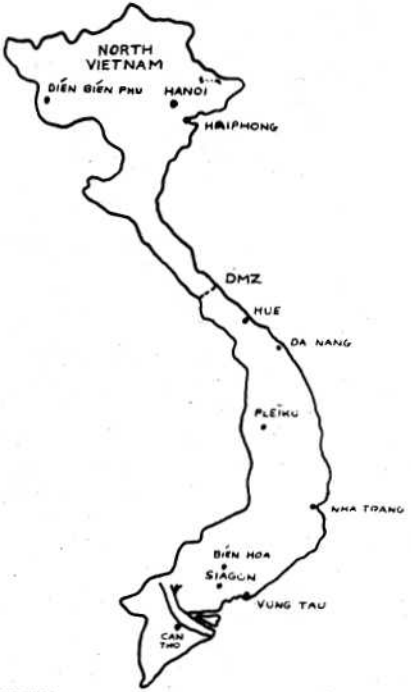
FUNDAMENTALS
OF
MAP READING AND LAND NAVIGATION



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MAP READING

1. PURPOSE: To provide the soldier with a ready reference of map reading fundamentals.

2. IMPORTANCE: The ability to read, understand, and use a map is of primary importance to the soldier and must be learned early in his training. Maps play a vital role in any military operation. Proficiency in map reading results from practice.

3. DEFINITION OF A MAP: A map is a line drawing, to scale, or a portion of the earth's surface as seen from above.

4. MARGINAL INFORMATION:

   a. Marginal information is that information contained in the margin of a map which gives details of a technical nature that must be considered if the map is to be used effectively.

   b. While the amount of information varies in detail and degree, a study of the margin of a map will generally reveal the following:

      (1) The name and title of the sheet.

      (2) The sheet number.

      (3) An index showing adjacent map sheets.

      (4) The declination diagram indicating the direction and relationship of True, Magnetic, and Grid North.

      (5) The scale of the map is expressed as a representative fraction (RF) and graphically.

      (6) The contour interval.

      (7) The grid reference box.

      (8) The agencies that prepared or supervised the original map and/or subsequent revisions.

      (9) The date compiled and field checked.

      (10) A legend.

   c. A study of the above items will indicate the uses and limitations as well as the accuracy and reliability of a map.

5. TOPOGRAPHIC SYMBOLS:

a. Topographic symbols are standard drawings by which mapped features are shown on a map.

b. To increase their value and ease of identification, Topographic symbols have distinctive colors. The following map colors are standard:

(1) BLACK - manmade objects; i.e. road, building, mine

(2) RED - Road classification and some manmade features such as large built up areas

(3) BLUE - Drainage; i.e. river, lake, swamp.

(4) GREEN - Vegetation

(5) BROWN - Elevation and relief; i.e. contour lines

6. MILITARY GRID SYSTEMS:

a. A Military Grid System is a network of squares formed by North-South and East-West grid lines placed on a map. The distance between grid lines represents 1000 meters.

b. The purpose of a grid system is to enable the map reader to quickly and accurately locate a point on a map. Grid lines are identified by a specific number which is printed in the margin directly opposite the line that it indicates. Any point on a map can be identified by means of COORDINATES. The following are the rules for reading grid coordinates:

(1) Use only the large, boldface numbers in the margin labeling each grid line.

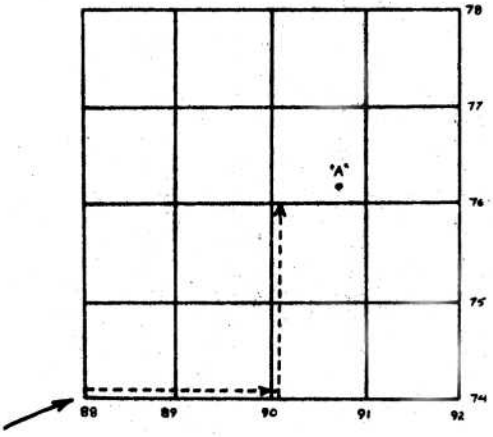
(2) Starting at the lower left hand corner of the map sheet, read RIGHT and UP.

(3) Write the coordinates as a continuous series of numbers. The first half of the total number of digits represents the RIGHT reading; the last half represents the UP reading.

c. **EXAMPLES (map with 1000 meter grid squares):**

(LOCATE GRID SQUARE)

POINT "A" IS IN GRID SQUARE 9076



START HERE AND READ RIGHT THEN UP

(1) Location of a point within a 1000 meter grid square is used to designate an object within a large area.

