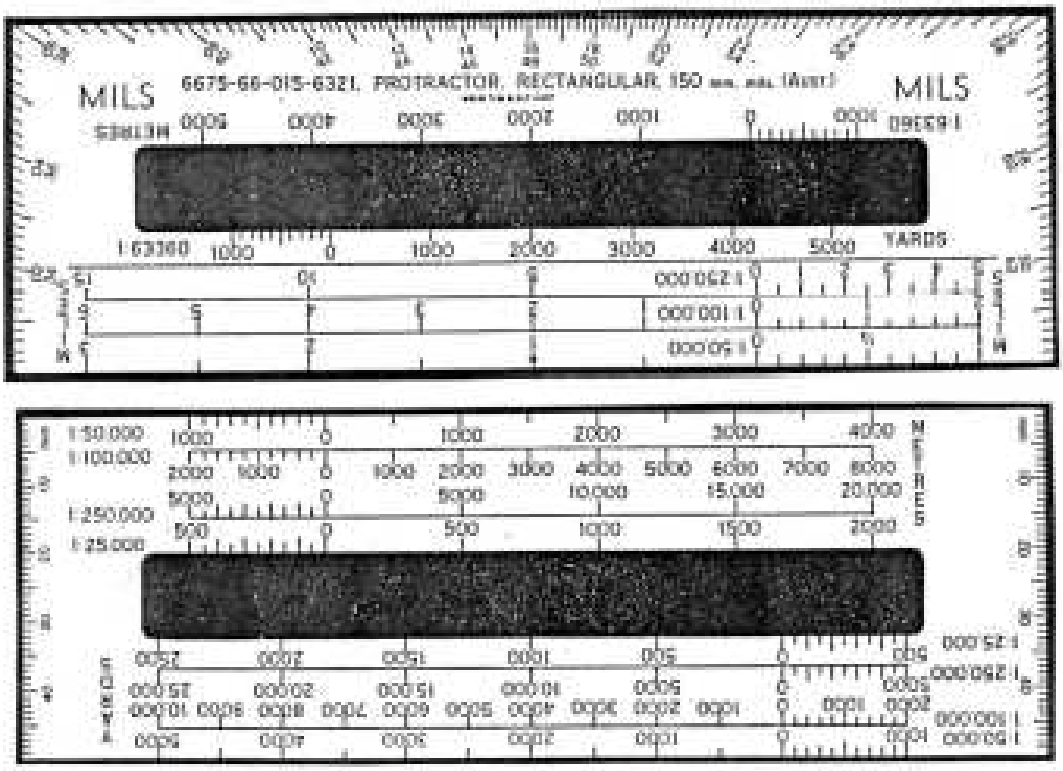
ANNEX A

RELATIONSHIP OF BEARINGS



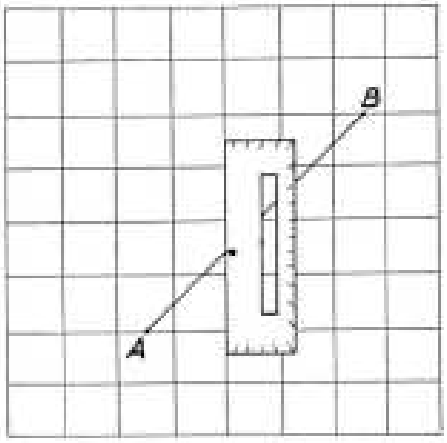
ANNEX B

SERVICE PROTRACTOR

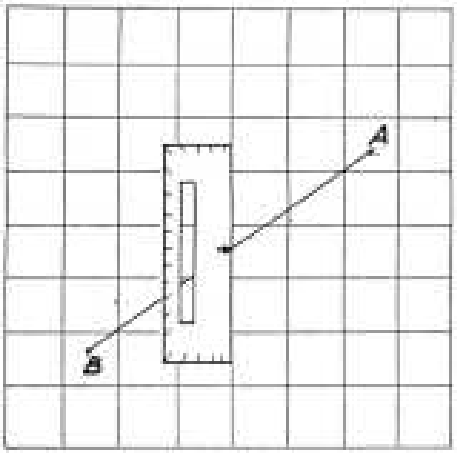


ANNEX C

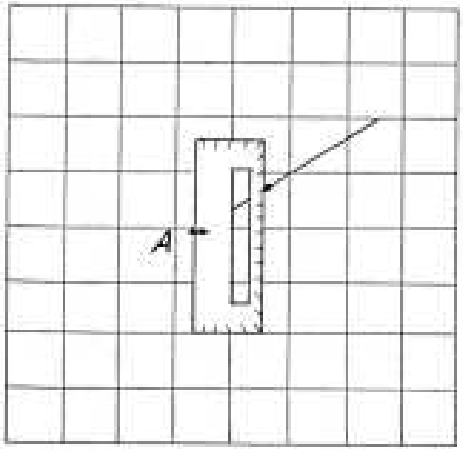
USE OF PROTRACTOR



LESS THAN 3200 MILS



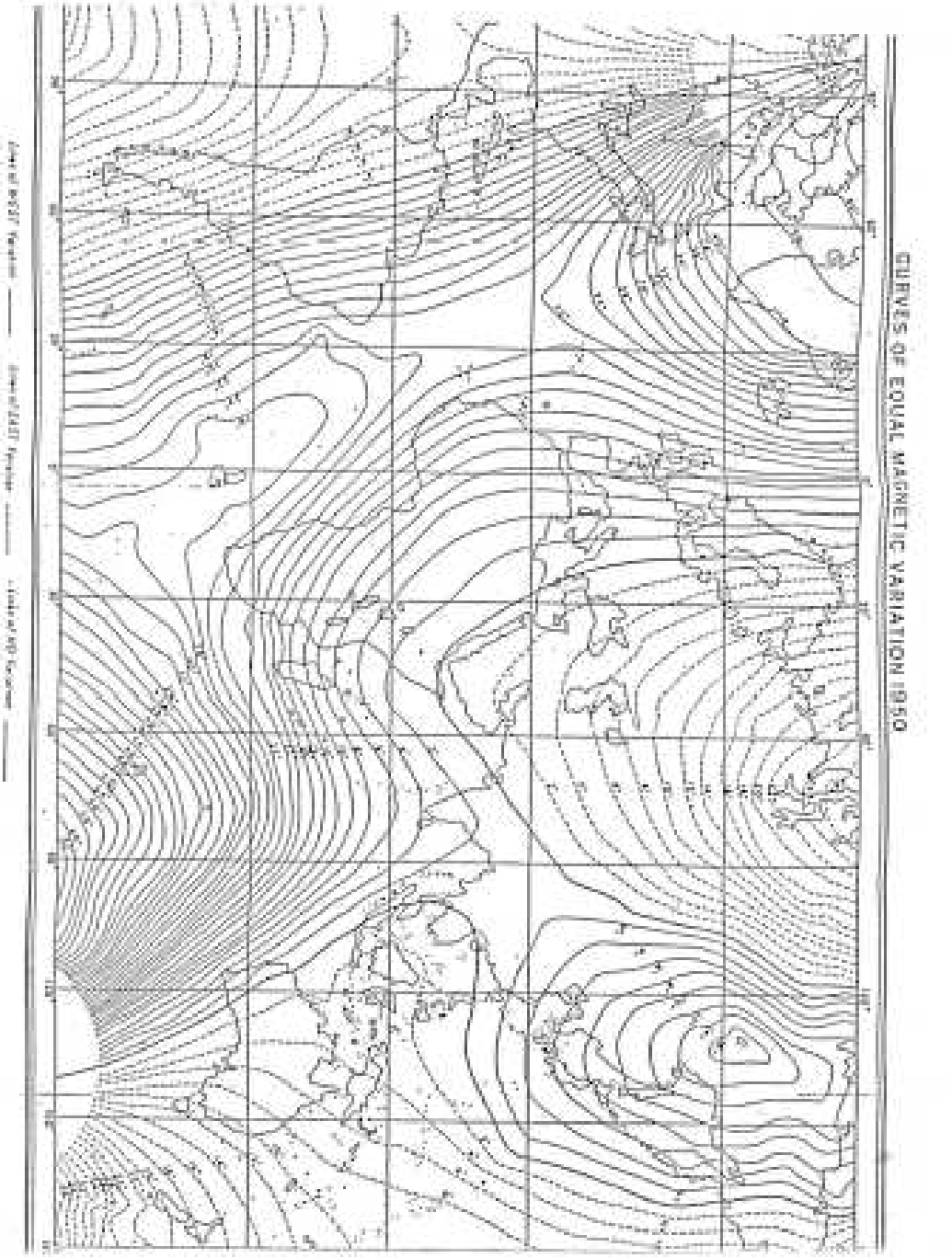
BETWEEN 3200 and 6400 MILS



PLOTTING A BEARING

ANNEX D

MAGNETIC VARIATIONS



FIELDCRAFT PROFICIENCY (FCP)
FCP 5 - THE COMPASS
2 PERIODS

Introduction

5001. The ability to read a map is not sufficient on its own to enable a cadet to participate effectively in fieldcraft exercises. Being able to move in a pre-determined direction, to arrive accurately at a pre-determined point and to find the direction of one point from another in the field is also very important. The Silva Compass has been designed and constructed to assist the user in achieving these desired ends. However, the results given by using the compass will be in direct relation to the skill of the user. Therefore, for good results to be achieved it is necessary for cadets to be skilled in the use of the compass and this will come with practice in the field.

5002. The Silva Compass was developed in Sweden during the 1930's by Kjellstrom Brothers. Although initially designed for the sport of orienteering, these compasses are now used widely throughout the world by the armed forces and by many other organisations as a general purpose compass.

5003. There are many different types of Silva Compasses available, however the basic construction for all types remain the same. The compass enables the user to plot and calculate bearings rapidly and accurately on the map without the use of a protractor by combining, on a common base plate both a compass and protractor.

5004. The main parts of the most common type of Silva Compass are shown at Annex A. These consist of the:

a. Base Plate, which contains:
    1. Romer Scales (for grid references);
    2. Direction Arrow;
    3. Magnifying glass;
    4. Index Line;
    5. Compass housing;
    6. Luminous points.
b. The Compass Housing contains:
    1. Meridian or orienting lines;
    2. Compass needle
    3. Orienting Arrow.

