

## CHAPTER 11

# FIELD SKETCHING

## SECTION 1 - INTRODUCTION

### 1101. General

1. A sketch is a large scale, free-hand drawn map or picture of an area or route of travel, showing enough detail and having enough accuracy to satisfy special tactical or administrative requirements. Sketches are useful when maps are not available or the existing maps are not adequate, or to illustrate a reconnaissance report.

2. Sketches may vary from hasty to complete and detailed, depending on the time element, the accuracy required, the situation, climate conditions, skill of sketcher, and the area. In addition, the degree of accuracy will vary with the purpose of the sketch, eg, a minefield sketch must be more accurate than a defensive position sketch.

### 1102. Types of Sketches

There are two types of sketches - the military and the panoramic. The former is the vertical view of the ground. They include road and area sketches. Road sketches show the natural and military features on and in the immediate vicinity of the road. Area sketches show the natural and military features pertaining to a particular area in which the sketcher has access to the entire area. The panoramic sketch is an oblique view of the ground. Only panoramic sketches are discussed in this publication in any detail.

### 1103. Scales of Sketches

The scale of a sketch is determined by the object in view and the amount of detail required to be shown.

## SECTION 2 - THE PANORAMA

### 1104. General

1. A panorama sketch is a drawing of the view seen from a given point. It shows the horizon which is always of military importance, and intervening features such as crests, woods, structures, roads and so on, which are of military value or an aid in the location of detail of military value. Such a drawing can be of the greatest value in illustrating a report and will be undertaken when photography is not available or feasible. As is the case for all drawings, artistic ability is an asset, but satisfactory panoramas can be produced by anyone however much he may be lacking in artistic skill. Practice is, however, essential, and certain principles must be observed. These are:

- a. Work from the whole to the part. Before putting pencil to paper study the ground carefully both with the naked eye and through binoculars. Decide what is the extent of the country that is to be included in the drawing. Select the major features which will form the framework of the sketch.
- b. Do not attempt to put too much detail into the drawing. Minor features should be omitted unless they are of tactical importance, or are required to aid recognition or to lead the eye to some adjacent feature of tactical importance. Only practice will teach how much detail should be included in the sketch and what should be left out.
- c. As far as possible, draw everything in perspective. The general principles of perspective are -
  - (1) The further away an object is in nature, the smaller it should appear in the drawing.
  - (2) Parallel lines receding from the observer appear to converge; if prolonged they will meet in a point called the "Vanishing Point". The vanishing point may be assumed to be always on the same plane as that on which the parallel lines rest. Thus railway lines on a perfectly horizontal surface, receding from the observer, will appear to meet at a point infinitely far away on the horizon, which is the eye level of the observer. If the plane on which the railway lines lie is tilted, either up or down, the vanishing point appears to be similarly raised or lowered. Thus the edges of a road running uphill and away from the observer will appear to converge to a vanishing point above the horizon, and if running downhill, the vanishing point will appear to be below the horizon. Figure 11-1 gives an example of perspective drawing.
- d. Roads and all natural objects such as trees and hedges should be shown by conventional outline, except where peculiarities of shape make them useful landmarks and suitable as reference points. This means that the instinct to show the actual shapes seen should be suppressed, and conventional shapes used, as these are easy to draw and convey the required impression. Buildings should normally be shown by conventional outline only but actual shapes may be shown

when this is necessary to ensure recognition or to emphasize a feature of the building which is of tactical importance. The filling in of outlines with shading or hatching should generally be avoided, but a light hatch may sometimes be used to distinguish wooded areas from fields.

- e. All lines must be firm and continuous.

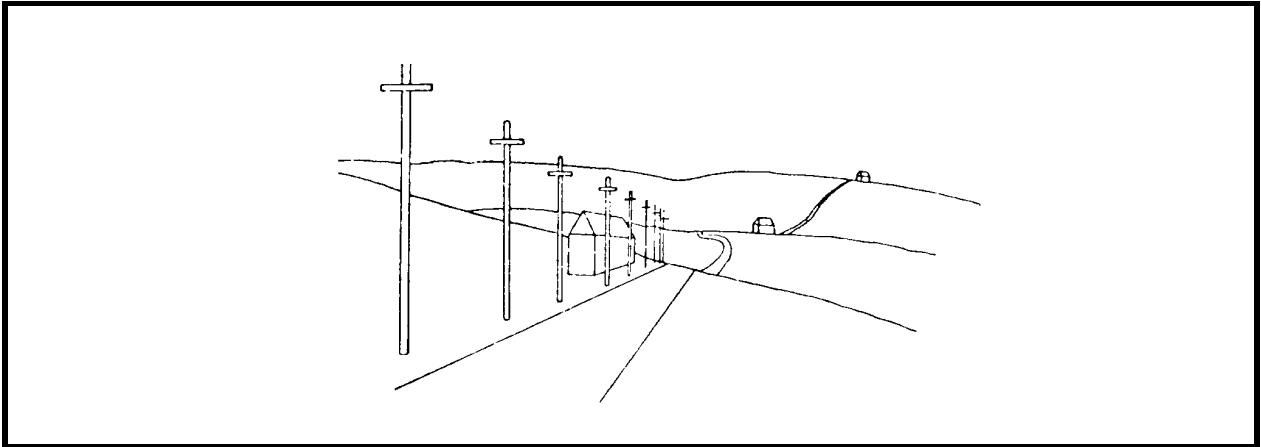


Figure 11-1 Example of Perspective Drawing

2. The panorama sketcher should have with him the following items:
  - a. a Service protractor and/or suitable graduated ruler;
  - b. a pencil capable of producing both fine and firm black lines - "H" is recommended;
  - c. a penknife or razor blade to sharpen the pencil;
  - d. an eraser;
  - e. a length of string; and
  - f. suitable paper, squared for choice, clipped on to a board, or in a book with a stiff cover to give a reasonable drawing surface.

### **1105. Extent of Country to be Included**

1. Before beginning a panorama sketch, the extent of country to be included must be decided. Military conditions and requirements will usually provide the answer. It will be found, however, that an area subtending 30 degrees of arc is a suitable maximum to draw on a single sheet of paper. Should a wider scope be required, it is usually better to produce two panoramas, one of each half of the total area wanted, and to stick them together afterwards.