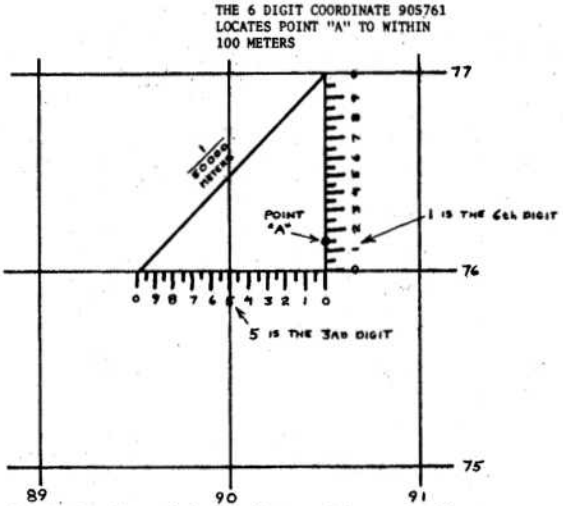
(a) Identify the grid square by the numbers of the two grid lines intersecting at the lower left hand corner; e.g. 9076.

(b) The 4 digit coordinate will locate a point within 1000 meters.

(2) Location of a point within 100 meters (6 digit coordinate)

(a) Use the proper coordinate scale (1:50,000)

(b) Place the coordinate scale along the east-west grid line at the lower left hand corner of the grid square, then slide it eastward to the center of the object.



(c) The long lines of the coordinate scale represent 100 meter intervals. If the point falls between a 100 meter interval, use the smaller number. To determine the 3d digit of the 6 digit coordinate, read the number on the coordinate scale where the north-south grid line intersects it. To determine the 6th digit, use the number that intersects your objective.

7. **SCALE:**

a. **Scale is defined as the fixed relationship between map distance and the corresponding ground distance. It is expressed as:**

(1) A REPRESENTATIVE FRACTION (RF)

(a) $RF = \frac{MD \text{ (Map distance)}}{GD \text{ (Ground distance)}}$

(b) The RF appears in the margin of the map as $\frac{1}{50,000}$

1/50,000, or 1:50.000, all of which mean that one unit of measure on the map equals 50,000 similar units of measure on the ground.

(2) GRAPHIC SCALE:

(a) This is the printed scale in the margin that is used to measure ground distance on the map.

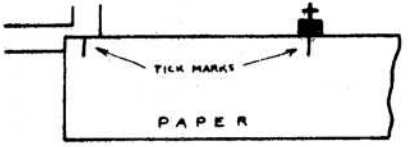
(b) Military maps normally have three graphic scales expressed as miles, meter, and yards. Some have an additional graphic scale in nautical miles.

(c) Distance will usually be expressed in meters.

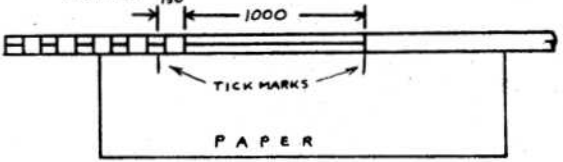
8. MEASURING DISTANCE:

a. Straight Line Distance (Example: Measure the distance between the road junction and the church)

(1) Place a straight strip of paper on the map between the two points and mark the paper opposite the center of each of the points.



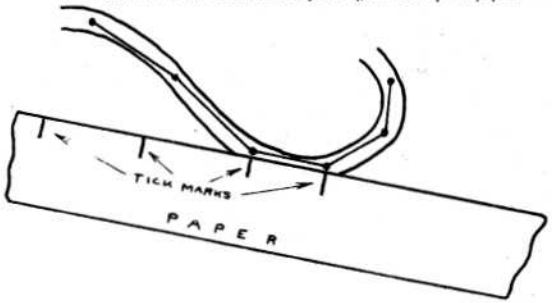
(2) Place the paper on the appropriate bar scale and read the distance.



(3) The distance is over 1000 meters and less than 2000 meters. By using the section of the bar scale that is divided into 100 meter sections, the distance is found to be 1000 meters plus 150 meters or 1150 meters.

b. Road Distance:

(1) Use a straight strip of paper; divide the road into small straight line sections, at the same time mark these straight line sections consecutively along the strip of paper.