How to take a Bearing

5005. To take a Magnetic Bearing with the Silva Compass:

a. first face the object that is intended taking a bearing;
b. hold the compass with the direction arrow pointing to the actual landmark and level the compass enough to permit the needle to swing freely;

c. turn the dial of the compass housing without changing the position of the whole compass until the orienting arrow in the housing is parallel with the magnetic needle and the red end is pointing to the letter 'N';

d. now read bearing on the dial at the index pointer this is the magnetic bearing.

It is seldom that a bearing accurate to less than 20 mils is needed. An error of 20 mils would mean an error of 1km in 60km (or 100m in 6km).

Precautions

5006. At all times when using a compass it is essential to ensure that the compass is not affected by steel or iron objects in the vicinity. Such objects as a motor vehicle, an overhead power lines, iron pipes under the ground, a wire fence or a bunch of keys in the pocket if close enough can cause the compass to read incorrectly. Safe distances are:

a. Motor Vehicle 25m

b. Wire fence 10m

c. Steel helmet 3m

d. Keys, whistle, etc 0.5m

Grid Bearing

5007. The method of taking a Grid Bearing from a map is:

a. place the compass on the map with the long edge along the desired line of travel, making sure that the direction arrow on the compass plate points in the direction you wish to travel;

b. turn the dial until the compass meridian/orienting lines on the transparent bottom are parallel with meridian lines of the map and the 'N' points North on the map;

c. read the grid bearing on the housing where the index line intersects it.

CAUTION

The bearing that has been calculated is a **GRID** bearing. This must be converted to a **MAGNETIC** bearing if it is intended to be set as a heading for a march.

Magnetic Variation

5008. When the compass is used with a grid bearing on a map, an adjustment should be made to allow for the Magnetic Variation. This is especially true if there is considerable variation, or if accuracy is important. With one turn of the dial proper allowance can be made for variations.

Grid to Magnetic

5009. To convert from a Grid Bearing to Magnetic Bearing:

a. find out the amount of variation;

b. turn the dial as per the following rule:

1. Variation East --- turn dial East

2. Variation West --- turn dial West

5010. To convert from Magnetic Bearings to Grid bearings the reverse of para 5009 would apply:

a. Variation East --- turn dial West

b. Variation West --- turn dial East.

5011. In applying these rules the basic method used is:

a. GRID to MAGNETIC

1. Variation East --- SUBTRACT

2. Variation West --- ADD

b. MAGNETIC to GRID

1. Variation East --- ADD

2. Variation West --- SUBTRACT

Back Bearings

5012. Unlike most other compasses, there is no requirement to calculate back bearings with the Silva Compass. If the user is marching on a given bearing and wishes to return to his original starting point, simply turn around to face roughly in the direction from which he came and reverse the compass so that the direction arrow points towards the user. This is shown at Annex B.

5013. Orientate the compass by turning the whole body until the red end of the compass needle points to the North point on the compass housing and march in the direction in which the back of the compass plate faces.

Maintaining Direction by Day

5014. To find the direction of a given bearing, turn the dial until the desired bearing is shown at the index pointer. Hold the compass in a level position enough to allow the magnet needle to swing freely, and also have the direction arrow pointing straight ahead. Orientate the compass and yourself by turning yourself around until the red North end of the magnetic needle points to the 'N' on the dial. The travel or direction arrow is now pointing to the desired direction of travel.

5015. Take note of some distant object that is in line with the arrow. This object will be on the required bearing. If in very dense low scrub the method used to maintain a bearing is to have reference to the compass held in the hand and set on the desired heading.

Maintaining a Bearing by Night

5016. Having been given a bearing for a night march this needs to be set on the compass. With reasonable light set the bearing as for day time. Using the two luminous points on the meridian housing and the single luminous patch on the compass needle kept between these two to form a direction arrow will point the desired line of travel. This can be used by reference to the compass held in the hand as for day time.

Orientating a Map

5017. A map is much easier to compare with the ground if north on a map corresponds (points in the same direction) with North on the ground. When this is done the\ map is said to be set or orientated and objects on the ground are in the same direction from the observer as they are on the map from the observer's position on the map.

5018. A map is readily, accurately and quickly set or orientated by using a compass. This is done by placing the compass on the map with the edge along the line of Grid North. Turn the dial of the compass until the 'N' and the meridian lines are pointing to the direction of the travel or direction arrow. Turn both the map and compass until the magnetic needle points to 'N' on the compass. The map is now orientated.

Finding Position Compass

5019. The first step in finding one's position is to orientate the map. The next step is to search the area in which he thinks he is for features on the map that can be located on the ground and vice versa. To find the position on a map by resection, at least two prominent features are used. The features should be able to be identified on the map. Taking an accurate as possible bearing of one of the features and converting this bearing to a Grid bearing, place the compass on the map so that the side of the base plate intersects the feature, and while keeping the edge of the compass base plate on the feature, turn the entire compass on the map until the compass orientating lines are parallel with the meridian lines on the map, and so the orientating arrow points to North on the map. Draw a line on the map along the edge of the compass intersecting the feature.

5020. This procedure is repeated using another feature well spaced from the first one. Where the lines from the two features intersect should be the position of the observer. It is advisable to take a third feature to confirm the position indicated by the first two. Features should be well spaced apart if possible in the order of 120 deg to give the best possible results.