2. A convenient method of making a decision as to the extent of country to be drawn in a single sketch is to hold a Service protractor about a foot from the eye, close one eye, and consider the section of country thus blotted out by the protractor to be the area to be sketched. The extent of this area may be increased or diminished by moving the protractor nearer to, or further from the eye. Once the most satisfactory distance has been chosen, it must be kept constant by means of a piece of string attached to the protractor and held between the teeth.

### **1106. Framework and Scale**

1. The next step is to fix on the paper all outstanding points in the landscape in their correct relative positions. This is done by denoting the horizontal distances of such points from the edge of the area to be drawn, and their vertical distances above the bottom line of this area, or below the horizon. If the size of the sketch is limited in the horizontal direction to the length of the protractor, the horizontal distances in the picture may be had by lowering the protractor and noting which graduations on its upper edge coincide with the feature to be plotted; the protractor can then be laid on the paper and the position of the feature marked above the graduation noted. If the sketch is longer horizontally than the length of the protractor, the horizontal readings must be increased proportionally when plotting. Vertical distances may be similarly got by turning the protractor with its long side vertical. Thus, the exact position of any piece of detail may be plotted accurately on the paper. Squared paper, such as in a Field Message Book, will be of assistance.

2. The eye appears to exaggerate the vertical scale of what it sees, relative to the horizontal scale. It is preferable, therefore, in panorama sketching to use a larger scale for vertical distances than for horizontal, to preserve the aspect of things as they appear to the observer. A suitable exaggeration of vertical scale relative to the horizontal is 2:1, which means that every vertical measurement taken to fix the outstanding points in the landscape should be doubled, while the horizontal measurements of the same points are plotted as read.

### **1107. Filling in the Detail**

When all the important features have been plotted on the paper in their correct relative positions, the intermediate detail is added, either by eye or by further measurements from these plotted points. In this way, the panorama will be built up on a framework as shown on Figure 11-2. All the original lines should be drawn in lightly. When the work is completed, it must be examined carefully and compared with the landscape to make sure that no detail of military significance has been omitted. The work may now be drawn in more firmly with darker lines, bearing in mind that the pencil lines should become darker and firmer as they approach the foreground.

### **1108. Conventional Representation of Features**

1. The following methods of representing natural objects in a conventional manner should be borne in mind when making the sketch:

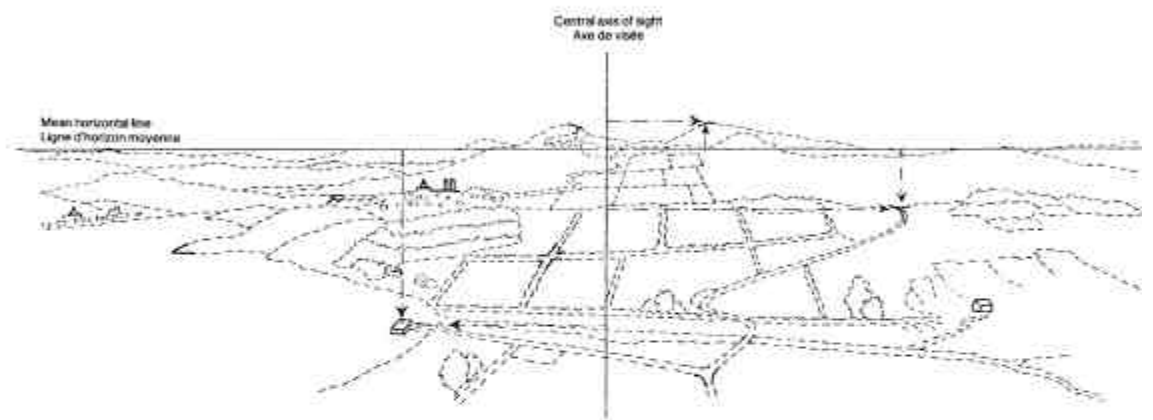
- a. Outstanding Points. The actual shape of all outstanding points which might readily be selected as reference points when describing targets, such as oddly shaped trees, outstanding buildings, towers, etc, should be shown. They must be accentuated with an arrow and a line with a description, eg, "Outstanding Tree with Large Withered Branch" or "Square Embattled Tower", and the map reference given where possible.
- b. Rivers. Two lines diminishing in width as they recede should be used.
- c. Trees. Trees should be represented by outline only. Some attempt should be made to show the characteristic shape of individual trees in the foreground.
- d. Woods. Woods in the distance should be shown by outline only. In the foreground the tops of individual trees may be indicated. Woods may be shaped or hatched, the depth of shading or hatching becoming less with distance.
- e. Roads. Roads should be shown by a double continuous line, diminishing in width as it recedes.
- f. Railways. In the foreground railways should be shown by a double line with small cross lines (which represent the ties) to distinguish them from roads; in the distance they will be indicated by a single line with vertical ticks to represent the telegraph poles.
- g. Churches. Churches are shown in outline only, but care should be taken to denote whether they have a tower or a spire.
- h. Towns and Villages. Definite rectangular shapes denote houses; towers, factory chimneys and outstanding buildings should be indicated where they occur.
- j. Cuttings and Embankments. These may be shown by the usual map conventional sign, ticks diminishing in thickness from top to bottom, and with a firm line running along the top of the slope in the case of cuttings.

## 1109. Other Methods

1. The foregoing method of drawing panoramas will be found the easiest and most encouraging for a beginner. There are, however, other methods.
2. A simple device which will help a great deal in panorama drawing can be made by taking a piece of cardboard and cutting out of the centre of it a rectangle of the same size, approximately, as the Service protractor. A piece of celluloid or photographic film with the emulsion cleaned off is then pasted over the rectangle. A grid of squares of about half-inch size is drawn in firm lines on the celluloid. The effect is that of a ruled celluloid window in a cardboard frame, through which the landscape may be viewed. The paper on which the drawing is to be made is ruled with a similar grid of squares. If the frame is kept at a fixed distance from the eye by a piece of string held in the teeth, the detail seen can be transferred to the paper square by square.
3. Another method is to divide the paper into strips by drawing vertical lines denoting a fixed number of degrees of arc and plotting the position of important features by taking compass bearings to them. This method is accurate but slow.