(2) Place the paper on the appropriate graphic scale and determine the distance.

(3) REMEMBER:

(a) Make the tick marks center mass of object.

(b) Use the correct bar scale.

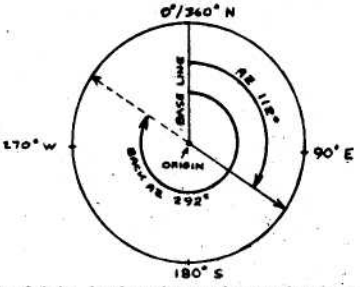
(c) When measuring road distance, use the center of the road.

9. DIRECTION:

a. Direction is defined as an imaginary straight line on the map or ground. Direction is expressed as an AZIMUTH.

b. An AZIMUTH is defined as a horizontal angle measured clockwise from a base direction.

c. All directions originate from the center of an imaginary circle called the azimuth circle. This circle is divided into 360 equal units of measurement called degrees. The degrees are numbered in a clockwise direction, the zero point at North, East at 90 degrees, South at 180 degrees, and West at 270 degrees.



AZIMUTH CIRCLE

*NOTE: Origin is the point on the map that you are measuring the Azimuth from.

d. Distance has no effect on azimuth.

e. The BACK AZIMUTH of a line differs from its azimuth by exactly 180 degrees. The rules for finding back azimuth are:

(1) If the azimuth is less than 180 degrees, add 180 degrees to obtain the back azimuth.

(2) If the azimuth is more than 180 degrees, subtract 180 degrees to obtain the back azimuth.

(3) If the azimuth is 180 degrees, the back azimuth is zero or 360 degrees.

10. DECLINATION DIAGRAM:

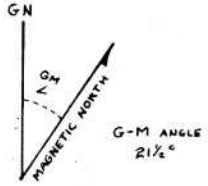
a. The declination diagram indicates the difference between:

(1) GRID NORTH (GN) - The direction of the north south grid lines.

(2) MAGNETIC NORTH (⍋) - The direction in which the magnetic arrow of the compass points.

(3) TRUE NORTH (★) - The direction of the north pole (True North will not be mentioned further since it does not effect this training).

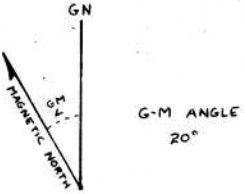
b. Grid North and magnetic North form the G-M ANGLE. The conversion of a grid azimuth to a magnetic azimuth and vice versa involves the following formulas:



Easterly G-M Angle
Magnetic north is east (right) of Grid North

To convert Magnetic azimuth to a grid azimuth ADD G-M angle.

To convert a grid azimuth to a magnetic azimuth SUBTRACT G-M angle



Westerly G-M Angle
Magnetic north is west (left) of Grid North.

To convert Magnetic azimuth to a grid azimuth SUBTRACT G-M angle

To convert a grid azimuth to a magnetic azimuth, ADD G-M angle

c. If the G-M angle is given to the nearest ½ degree, round it off to the next highest degree before converting, i.e. 21½ degrees is rounded off to 22 degrees.

11. **DETERMINING DIRECTION:**

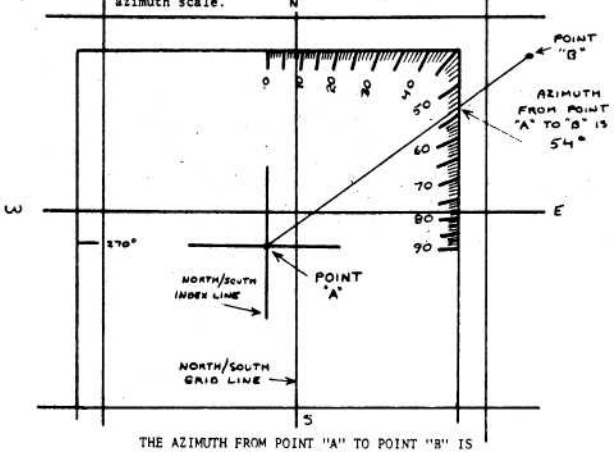
a. With PROTRACTOR (determine the grid azimuth from point "A" to point "B")

(1) Connect the two points with a straight line.