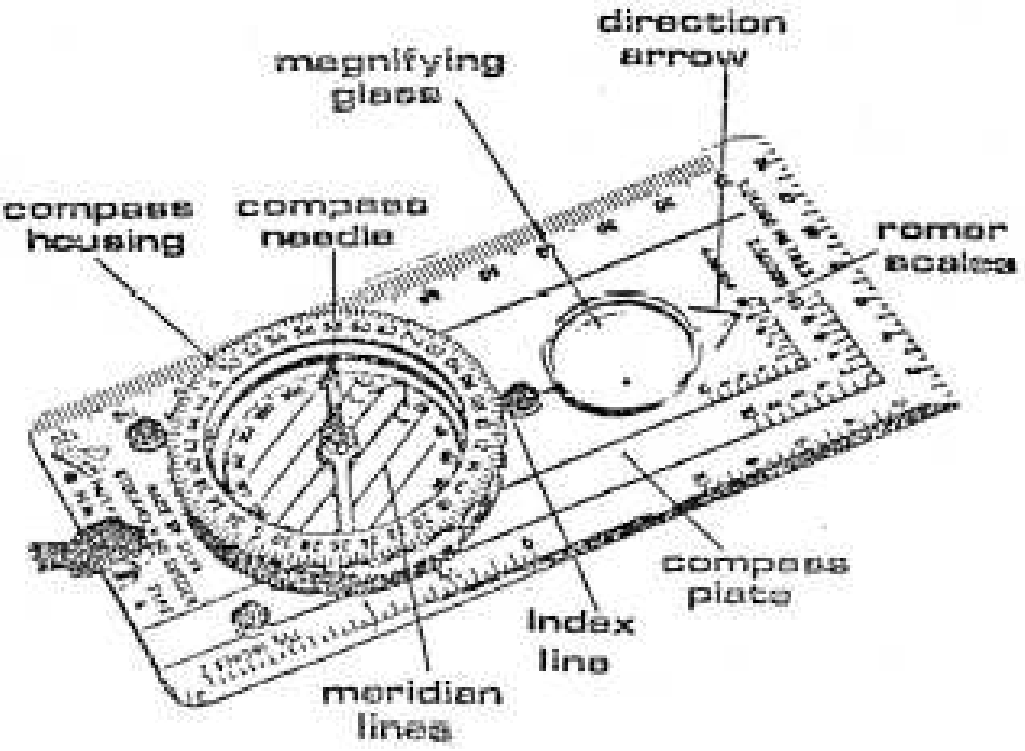
Annexes:

A. Silva Compass

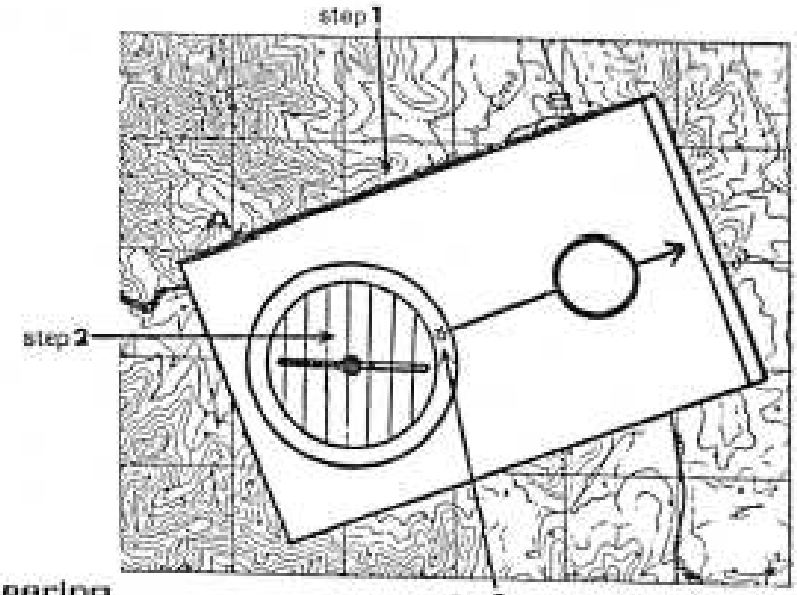
B. Back Bearing

ANNEX A

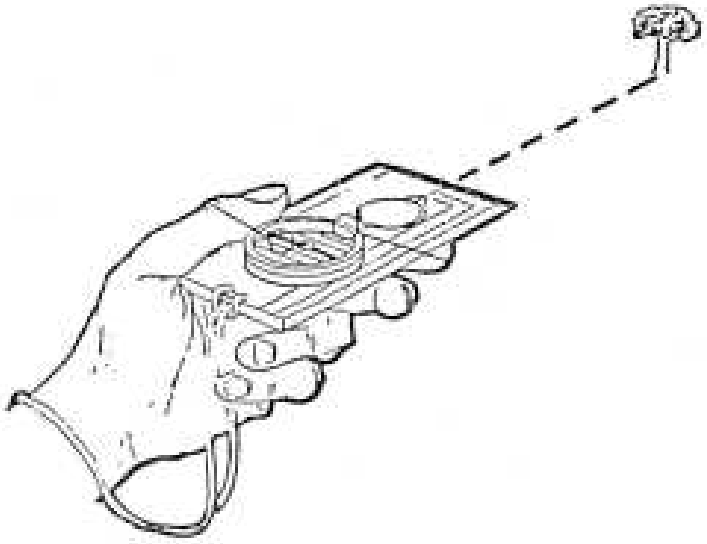
SILVA COMPASS



The type 4 SILVA compass



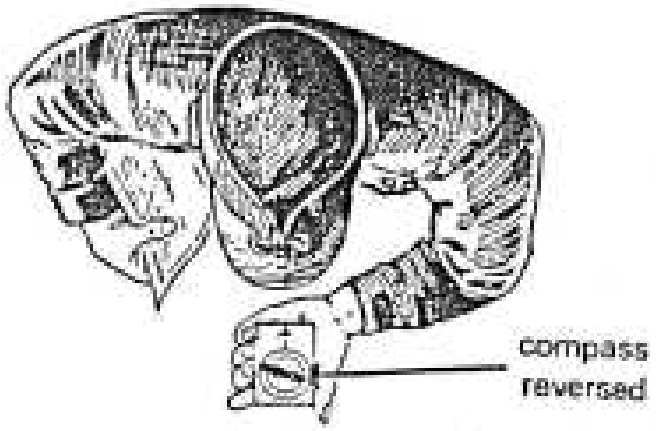
Grid bearing



Magnetic bearing

ANNEX B

BACK BEARING



Back bearing

FIELDCRAFT PROFICIENCY (FCP)
FCP 6 - FIELD NAVIGATION
2 PERIODS

Compass Marching by Day

6001. Having set the compass on the desired direction and determined the direction travel, take note of some distant object that is in line with your direction travel. This object will be on the required bearing.

6002. To mark the bearing more permanently an assistant with a stick with white paper or cloth wrapped around one end, is sent out on a line of the bearing for about 50 to 100 metres and the stick is planted in the ground. Another marked stick is placed at the position of the observer and the two sticks then give the line of the bearing.

6003. To maintain a bearing on the march the object chosen along the line of the bearing should be as distant as possible. What is better still is two distant objects in line along the bearing. If the march is made keeping the two objects in line then the line of the bearing will be maintained. It is advisable to check occasionally by setting the back bearing on the starting point if it is visible.

6004. In very dense low scrub the method used to maintain a bearing if no distant object is visible is to have reference to the compass held in the hand and set on the desired heading. This is the most accurate method for most conditions.

Compass Marching by Night

6005. Even at night it is often possible to distinguish objects at some distance, particularly against a skyline. On moonlight nights they may be seen from an even greater distance. With the compass preset to the required bearing by one of the methods outlined for day work, line up the bearing. Select the most distant object visible on this line and march to that and so on. The object need not be exactly on the bearing, the distance to the right or left of the object can be estimated and checked periodically with the compass.

6006. A star may be chosen to march to if it is on or near the line of the bearing. This is convenient, as the star can be followed over a much longer distance, but some precautions must be observed:

a. the star chosen must be conspicuous and easily identified. It is not possible to watch a star continuously so it must be capable of being picked out quickly;

b. the star chosen should not be too high in the sky nor too low. If it is too high the head may have to be tilted at an uncomfortable angle. If too low it may be obscured by dust or haze;

c. stars move. A star fairly low down may move about 100 mils in twenty minutes. An error of 100 mils is about 150m in 1.5km. The length of time a star moving to the side, may be followed will depend on the degree of accuracy needed in following the bearing. Generally one of these stars could be used for only about 15 to 20 minutes. However, stars that are rising or setting vertically (stars in and near Orion) may be followed for some time longer. Whenever a star is used a compass check should be made on it every few minutes, since it is not always possible to determine in a short period of time if the star is moving vertically or obliquely.

6007. On dark nights when stars are not visible and objects more than a few metres away are invisible, different procedures must be taken. The method is to send a person ahead on the

bearing as far as that person can be seen, follow them up and then send them ahead again. When there is no necessity for silence the person can be sent ahead, called to a halt before they disappear and told to move right or left until they are dead on the line of the bearing. The person can be seen at a greater distance if a square of white paper or cardboard or cloth attached to their back. This makes longer bounds possible and progress will be quicker.

6008. Once the technical details of the compass have been mastered, the only way in which one can become really proficient in its use is to obtain experience by using it out of doors.

Distances – Paces

6009. Once the compass bearings have been mastered there only remains that of distance. Plot a route carefully on the map beforehand and divide the journey into suitable legs, (more about this under heading of Navigation). These will of course vary in length, but a reasonable average to aim for would be 1000 to 1500 metres.

6010. The best way of estimating distance travelled is to count paces. As a working basis the length of an average pace is taken to be 75cm. The distance calculated from the map will usually be measured in metres. These can be converted into paces by:

No. of Paces = Distance (Metres) x 1.25 (use 1.3 for ease of calculations)

eg. Dist 1200m No. of Paces = 1200 x 1.3 = 1560 Paces

6011. When marching on a compass course it is usual to have two members counting paces. Where the total disagrees, an average should be maintained.