## **1110. Finish**

1. Figure 11-3 shows an example of a finished panorama. It should be clear and simple. A few touches of colour may be used for emphasis. Thus, rivers may be tinted blue, roofs red, roads brown, but colour must be used lightly and sparingly.
2. No attempt should be made to produce an artistic effect by the insertion of unnecessary detail. The following information should always be given:
  - a. Map reference of the observer's position.



Note: Above drawing shows points whose positions, after being plotted from measurements with a protractor, can be used as a framework on which the remaining detail may be fitted.

Nota — Le dessin indique les points dont les positions, une fois reportées d'après les mesures prises au rapporteur, peuvent servir de cadre auquel rattacher les autres détails.

Figure 11-2 Panorama Drawing

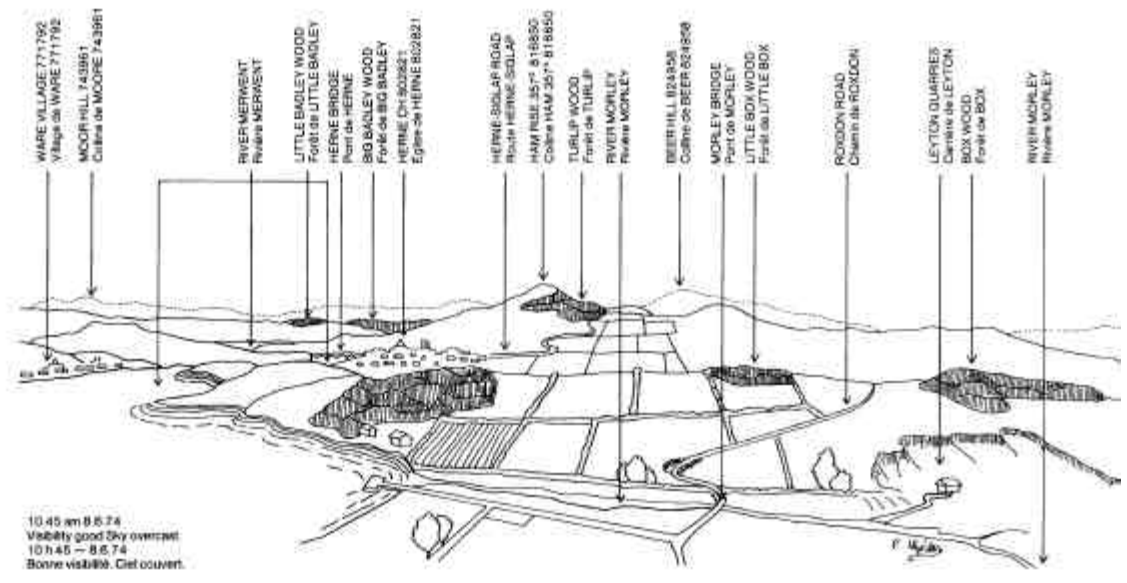


Figure 11-3 Panorama from Top of Littleham Hill 835746

- b. Bearings, names and, where possible, map references of important points, towns, villages, etc, should be written above the panorama, and lines drawn into the work to indicate the position referred to.
- c. The bearing of the centre of the panorama from the point of observation.
- d. The name, rank, and the unit of the observer.
- e. The date, time and notes as to the weather conditions.
  
- f. Any indication of troop locations on the panorama should be in the conventional colours. ie, red for enemy and blue for friendly forces.

## SECTION 3 - PANORAMAS FOR ARTILLERY USE

### 1111. Observation Post Panoramas

1. In addition to the view that can be seen from the observation post, a panorama drawn for artillery purposes should show a central line drawn through some conspicuous point in the zone of observation, together with a network of vertical lines showing the lateral angles right and left of it. The angles of sight to probable targets or target areas should also be shown.
2. The lateral angles can be measured with the director, the prismatic compass, or graticulated binoculars.
3. Artillery panoramas are useful for three purposes:
  - a. as a means of reporting to an artillery commander the view that can be seen from an observation post;
  - b. as an aid to an artillery commander in the indication of targets for observed fire; such a panorama need only show a few prominent reference points drawn clearly and unmistakably; and
  - c. as an aide to observation during periods of reduced visibility, eg, smoke, haze, twilight, etc, and to assist in identification of features by moonlight and artificial means.

## SECTION 4 - SUPPLEMENTARY SKETCHES

### 1112. Thumbnail Sketches

1. Small sketches, such as shown of Figure 11-4, should be used to illustrate descriptions of details of road turning, bridges, fords, watering points, wells, sidings, buildings for demolition, detours in a road, etc. For example, in a road reconnaissance where the only available map is on a small scale, such as 1:250,000, and a camera is not available nor practicable, it is simpler to show an intricate turn in a village by a sketch such as Figure 11-4, than by making an enlargement of the map and adding the necessary detail. Or again, in a route reconnaissance for a column moving across country, the point where a change of direction is to be made can be given by a sketch, as in Figure 11-5, which shows the relative positions of detail at that point, such as two houses in line or the relation between a group of trees and some feature in the distance.