(2) Place the index of the protractor over point "A".

(3) Keeping the index of the protractor over point "A" rotate the protractor until the 0-180 degree line is parallel to a north-south grid line.

(4) The azimuth from point "A" to point "B" found on the azimuth scale on the outer edge of the protractor where the straight line between the two points intersects the azimuth scale.



THE AZIMUTH FROM POINT "A" TO POINT "B" IS

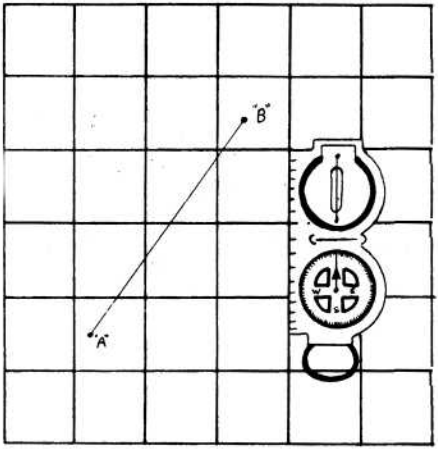
(5) Insure that a protractor is placed on the map correctly and the north-south index line is parallel to a north-south grid line.

b. With COMPASS (determine the magnetic azimuth from point "A" to point "B")

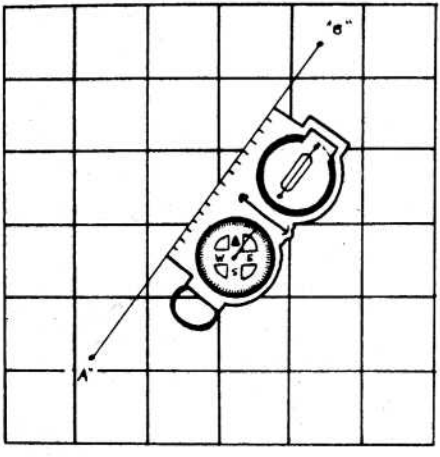
(1) Draw a line connecting the two points.

(2) Orient the map by placing the straight edge of the compass along any north-south grid line with the front of the compass pointing toward the top of the map.

(3) Rotate the map until the north seeking arrow is in line with the black index line. The map is now oriented, do not move it.



(4) Without moving the map, pick up the compass and place the straight edge on the line drawn between the two points. The thumb ring is toward the starting point ("A") and the front of the compass is toward the other point ("B").

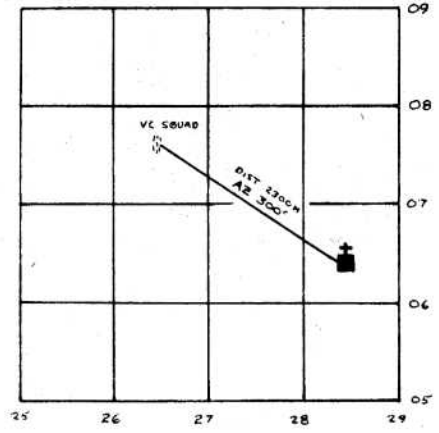


(5) Read the azimuth, front point "A" to point "B" under the black index line.

c. Remember the difference between a grid azimuth obtained by using a protractor and a magnetic azimuth obtained by using a compass.

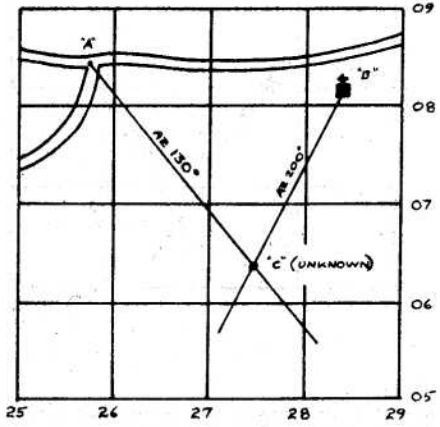
12. PLOAR COORDINATES: A method of locating or plotting a point by an azimuth (direction) and a distance from a known location. The azimuth is either grid or magnetic (be sure to state which) and the distance is usually expressed in meters.

EXAMPLE: You are located in the church grid square 2806. Using polar coordinates, give the location of the VC squad.