Navigation Planning

6012. Time spent in planning the route before starting, will save unnecessary hardship over 'bad going' and greatly reduce the chance of error:

a. study the map noting the main features in the general area to be covered, e.g., direction of flow of rivers, heights of hills, artificial objects, variations in vegetation;

b. using a sharp pencil draw in the route to be taken;

c. mentally traverse the route and note the nature of the 'going' and the main obstacles. The best way to avoid 'bad going' and negotiate obstacles should be decided now and the final route plotted on the map;

d. select bounds. Unmistakable objects such as a river junction, road junction or hill should be used as bounds. These should be about one hour's march apart, so as that one's exact location can be pinpointed at regular intervals;

e. work out the Navigation Data Sheet including bearings, estimated distances, marching time and going for each bound. This is covered in more detail at paragraph 5018;

f. a list of navigation do's and don'ts is at Annex A.

Estimating Time

6012. Accurate estimation of time is gained only by practical experience. Time taken will be influenced by:

a. a. hills;

b. stream crossings;

c. swamps, including swampy grass land;

d. secondary growth;

e. rain forest;

f. tracks (if the situation will permit their use, speed may be increased);

g. dry grass land;

h. cultivated areas;

i. whether moving by day or night; and

j. temperature.

Estimating Distance

6013. When estimating distance from the map allowance must be made for the rise and fall of the ground. Where the measured distance on the map is 1000 metres, it will only be accurate if the ground is flat. If there is a hill included in the 1000 metres, its height will have to be taken into account and the pacing adjusted for climbing it on one side and going down the other. Annex B shows the requirements of additional paces required for various gradients.

6014. In the jungle, it is always necessary to convert distance into time at the planning stage, because the time taken to cover 100 metres of ground will vary with the changes of vegetation, the number and nature of obstacles, and the type of country.

6015. Paces do not lengthen appreciably on steep downgrades, cautious approach tends to shorten paces, as traversing an object increases the number of paces. Experience and practice are the only sure means of achieving accuracy.

Locating a Pinpoint Objective

6016. In the jungle, it is possible to be within 20 metres of the objective and you cannot see it. Therefore, when aiming for a pinpoint objective it is advisable to select as an auxiliary objective the middle of a nearby linear feature with clearly defined limits such as a length of track, an arm of a stream, or a border of cultivation. These must stretch across the pinpoint. An error of a few mils is less likely to cause the party to miss the broader auxiliary objective. On arrival, it should be a comparatively simple matter to locate the nearby pinpoint objective.

Annex C illustrates this principle. It will be noted that if a bearing of 1800 mils is followed any error South will result in the objective being missed altogether. By aiming 200 mils North, the track would be located and the objective found without chance of bypassing.

Checking

6017. During movement make the following checks on navigation:

a. Nominate Pacers: distance travelled must be estimated as well as measured by paces. Experience in jungle movement is the best guide for estimating distance covered in a given time. Counting paces will assist, and cadets must be detailed for this purpose. However, a person will take shorter paces where the going is slow or difficult and there is a tendency to overestimate the distance travelled;

b. Check Compass, Map and Data Sheets: direction should be checked against the compass at regular intervals. Prominent landmarks must be checked and identified on the map as they are passed. There is often a tendency in close country to take the easiest route. This must be resisted;

c. Locate each Bound before Proceeding to the Next: if, at the end of the required time and distance, a bound is not located, there has been an error in navigation which must be corrected before continuing. A temporary halt is necessary, while reconnaissance is carried out to find the bound. Reconnaissance parties, sent out to locate a bound must

be given a definite duration of movement, e.g. 'move down this creek for 15 minutes to see if this creek junction exists'.

Navigation Data Sheet

6018. The Navigation Data Sheet is a record of how you plan to complete each leg of the journey. It is also a ready reference and a means of checking that you are maintaining the planned track. A copy of a Navigation Data Sheet is at Annex B and is largely self explanatory but a brief description of how to use each column is as follows:

a. Leg - the number at that leg;

b. From - grid reference of the start point of the leg;

c. To - grid reference of the destination of that leg;

d. Estimated Distance - calculated from the map;

e. Estimated Paces - calculated to include terrain;

f. Estimated Time - calculated to include terrain and vegetation,

g. Going - includes check features expected on the leg,

h. Remarks - any other relevant information.

Bypassing Obstacles

6019. When an unexpected object is encountered eg. swamp or bamboo forest etc, a decision must be made to bypass the object or go through. If the decision is to bypass it, any tendency to cling to the edge of the object and feel a route round it must be avoided, as a loss of direction will result.

6020. The methods of bypassing which eliminate the possibility of error are as follows:

a. Method 1: from the edge of the area, plot a fresh course at 900 from the line of march, i.e. using the rear of the base of the compass, and move a pace distance, say 500 paces. When the 500 pace mark has been reached swing back on the original heading or parallel line of march, for sufficient distance to ensure bypassing. Then swing back 900 in the direction of the original line of march for the desired distance e.g. 500 paces to get back to a point from which the march can be continued. Annex C shows the method used, remember to add the paces counted while travelling along the march bearing as part of the distance travelled;

b. Method 2: Select an object to a flank. Plot a new course to this object and from it plot another course to another object on the line of the march. This method is also shown at Annex C.