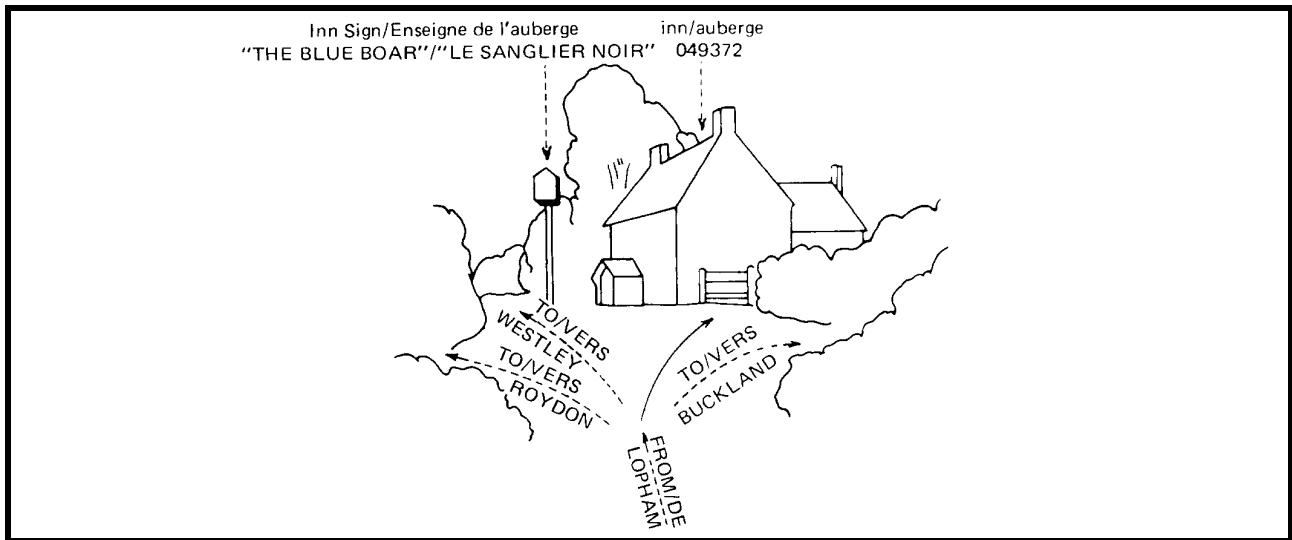


Figure 11-4 Thumbnail Sketch

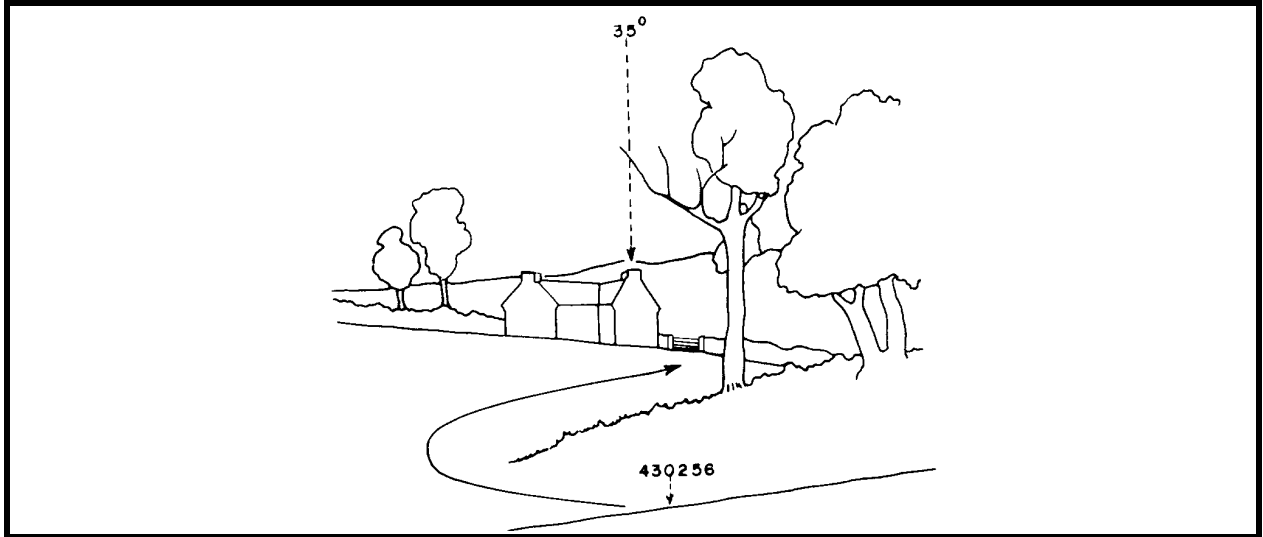


Figure 11-5 Thumbnail Sketch

2. The principles and methods of panorama drawing apply also to the preparation of thumbnail sketches of special interest. The sketches are drawn by eye, the main proportions being first lightly sketched in by measurement, either with the protractor, as in panorama drawing, or by holding the pencil at arms length and marking off distance on it with the thumb.
3. As with all military sketches, simplicity and legibility should be the keynote.

### **1113. Range Cards**

Every section post should have a range card. This card takes the form set out in CFP 309, Infantry, Volume 3, Section and Platoon in Battle. This may be elaborated by a simple panorama sketch of the post's front, showing only the main features and their ranges. Such panorama sketches can also be of value at OPs.

**(1114 to 1199 not allocated)**

## CHAPTER 12

# MAP READING INSTRUCTION

## SECTION 1 - PLANNING A COURSE

### **1201. Introduction**

The aim of this chapter is to help the instructor in his task of teaching map reading. Although the other chapters in this publication supply the material on which the instructor can base his lessons, there is more information contained in them than is likely required in a basic map reading course. Also the order of the chapters, although following a logical sequence, may not be in the most appropriate sequence for a particular instructional requirement. Instructors cannot therefore blindly follow the book through from chapter to chapter, and must plan their course to meet the requirements of their particular students.

### **1202. Performance Objectives**

1. The first essential is to establish exactly what map reading skills and knowledge the student will actually need in his Service employment. Before deciding on the subject content and direction of course, the instructor must specify exactly the standard of performance that his students must reach at the end of their training.
2. Such precise and detailed statements of performance are called performance objectives and indicate exactly what the trained man must be able to do under test conditions at various stages of his training.
3. Many arms and services have prepared their own performance objectives for particular employments and the instructor should, if possible, obtain a copy of the relevant performance objectives for the particular branch. If there are no prepared map reading performance objectives available, then the instructor must prepare his own material in the format which has generally been adopted for this purpose.
4. An extract from a typical set of map reading performance objectives is given in Table 12-1.