13. INTERSECTION:

a. Intersection is the method used to determine the location of an unknown point by occupying two known locations and sighting on the unknown location. (Example: Points "A" and "B" are known locations, Point "C" is visible to points "A" and "B". What is the location of Point "C")

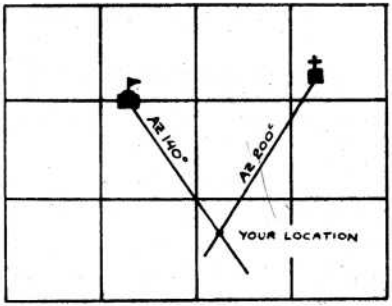


(1) Move to point "A". Using your compass, determine the azimuth from point "A" to point "C". Plot this azimuth from point "A" to point "C" on your map (remember to convert the magnetic azimuth to a grid azimuth before plotting.

(2) Move to point "B". Using your compass, determine the azimuth from "B" to "C". Plot this azimuth on your map. (Remember to convert).

(3) Point "C" is located where the two azimuths intersect.

14. RESECTION: A method of determining your position by sighting on two known locations. (Example: Determine your location by using two outstanding features on the ground that can be located on the map)



a. Select two outstanding features on the ground that can be located on the map (school and church)

b. Using your compass, determine the magnetic azimuth to the school. Compute the back azimuth. From the school, plot the back azimuth on your map (remember to convert).

c. Using your compass, determine the magnetic azimuth to the church. Compute the back azimuth. From the church, plot the back azimuth on your map. (remember to convert).

d. You are located where the two azimuths resect.

15. TERRAIN ASSOCIATION: One of the most important functions of a map is to show graphically, to the map reader, a part of the earth's surface; therefore, the ability to study a map and visualize the ground, not as topographic symbols, but as actual ground formations such as hill, valleys, etc., must be acquired by all map readers. To reach this goal, a thorough knowledge of elevation and relief (shape) is essential. One should also become familiar with the terms applied to terrain (ground) features.

16. ELEVATION AND RELIEF:

a. Elevation is height expressed in feet above or below mean sea level.

b. Relief is the variation in the height and shape of the earth's surface.

c. Elevation and relief may be indicated on a map in many ways but on the military maps you will find it represented by CONTOUR LINES.

d. Contour lines are imaginary lines on the ground that connect points of equal elevation. On a map they are shown in brown. The contour interval, which is the vertical distance between contour lines (up or down distance), is stated in the lower center margin of the map. Every fifth contour line is printed more heavily than the others and is numbered showing the height above or below mean sea level. This line is known as the index contour line. The following are some of the characteristics of contour lines:

(1) Contour lines are smooth curves which always close.

(2) When crossing a valley or a stream, contour lines form U's or V's with the base of the U or V pointing toward higher ground or up stream.

(3) When crossing ridges, contour lines form U's or V's with the base of the U or V pointing away from high ground.

(4) Contour lines that are close together indicate a steep slope; contour lines that are far apart indicate a gentle slope.

(5) On uniform slopes, contour lines are evenly spaced; on irregular slopes, contour lines are unevenly spaced.

(6) Last closed contour line indicates a hilltop.

(7) Movement parallel to contours is relatively level. Movement across contours is up or down slope.

17. TERRAIN FEATURES:

a. All ground forms may be classified into the following primary terrain features:

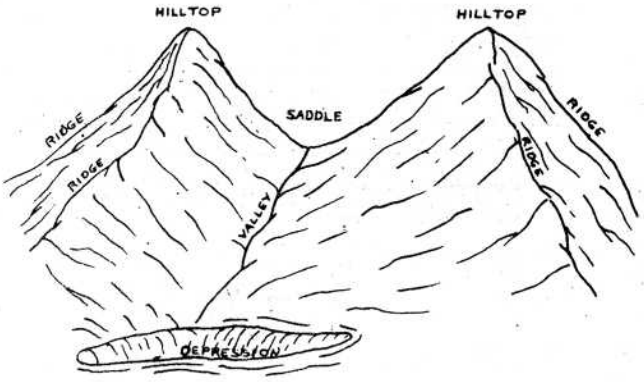
(1) Hilltop

(2) Ridge

(3) Valley

(4) Saddle

(5) Depression



b. Contour lines are used to indicate these ground forms on a map.

c. The relationship existing between contour lines and actual ground forms is illustrated as follows:

HILLTOP

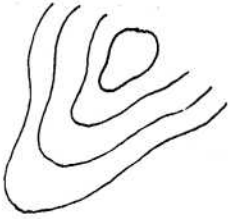
On Map

Last closed contour

On Ground

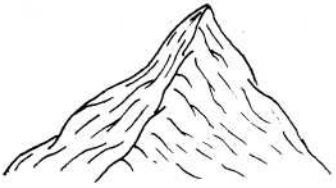
When you are located on a hilltop, the ground slopes in all directions

RIDGE



On Map

U or V shaped contours with the base of the U or V pointing away from higher ground



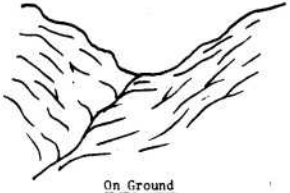
On Ground

When you are located on a ridge, the ground slopes down in three directions and up in one direction

VALLEY

On Map

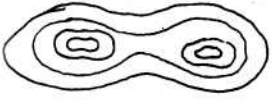
U or V shaped contours with the base of the U or V pointing toward higher ground



On Ground

When you are located in a valley, the ground slopes up in three directions and down in one direction

SADDLE



On Map

Hourglass or figure eight shaped contours

On Ground

When you are located in a saddle there is higher ground in two directions and lower ground in two directions.

DEPRESSION

On Map

Tick marks point downgrade

On Ground

When you are located in a depression there is higher ground on all sides.

d. INTERPOLATION of elevation

(1) To determine the elevation of a point that falls between two adjacent contours, estimate the relative distance of the point between the two contours and add the same estimated distance of the contour interval to the elevation of the lower valued contour line.

Example: A point located half way between the 100 foot contour and the 120 foot contour would have an elevation of 110 feet.

(2) A "rule of thumb" used to determine the elevation of the top of a hill is to take the elevation of the last closed contour line and add to it one-half the contour interval.

Example: Hilltop last closed contour line = 120 feet. Contour interval is 20 feet. One-half the contour interval = 10 feet. Elevation to the top of the hill equals 130 feet.

(3) To determine the elevation of a depression, subtract one-half the contour interval from the last depression contour line.

Example: Depressions last contour line = 40 feet. The contour interval = 20 feet. One-half the contour interval = 10 feet. Elevation of depression = 30 feet.

18. USE OF THE MAP IN THE FIELD

a. The primary purpose of a military map is to serve as a valuable aid in the accomplishement of successful military operations in the field. To this end, the following procedures should be employed:

(1) Determining your location on the map and on the ground:

(a) Orient the map to North.

(b) Inspect the surrounding area on the ground for all distinct terrain features.

(c) Inspect the map for an area having the same type terrain features in the same relative positions as those on the ground.

(d) Comparing the map to the ground, and using a process of elimination, isolate the terrain feature upon which you are located.

(e) Confirm this terrain feature by assuring that the direction, distance, and difference in elevation to all adjacent terrain features compares identically on the map and the ground.

(f) Determine your exact location on the isolated terrain feature by a detailed analysis of all the immediate terrain features.

(2) Ground Navigation:

(a) Ground navigation is a method of movement between two points wherein an individual, using terrain features to guide upon, knows his map and ground location throughout the movement. In order to be successfully employed, Ground Navigation demands a thorough knowledge of terrain features as they appear on the map and on the ground. Since terrain features are used to guide upon during movement, the use of the compass for movement is minimized.

(b) In Ground Navigation, two basic rules must always be applied:

1 Begin from a known location on both the map and the ground.

2 Orient the map to the ground and keep it oriented throughout the movement.

(3) With the basic rules established, the following steps outline the technique of ground navigation:

(a) Through a map study of the terrain, determine the most practical route to your destination; select terrain features along this route to guide on during movement.

(b) Determine general direction of movement.

(c) Begin movement, considering the following factors:

1 Horizontal distance between terrain features along route.

2 Vertical distance between terrain features along route.

3 Confirmation of your location as selected.

(d) Upon arrival at the final destination, CONFIRM the location by conducting a detailed comparative analysis between the ground position and the plotted map position.

(4) Ground Navigation is most effective when distinct terrain features exist and can be seen. Under conditions of reduced visibility and in the absence of terrain features, a combination of methods must be used. Primarily following an azimuth along the prescribed route to terrain features that are easily distinguished. In short, the combination of methods we use involve both the map and the compass.