Action if Lost

6021. If lost, do not act hastily. The correct action is to halt and consider:

a. whether the navigator has drifted left or right of the mean course;

b. whether the party could have gone past the object (time and distance should be checked);

c. whether the ground covered conformed with the 'going' in the navigation data sheet;

d. whether there are natural or artificial features in the area which will help to fix position;

e. the possibility of a map error. Extreme care should be taken before attributing one's 'being lost' to this cause.

6022. After consideration of the above, the next step is to orientate the map and search the area for features on the map that can be located on the ground and vice versa. Try to identify places and things not too far distant for a start; note their directions and judge their approximate distance. If a point to the front and one to the side can be identified this fixes the position of the observer more specifically and allows other points to be identified. As a final check two or three distant objects should be chosen and checked to see if they line up with the map.

6023. Roads and railway lines can also be used particularly if the observer is almost in line with a straight stretch by moving until the observer is in line, knows that he/she is on a certain line on the map. By estimating the distance from the road or railway line can fix the position.

6024. The most safe and sure means is by use of map and compass using the resection method and provides an accurate method of fixing position.

6025. As a last resort if it is impossible to locate one's position, the best action is to select from the map some large or long feature that could not be missed, if a road, a railway line or a river whose general direction can be found and then walk in this direction until it is reached. This is called making a landfall.

6026. If a river or road running east and west is to the north of the observer, walking north will bring the observer to some point on the river or road. The feature is then followed in one direction or the other. A river is better followed downstream because there is more likelihood of finding habitation as the river nears its mouth. If a road being followed starts to become fainter it is better to follow in the other direction. Telephone and power transmission lines may not be shown on the map but they will lead to civilisation.

Annexes:

A. Navigation Do's and Don'ts

B. Navigation Data Sheet

C. Bypassing Obstacles

ANNEX A

NAVIGATION DO's AND DON'Ts

NAVIGATIONAL DO's AND DON'Ts

Serial	*DO'S*	*DON'TS*	*Remarks*
1.	Plot course on map and plan detours.	Make up the route on the ground as you go.	When the final route is decided, make out a Navigation Data Sheet.
2.	Check compass and map at regular intervals.	Rely on sense of direction.	Carry the compass in an accessible place.
3.	Locate each bound before proceeding to the next.	Estimate position and proceed on an assumption.	Bounds should be unmistakable objects.
4.	Count paces and estimate distance.	Rely on instinct to judge distance travelled.	The tendency in jungle is to over estimate.
5.	When the objective is small, allow for error.	Expect accuracy within metres when bounds are long distances apart.	
6.	Stay strictly on the bearing.	Let scouts drift off course to take an easier route.	With training, scouts can maintain direction for long periods without need for correction.
7.	Bypass bad going by a deliberate measured bearing.	Attempt to feel around an obstacle.	
8.	If the ground does not conform with the map, stop, mentally go back over the course to find where the error occurred. Reconnoitre to find the land mark.	Blame the aids and carry on.	Remember: 1. The compass is right. 2. The map is right. 3. You are wrong.

ANNEX B

NAVIGATION DATA SHEET

NAVIGATIONAL DATA SHEET

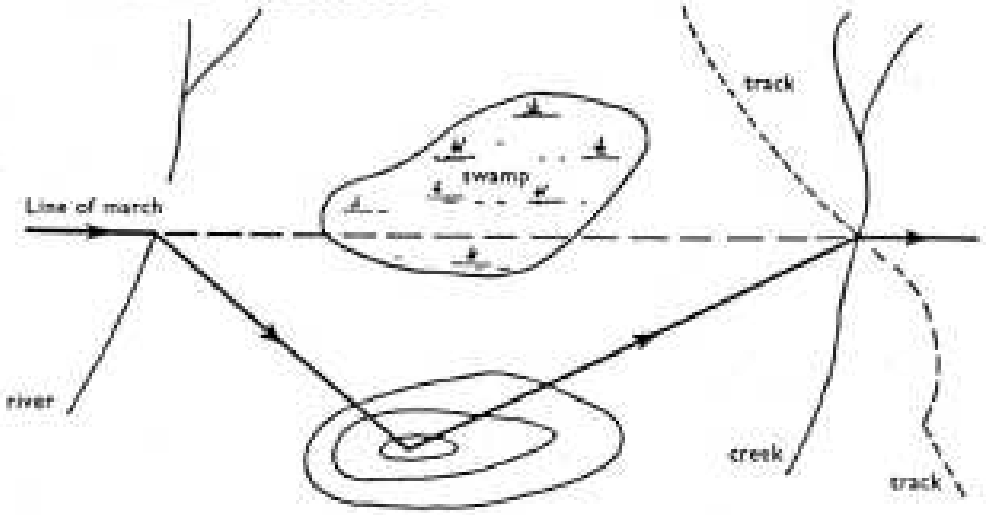
Leg	From	To	Grid Bearing	Magnetic Bearing	Estimated Distance in metres	Estimated Distance in paces	Estimated Time in minutes	Going	Remarks

ANNEX C

BYPASSING OBSTACLES

BYPASSING — METHOD 1

BYPASSING — METHOD 2



FIELDCRAFT PROFICIENCY (FCP)
FCP - 7 – KNOTS AND LASHINGS
1 PERIOD

General Use of Knots and Lashings

6001. In the field, a knowledge of rope work is invaluable when understanding pioneering type tasks. Standardised knots and lashings are used by various organisations so that each member knows what the other person is doing or has done previously, particularly if you are dismantling or repairing someone else's construction. AAFC Cadets at basic level, are required to master three knots and two lashings. These are illustrated below in Figures 1 and 2.