| <b>Serial (a)</b> | <b>Performance (b)</b>   | <b>Conditions (c)</b>  | <b>Standards (d)</b>  |
|-------------------|--|--|---|
| 1.                | State the meaning of any conventional sign used on the map issued.                 | Given a 1:50,000 map. Good light Conditions. To be shown any 20 Signs. May use panel at the foot of The map.   | Without error. Time limit 5 mins for all 20 signs.              |
| 2.                | State the grid reference of a map square indicated on the map.                     | Given a map as above.  | 4 figures without errors.                                       |
| 3.                | Stage grid reference of point indicated on the map.                                | Given a map as above. Using Protractor or romer.   | 6 figures without error.  |
| 4.                | State the shortest distance on the ground between two points indicated on the map. | Given a map as above. Using Tractor. Distance between two points at least 5 km.  | To nearest 100 m.   |
| 5.                | State distance along a defined route between two points indicated on the map.      | Given a map as above, using paper And protractor. Route at least 15 km long.   | Correct to within 300 m.  |
| 6.                | Calculate the current grid magnetic angle.   | Given a map as shown, using paper And pencil.  | Correct.  |
| 7.                | State the grid bearing Between two indicated points on the map.                    | Given a map as above. Using Protractor, paper and pencil. Points at least 2 km apart.  | Correct to nearest 20 mils.                                     |
| 8.                | Set the map to the ground.   | Given a map as above and compass.  | Correct.  |
| 9.                | Point out on the ground the positions indicated by six-figure grid references.     | Given own location on map and ground. Given 3 six-figure grid references. Given a map and a compass. Positions to be clearly visible and in range 500 m - 1,500 m. Positions to be easily identifiable eg, Church, Woods, X roads, lone house. Without error. Not more than 10 minutes for this complete test. | Without error. Not more than 10 minutes for this complete test. |

Table 12-1 Specimen Performance Objectives

5. As can be seen from the table, performance objectives have three major components:
- a. Performance. They state what the serviceman has to do, on training or in a test of training.
  - b. Conditions. They lay down the conditions under which the performance is to be tested including -
    - (1) equipment, aids, manuals etc, to be used, and
    - (2) physical conditions, eg, outdoors, visibility, etc.
  - c. Standards. They set standards for acceptable performance, including margins of error and time limits.

6. It is necessary to have performance objectives which are both relevant and comprehensive. By reference to these performance objectives the course can be designed to ensure that the serviceman is taught only those map reading skills and knowledge that are essential for proper job performance. By testing the students both during and at the end of the course, the instructor can ensure that they reach the required standards of proficiency. Only by doing this can he be really sure that the course has achieved its aim.

7. General guidance on the writing of performance objectives can be found in the CFP 9000, Canadian Forces Manual of Individual Training, Vol 2, Analysis for Individual Training.

8. Although performance objectives are an essential step in deciding course content they do not necessarily describe the method or sequence in which the individual topics are to be taught. They will, however, give considerable guidance in the planning of a course, and enable the instructors to identify related subjects and prepare a balanced program.

9. Examination of the performance objectives will also provide the information on which to test the students during, and at the end of the course, since they will specify exactly the test conditions and standard of performance to be achieved.

## SECTION 2 - HOW TO TEACH BASIC MAP READING

### 1203. General

1. Map reading is essentially a skill, and true proficiency will only be achieved by practice on the ground. Instructors should therefore arrange in the planning of the program for as much as possible of the training to be done out of doors. To teach map reading, the only tool required initially is a map, and the only material required is tile ground. There is no excuse for not teaching a great deal of map reading in a practical way on the ground.

2. Obviously, certain map reading knowledge is more conveniently imparted in a classroom situation, and here it is most important to make the maximum use of visual aids (see Sect 4), but classroom instruction must be followed up as soon as possible with practical instruction and practice on the ground.

### 1204. The First Lessons

1. An excellent way of introducing beginners to map reading is to take them out on the ground and to show them that a map is a simplified picture of the ground. The instructor need not worry students to begin with about such technicalities as scale, conventional signs, the grid and north points, but just allow them to compare the map with the ground.

2. It is probably best to start with a 1:50,000 map where small features can easily be found. If possible, the class should be taken to a place that they know fairly well, preferably where there are well marked features - roads, woods, streams and buildings. A village is a good place. The instructor should start at a place where students can see for a short distance around and they should all have this place identified on their maps. If possible, the position should be facing north so that all printed information on the map is the correct way up for the student. Initially, the students should not be bothered by such technicalities as setting a map, but be merely made to line up a prominent straight feature on the map with the same feature on the ground.

3. The instructor can now start showing them how the map reproduces the ground... "Look down the road, there is a church; just beyond it are the cross roads with a small park, and houses around them; down the road to the right is a bridge over a stream, and so on. See how it all appears on the map". Students can now walk down the road, noticing the various places - the post office, the church - the students should see how these places are marked on the map - if they are. When they get to the cross roads the instructor makes them line up the map with the roads again. He lets them see that the church tower is lined up too, if they have done it correctly. He makes them look across the fields, there may be a farm or some other prominent feature about 500 metres away. He asks them to find it on the map, and lets them see that if they have oriented their map correctly it appears in the proper direction on the map.

4. Now the instructor can ask the students how far away the farm is. He shows them on the map how its distance compares with the distance from the church, and how they can estimate its distance on the ground. Near the farm is a silo; there is an unfenced road leading off to the farm. Across the fields, runs a power transmission line. He lets them find these features on the map and to see how they are marked. He shows them that the pattern on the ground is reproduced exactly on the map.

5. After a lesson of this sort, the class should understand the idea of a map, they should have been introduced to a good many of the conventional signs, they should have absorbed the basic ideas of scale and direction, and should see the reason for setting a map. None of these things need have been specifically mentioned; they just become obvious and so the ideas are picked up without difficulty.

6. The instructor should encourage the class to ask questions and should ask them questions. Contours could be introduced by asking the question "How can we tell that this road goes down a steep hill?". He shows them on the map the contour lines cutting the road and how by following them, they can find the height marked and thus find that in a certain distance the road drops the vertical distance between contour lines. Another idea has been implanted quite naturally.

7. The instructor should let the members of the class compare notes and work together. He is not trying to make them memorize facts but to absorb ideas. If they can get the ideas from their next door neighbour, so much the better, but the instructor must be sure that the ideas are sound.

### **1205. Subsequent Lessons**

1. In a subsequent lesson, the class could be taken to some place that they do not know, and instruction could carry on along much the same lines. They could be asked to say from the map what they would find round the corner or down in the dip. They should be shown the scale at the bottom of the map and how to use it to measure distance. One could also show them how a ring contour marks the top of a hill and that the distance the contours are apart is a measure of the steepness of the ground. The area of observation could then be widened and the students asked to identify one or two places up to one or two miles away.

2. Such problems should be kept simple at this stage and the aim should not be to test the students but to show them that the pattern on the map reproduces the pattern on the ground.