SECTION II

COMPASS AND DETERMINING DISTANCE

19. PURPOSE: To provide the soldier with a review of the nomenclature and use of the lensatic compass and methods of determining distances in the field.

20. LENSATIC COMPASS:

a. The Lensatic Compass consists of a case in which a magnetized dial is mounted on a pivot in such a manner that is can rotate freely when the compass is held level. Printed on the dial in luminous figures are the letters E, S, and W and a luminous arrow. Newer compasses do not have the S. The arrow always points toward North. East is 90 degrees, South 180 degrees, and West 270 degrees. On the dial there are two scales. The outer scale is in mils and the inner scale is in degrees. You will be using the inner scale which is in degrees. The front sight is a sighting wire that is set into the slot in the cover. The rear sight has a slot for sighting on the object and a lens for reading.

b. Two general rules always must be followed when using a compass:

(1) Keep away from metal objects and high tension wires.

(2) Keep compass closed when not in use.

c. To use the compass during daylight, the compass is held by the right hand with the thumb through the thumb loop and the index finger curved under the compass body for support. The cover is set straight up so that the sighting wire is perpendicular to the body of the compass and the rear sight is inclined at approximately 45 degrees to the dial. It is important that the compass body be held level so that the dial will rotate freely. The compass is held so that it may be sighted and the dial read through the lens without moving the head.

(1) To find the azimuth from your position to a definite object, hold the compass as described above and sight through the sighting slot and along the sighting wire in the cover to the object. Make sure that the sighting wire is centered in the sighting slot. Holding the compass and the head steady, glance down through the lens and read the azimuth on the degree scale directly under the fixed black index line on the glass crystal over the dial.

(2) To follow a definite azimuth, hold the compass as before and turn the body until the given azimuth appears under the black index line. Then, without moving the compass or the head, glance up through the sighting slot. Fix your eye on some distant object directly behind the sighting wire. This object lies on your azimuth. You then proceed to the selected object and repeat the procedure. The object that you select is called a steering mark. Be sure that you select a steering mark that can be easily identified and not confused with a similar object.

d. Different models of the Lensatic Compass vary somewhat in detail, but the basic principles are the same for night use. Mounted over the dial, in addition to the stationary glass cover or fixed crystal, is a moveable crystal. On this moveable crystal is at least one luminous line. On other models there are two Luminous lines, a long line and a short line. To pre-set the compass for night use, follow these steps:

(1) Light source available: Holding the compass in the palm of the hand, rotate until the desired azimuth falls under the index line. Holding the compass steady so that the desired azimuth remains under the index line, turn the moveable crystal until the luminous line (long luminous line) comes over the north seeking arrow.

(2) Light source not available: An azimuth may be set on a compass by the click method. As the moveable crystal is rotated, a series of clicks are heard. Each of these clicks represents 3 degrees. If the desired azimuth is divided by 3, the number of clicks needed to set the azimuth can be determined. To set the azimuth on the compass, the compass is held in the palm of the hand by grasping the moveable crystal. Rotate the compass clockwise the desired number of clicks.

e. With the compass pre-set, as described above, rotate the compass until the north seeking arrow falls directly under the luminous line. The body of the compass and the sighting wire are now pointed along the desired azimuth. To move at night, keep the luminous line and the north seeking arrow aligned and move in the direction of the sighting wire.

21. DETERMINING DISTANCE IN THE FIELD:

a. The navigator must have some means of determining distances traveled while moving over the terrain.

b. Striding is probably the most common method of measuring distances. A stride is equal to two natural steps, or counting each time that the right foot hits the ground. In the beginning, you will be using the pace method which is counting every step. Measuring the distance by the stride method or the pace method simply means counting the strides or paces between two points. Each individual must determine his pace count by pacing over a known distance (usually 100 meters) many times and then compute the average count. It should be remembered that different types of terrain and weather as well as the individual and the equipment that he is carrying will effect the pace count for each of these. The following are some of the conditions that will effect your pace count:

(1) Slopes: Stride or pace lengthens on down-grade and shortens on a up-grade.

(2) Winds: A head wind shortens your pace and a tail wind increases it.

(3) Surfaces: Sand, gravel, mud, and similar surfaces tend to shorten the pace.

(4) Elements: Snow, rain, or ice will shorten the length of your pace.