Knots

6002. The three knots and their uses are;

a. Reef Knot; used to join two ropes of equal diameter.

b. Rolling hitch; use to attach a rope to a pole or spar where the direction of pull is to the left or right along the pole, may also be used as a non-slip hitch on the rope itself.

c. Round turn and two half hitches; used to attach a rope to an eyelet, ring or spar. This hitch will not jam when wet.

a. Reef knot;

b. Rolling Hitch; (in the illustration it is being used as a non-slip titch on a tent peg)

c. Round turn and two half hitches;

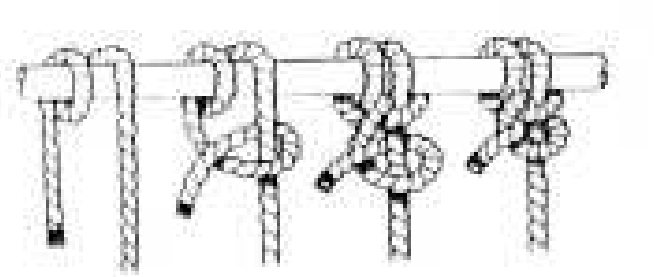


Figure 1 – The Three Basic Knots

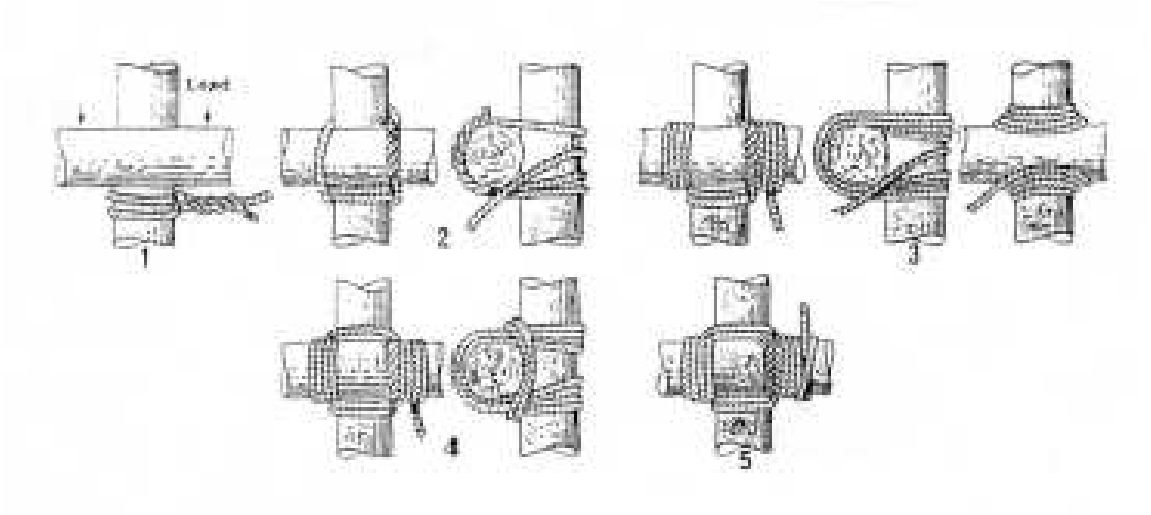
Lashings

7003. The two lashings and their uses are;

a. Square lashing; used to lash two poles together at right angles across each other. Start the lashing with a clove hitch on the pole that will bear the strain, underneath the cross member. Continue as shown in the diagram and finish with another clove hitch on the opposite side of the same pole.

b. Diagonal lashing; used to lash two poles together across each other when the angles are not at 90 degrees. Start with either a clove hitch (or timber hitch if known) across the entire joint of both poles to be lashed. Again, continue as shown and finish with a clove hitch on the lower part of the lashing.

a. Square lashing;



b. Diagonal lashing;

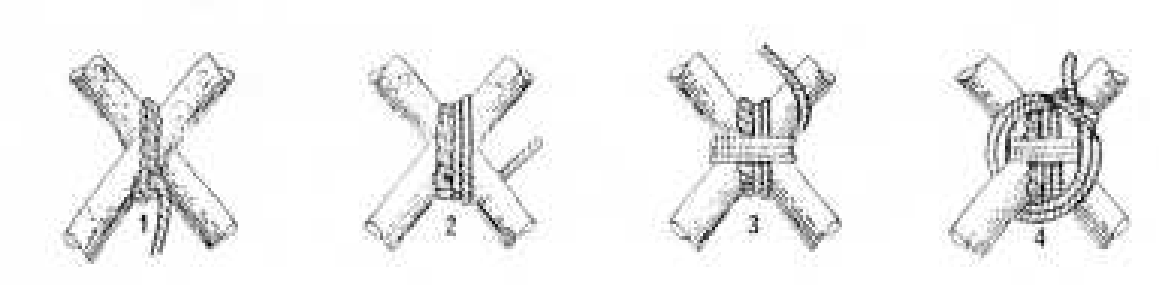


Figure 2 – The Two Basic Lashings