3. On the way to another lesson students could be asked to describe the place to which they are being taken. Their descriptions should be checked when they get there. If transport is required, then the instructor should try to obtain an open vehicle so that they can practise their map reading on the journey. On this lesson once again they should be given maximum practice in relating objects on the ground with objects on the map. Once again the area of observation can be widened further, they can be asked what lies on the far side of the wood, which side of the hill is steeper and so on.

4. For the next lesson, the instructor could do the same but take his students across country where there are fewer man-made objects, and make them rely more on the natural features and the shape of the ground.

5. After several such lessons the class will not be experts in map reading, but they should understand the map and how to use it. They should have learned that the map is a valuable tool designed to help them, not to make life difficult. If the instructor has done his work well they will be interested and will have absorbed some of his enthusiasm.

6. They should now be ready to go on to learn the other processes of map reading, but it should be impressed on them that only by constant practice with a map on the ground can they become expert and learn to extract from a map all that it has to tell them.

### **1206. Further Instruction**

1. Now that the class has learned to understand a map they can be introduced to other map reading topics. The actual topics covered and the depth of treatment required will depend to a certain extent on what the students are required to do in their Service employments, and here reference to the performance objectives will give guidance on the course content.

2. Whatever the subject, the instructor must explain the connection between what they are going to learn and map reading. A talk on bearings, though excellent in its way, might leave the class completely in the dark as to their uses. They will become mystified and soon lose interest.

3. Many classes will have already received basic instruction in map reading but perhaps require further instruction as part of a course or for some particular purpose. The instructor should not assume that they have all reached a common standard but should test the students in one or two practical periods outdoors. The information gained from such a test will give an indication of their strengths and weaknesses, and the course can be designed is required to bring them all up to the necessary standard.

## SECTION 3 - HINTS ON TEACHING CERTAIN TOPICS

### 1207. Grid References

1. Grid references are probably best begun indoors since they have nothing to do with the interpretation of a map as a plan of the ground. It should be explained clearly to the class that a grid reference is merely a device for enabling any point to be fixed on a piece of paper or on a map.
2. The instructor should spend time in preparing good clear visual aids for this lesson. He could start by explaining the system on a blank grid reproduced on a blackboard, or by means of an overhead projector. He could then progress to showing how this can be applied to a map.
3. The instructor should remember that the only essential knowledge that need be imparted about the grid is how to use it. In his job, the serviceman will probably only have to use grid references; it will not be necessary to explain the construction of the grid, its point of origin, and so on. Throughout his teaching, the instructor must bear in mind the amount of map reading the student is actually required to use in his Service employment.

### 1208. Scales and Distances

1. Elementary classes will probably require classroom instruction to practise the two basic skills of:
  - a. measuring distance on the map in a straight line or along a route; and
  - b. reading that distance correctly off the scale line.
2. This initial instruction should be followed up with plenty of practical problems outdoors, so that students can relate distance on the ground with distance on the map.

### 1209. Relief

1. Students should be taught that the distance between adjacent contours represents a rise or fall of so many feet (metres). This topic should once again be taught out of doors on reasonably hilly ground. It is much easier to explain steep slopes and gentle slopes, convex slopes and concave slopes, spurs and re-entrants by pointing them out on the ground, than by describing them in a classroom situation.
2. The aim should be to teach the students how to recognize the general shape of the ground from the contours on the map. They should be able to tell from where there is likely to be good observation, or where there is dead ground or a covered approach.
3. The teaching of relief on a blackboard or plane surface should be avoided if at all possible. The construction of simple three-dimensional models can help, but once again there is no substitute for outdoor instruction.

## **1210. Direction**

1. It may not be necessary for the trained soldier to know much more about direction than what has been gained from the initial practical map reading lessons. He must be able to locate his own position and maintain his direction by reference to known objects or he may perhaps have to identify unknown places by noting their direction in relation to known places. In addition, he may be required to maintain his direction by day and by night using the sun and stars.
2. In his job, the serviceman will have to carry out these tasks practically and at times on his own. It is, therefore, important that during training he is given sufficient practices as an individual to enable him to develop skill and confidence in the maintenance of direction. If the performance objectives specify that he should be able to maintain his direction at night as well as by day, then he must be given practice at night.
3. Once again, simulation of job conditions is important; for example, if the serviceman is required in his job to maintain direction cross-country in a vehicle, then he should be given practice in training in vehicle map reading.

## **1211. Bearings and the Compass**

1. Not all servicemen are issued with a compass, and the instructor should ascertain whether his particular students will be required to know how to use one. Assuming that they are required to use the compass, then he should start by explaining to the class how a knowledge of bearings will help them in their map readings problems. Until they understand this, bearings will seem to be a piece of dull and fairly useless geometry.
2. The stages of instruction could perhaps be as follows:
  - a. the use of bearings;
  - b. the difference between magnetic and grid north and how to find it;
  - c. how to plot and measure bearings on the map; and
  - d. the compass and how to use it to measure bearings on the ground.
3. The use of good visual aids will help in the teaching of this basic geometric work. Use of colour and overlays on either the blackboard or overhead projector will assist the class in understanding this theory. The overhead projector is a particularly versatile aid for this subject as the class can actually follow on the screen the plotting of bearings by the instructor, particularly if a transparent protractor is used.

4. The compass could well be taught out of doors from the start; it is much more stimulating and realistic to take a bearing on a church tower or tree, than on the corner of a classroom. A suggested sequence for teaching the compass is as follows:

- a. use as a simple compass to find north, south, east, and west;
- b. finding bearings;
- c. setting the compass; and
- d. marching with the compass.

## SECTION 4 - HINTS ON THE USE OF VISUAL AIDS

### 1212. Blackboard/Chalkboard

1. This can be used for the teaching of many of the theoretical aspects of map reading - such as the grid system, introduction to bearings, and intervisibility. Some points to remember in the use of the blackboard are:
  - a. Make maximum use of colour.
  - b. Prepare good diagrams well in advance.
  - c. Ensure diagrams are large and clearly visible.
  - d. Avoid trying to teach relief on a flat surface.

### 1213. Overhead Projector

1. This most versatile aid needs to be used with imagination. Some hints on its use in the teaching of map reading are as follows:
  - a. Make the maximum use of colour-marker pencils and felt tip pens available through normal supply channels.
  - b. Prepare good diagrams well in advance - for instance, most diagrams in this manual can be reproduced by using a Thermofax Copier.
  - c. Make sure diagrams are clear and the printing easily visible.
  - d. Avoid trying to teach relief on a plane surface.
  - e. Some aspects of compass work can be illustrated with the overhead projector, by the use of a Silva compass.
  - f. Simple transparent scales and protractors can be easily manufactured for use with the overhead projector.

### 1214. Film Strips and Films

1. Certain map reading films and film strips are on issue from NDHQ and base film libraries. Details of the titles available are contained in CFP 140, Canadian Forces Film Catalogue - Instructions and Film Listings.
2. These aids should not be used in isolation, as they achieve their maximum impact when used as part of a lesson to supplement the teaching of a particular topic.
3. It is also essential that the instructor views any film or film strip before showing it to a class, as only by doing this can he be sure that it is relevant to the topic being taught.

## **1215. Slides**

1. Colour slides and a slide projector are a convenient method for presenting the instructor's own material. There are normally funds available within most units to purchase colour film for use in training.
2. When showing slides, it is desirable to supply the students with maps of the area displayed so that they can compare map and ground directly.

## SECTION 5 - PRACTICAL TRAINING

### 1216. Practical Exercises

Once the students have mastered the basic skills of map reading, they will need practical experience in the topic by taking part in practical exercises. To begin with, they may be required to move over varying types of ground, from one pre-selected place to another, probably in small groups at first. Check points should be estimated to ensure that they have followed the correct route. The check points can be manned by instructors or the students asked to record exactly what they see when they get there, so that the accuracy of their route can be checked when they have completed the exercises. Later on, provided the ground is not too difficult or dangerous, and as they become more proficient, they can complete this type of exercise on their own. Orienteering is a particularly useful means of building proficiency and confidence in the use of maps and compass. This is discussed in detail in Chap 13.

## SECTION 6 - GENERAL SUMMARY

### 1217. Instructional Musts

1. Before planning a map reading course, it is essential to specify exactly what performances and standards the students must achieve by the end of the course. If the appropriate performance objectives are available, then they should be consulted. If they are not available, then instructors should prepare their own material in a similar format to that generally adopted for performance objectives.
2. Students should be tested throughout the course, as well as at the end of their training. This is necessary to ensure that they have reached the specified standard of performance.
3. Instruction in map reading should, wherever possible, be oriented towards practice with a map on the ground. A map reading topic should not normally be taught indoors, if it is possible to teach the same topic outdoors on the ground.
4. An excellent way of introducing beginners to map reading is by practical work with a map on the ground.
5. It is the responsibility of the instructor to stimulate interest in his class. An enthusiastic class will learn more quickly than a bored class. The maximum use should be made of appropriate visual aids during indoor instruction.
6. A short course in map reading cannot produce experts. Constant practice with a map on the ground is essential even after a course has finished.
7. Finally, every opportunity should be taken on unit exercises to incorporate a map reading requirement, and to pin-point errors arising from faulty map reading.

**(1218 to 1299 not allocated)**

## CHAPTER 13

# ORIENTEERING

### SECTION 1 - PROGRESSIVE ORIENTEERING TRAINING

#### **1301. General**

This chapter explains how orienteering can be used to teach and improve map reading skills. The suggested program is designed to give every individual the fullest opportunity to practise map reading, whereas conventional map reading exercises tend to exercise only one member of a group while the others accompany him without taking any real part in the actual map reading. Orienteering also enables men to spend more time on the ground and less in the classroom, and to map read on the move rather than from static positions. Furthermore it helps soldiers to enjoy map reading and improve their individual skills through competition.

#### **1302. What is Orienteering?**

Orienteering is a practical exercise run as a competition between individual soldiers. Participants are equipped with a light weight Silva type compass, a transparent and waterproof map cover, a red ball point pen, and a wrist watch. For each competition they are issued with a 1:25,000 map or photostat copy of the map of the area over which the exercise is to be run, an event card, and a description of each control point. Maps with a scale of 1:50,000 can be used if there is no coverage of the area in the 1:25,000 scale.

#### **1303. First Practical Exercise (Pin Prick Orienteering)**

Before the competition, the officer marks out a route along tracks through the woods with red and white tape tied to branches. Initially, the soldiers are issued with a map stapled onto cardboard, a compass, and a few pins. The start is marked on each soldier's map. On the very first exercise, the soldiers and their instructor walk in groups of four to six along the marked route. Each soldier must work out where he is the whole time, by counting paces and associating the map with the ground. When the soldiers in the group come to a yellow flag, they must pinprick the exact location of the flag on the map. The instructor checks each soldier's pinprick with a ruler and deducts one mark from a total of 10 for deviation of a millimetre. They continue down the course and again pinprick their maps at the next yellow flag. When they come to a blue flag they will find a sighting stick pointing in the direction of an object which is located within 1,500 metres, the soldier goes to the sighting stick, looks along it, then pinpricks the location of the object pointed out. Again, one mark is deducted by the instructor for each millimetre of error. Once the soldiers have completed this type of course a few times in a group, they are sent off individually over similar courses at one-minute intervals. The fastest soldier round the course with the minimum deductions is the winner.

### **1304. Second Practical Exercise (Compass Work and Pacing)**

The course consists of several short legs (200 to 1,000 metres). The exact course to be followed is marked on a map supplied to each soldier. He must then work out for himself the required compass bearings and number of paces along each leg. Somewhere along the direct route of most legs, one or more control points will be placed. Soldiers will not be told beforehand how many control points there are. Soldiers mark their instruction cards with the code letter of each control point they pass. Marks are awarded in accordance with the number of control point code letters noted.

### **1305. Third Practical Exercise (Route Selection)**

1. Soldiers line up at a table in fours. Every two minutes, four soldiers are each issued with map, compass, and event card, then despatched to one of four master maps. The soldier who is sent to master map A, for example, copies the two control points marked on the map onto his own map and completes the course as fast as possible. He then returns to the master map and explains his route to the exercise controller. Once the controller is satisfied that the soldier has found the controls by checking the stamp marks, he analyses the route taken and advises the soldier on route choosing and compass skills if any weaknesses have been revealed. Once the controller is satisfied that the soldier has learned the appropriate lessons, he sends the soldier to master map B, and so on in a clockwise manner. The control locations should be set out by the controller, who makes them more difficult with each successive exercise. The platoon commander would normally be the exercise controller.

2. Once the soldier has successfully completed a few of each type of these practical exercises, he is ready to compete as an individual in an orienteering competition.

### **1306. Orienteering Competitions**

1. Point to Point Event or Free Orienteering Event. In a point to point event, each competitor is given a photostat copy of part of a 1:25,000 map, and a list of descriptive clues of all control points. Competitors start at one minute intervals, their time of departure being written on their event card. From the start each competitor runs to the master map, about 150 metres away. This shows his exact location and the location of all control points and the order in which they must be visited. These he copies onto his own map. He quickly decides his fastest route to the first control point, then runs as fast as possible to all of the control points in the allotted order. His event card must be appropriately stamped at each control point. The competitor who completes the course in the shortest time, and who can show the stamp marks of every control point is the winner. The officer who sets the course should make it simple at first, then progressively more difficult.

2. The Line Event. Unlike the point to point event or free orienteering, where the choice of route is left to the competitor, the line event consists of following a given route. A bold line is marked on the master map showing the A.hole route from start to finish. The competitor copies this onto his map and follows the route on the ground in the direction indicated. Along the route there are hidden control points which the competitor will only find if he is exactly on the route shown on the master map. When the competitor finds the red and white marker of the control point, he stamps his event card and makes a note on his map of his exact location. The competitor who completes the course fastest with all the stamp marks of the control points on his event card is the

3. The Score Event. In a score event, the area chosen for the competition is dotted with a large number of control points. The control points near the start and finish carry a low point value, whilst those farther away, or more difficult to find, carry a high point value. The competitor is given a time limit in which to find as many control points as possible. He can select any route he wishes to find the control points that he decides will enable him to gain the highest score in the time available. The course must be designed to ensure that there are more control points than can possibly be visited in the allotted time. Each control point has a code letter inscribed on it which the competitor notes on his event card as proof to the judges that he has found it. It is important for the competitor to make a sound time appreciation to arrive back at the finish by the allotted time. If he fails to do so, five points are deducted from his total score for every minute he is late. The time of the competition may vary from one to three hours.

4. The Night Event. In a night event, the control points are sited in well-defined locations over simple terrain. They are marked by small red lamps which can be seen from all directions to a distance of 30 metres. The control points are set up in daylight and sited in a circle around the position chosen for the start and finish. The control points should be sited 400 to 800 metres apart, depending on the terrain. Soldiers are split into pairs and given five minutes in a lighted tent at the start to plot the locations of the six or so control points on their maps. They are despatched at intervals to visit all the control points in any order they wish in the time allotted for the competition. Usually, two or three hours is ample time for a competition of this nature. The correct stamp mark of one of the control points gives a competitor 20 marks, but five marks are deducted for each minute by which he exceeds the overall time limit. The pair with the highest marks wins. After sonic practice, longer and more difficult night events may be arranged until finally men may compete as individuals. The controller should have a projector pyrotechnic to help guide back any lost competitors.

5. Variations. The types of orienteering outlined above may be varied in numerous ways to suit particular requirements. A modified form of orienteering can, for example, greatly assist in the training of APC crews.

## 1307. General Hints for Orienteers

### 1. Before the Start

- a. Check that you have all the necessary items of equipment.
- b. When the competition map is issued, boldly mark the Eastings grid lines with red pen. This helps to speed up the setting of the compass.
- c. Tape the event card on to the back of the waterproof cover so that the card can be stamped easily at control points.

### 2. During the Competition

- a. At the master map mark all the control points onto your map with a red circle. If necessary, number these in the order they are to be visited. Draw a straight line between each point. Do not sacrifice accuracy for speed.
- b. Tape the issued description clues alongside the map. Place the map in the waterproof cover.
- c. Move away from the master map area and concentrate on the first control -
  - (1) Check its description.
  - (2) If the control point is not in an obvious position, choose an attack point about 30 to 200 metres from the control point. For this purpose, select something you can recognize easily, eg, a bridge, a track junction, or a pylon cable crossing a path.
  - (3) Check the route direct from your present position to the attack point. Check to see if there is a quicker route to the left or to the right.
  - (4) Decide the best route to follow. Study this carefully. If the attack point is, for example, a stream/track junction, then aim off about 60 mils and get to the stream as fast as possible.
  - (5) If you have aimed off properly you will know when you reach the stream which direction you must turn to reach the attack point.
  - (6) At this stage of the competition you simply map read using the compass only as a quick check or guide.
  - (7) Once at the attack point, calculate the accurate compass bearing and distance to the control point.
  - (8) Then move accurately to the control point, counting your paces. You should know how many paces you take to run 100 metres over different types of terrain.
  - (9) When you have run the required distance on an accurate bearing, stop. You should be very close to the control point. Look at your map and the description again and find the control point.
- d. Once you have found the control point, quickly stamp your event card then get away in case you attract other competitors. When you are about 30 metres clear, go through the same procedure for finding the next control point.
- e. Always keep your thumb over the last position you confirmed on the map.

3. At the Finish. Once you have finished the competition and handed in your completed event card, discuss your route with other competitors and try to discover how you could have improved your performance.

### **1308. Orienteering Syllabus**

The syllabus shown in Table 13-1 has been found suitable for training complete novices to become proficient orienteers.

| <b>Lesson</b> | <b>Time in Hours</b> | <b>Subject</b>  | <b>Location</b>               |
|---------------|----------------------|---|-------------------------------|
| (a)           | (b)                  | (c)   | (d)                           |
| 1             | 2                    | The Map. Introduction and description.  | Classroom and outdoors.       |
| 2             | 2                    | The Fundamentals of Orienteering<br>a. Finding direction without the compass.<br>b. Measuring distances by pacing.<br>c. Associating ground with the map.<br>Exercise. (See 1st Practical Exercise. | Simple terrain.               |
| 3             | 2                    | The Compass and Compass Marching.<br>(Introduction to the Silva compass system).  | Classroom and simple terrain. |
| 4             | 2                    | Compass March with Marked Map (See 2nd Practical Exercise)  | Simple terrain.               |
| 5             | 2                    | Line Orienteering   | Unknown terrain.              |