(5) Clothing: Excess weight of clothing or other equipment will shorten your pace.

(6) Stamina: Fatigue tends to shorten your pace.

ANNEX "A"

COMMON TOPOGRAPHICAL SYMBOLS

Railroad, Narrow Gauge (black)

Cemetery (black)

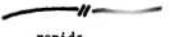
Bridge. (black)

Prominent Fence (black)

School (black)

Spot Elevation (black)

Christian Church (black)



Small Rapids (blue)

Pagoda (black)

Foot Bridge (black)

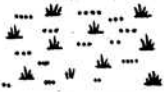
Open Pit Mine or Quarry (black)

Non-Christian House of Worship (black)

Railroad Track (black)

Ruins (black)

Intermittent Stream (blue



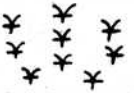
March or Swamp (blue)

Rice Paddy (blue)

Orchard or Plantation (green)

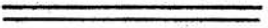
Tropical Gradd (green)

Mangrove (green)

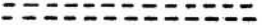


Nipa (Green)

Hard-Surface, Medium duty Road (red)



Improved, light duty Road (black)



Unimporved Dirt Road Black

Trail (black

ANNEX "B"

PRACTICAL EXERCISE *

22. PURPOSE: To develop familiarity with the basic elements of maps and map reading.

23. MARGINAL INFORMATION:

a. When was the ANDERSON ISLAND map field checked? 1959

b. What is the contour interval of the ANDERSON ISLAND map sheet? 40 Ft

c. What is the number of the map sheet that is to the east of ANDERSON ISLAND map sheet? 1S78 III

d. What is the scale of the ANDERSON ISLAND map? 1:50,000

24. TOPOGRAPHIC SYMBOLS:

a. What color is used to indicate:

(1) Manmade objects? Black

(2) Vegetation? Green

(3) Relief? Brown

(4) Water? Blue

b. What does each of the following topographic symbols indicate?

(1)  Open pit mine or quarry

(2)  Church

(3)  Improved road, light duty

25 GRID COORDINATES:

a. Identify the features found at the following coordiantes:

(1) 258151 Hodge Lake

*NOTE: Map used for practical exercise: ANDERSON ISLAND, Sheet 1468 II

(2) 257084 Lookout tower

(3) 226086 Depression

(4) 238118 Bartlet Hill

b. Write the 6 digit coordinates to the following locations:

(1) Spot elevation 384 in grid square 3008. 301089

(2) Guard post in grid square 2509. 252092

(3) Bauman Lake in grid square 2709. 274094

26. SCALE:

a. What does the scale of a map show? The fixed relationship between map distance and the corresponding ground distance.

b. Military maps normally contain graphic scales using what three units of measure? Meters, Yards, and Miles

27. DISTANCE:

a. Determine, in meters, the straight line distance between spot elevation 384 in grid square 3008 and spot elevation 338 in grid square 2913. 4675 meters

b. Determine, in meters, the road distance between Sta F26 in grid square 3509 and the lookout tower in grid square 3313. 5725 meters

28. DIRECTION:

a. What is the grid and the magnetic azimuth from spot elevation 422 in grid square 3407 to spot elevation 384 in grid square 3008? Grid Azimuth = 223 degrees, Magnetic Azimuth = 201 degrees.

29. POLAR COORDINATES:

a. You are located in the guard post in grid square 2509 (known location). Using polar coordinates, give the location of the lookout tower located in the lower half of grid square 2508. (use a magnetic azimuth) Distance 960 meters, azimuth 122 degrees.

b. You are located in the guard post in grid square 2509 (known location). Using polar coordinates, give the location of the tower in grid square 3105 (use magnetic azimuth) Distance 7020 meters, direction 99 degrees

30. INTERSECTION:

a. You are located in STA 6, coordinates 320079. From your position you can see an enemy bunker on an azimuth (grid) of 65 degrees. You then move to the lookout tower located at coordinates 321089. From this position you can see the same enemy bunker on an azimuth of 120 degrees (grid). What is the location of the enemy bunker? 330083

b. You are located at the tower in grid square 3105. From you location you detect an enemy observation on an azimuth (grid) of 36 degrees. The friendly forces located at the lookout tower in grid square 3108 have detected the same enemy observation post on an azimuth (grid) of 144 degrees. What is the location of the enemy OP? 325075

31. RESECTION: Your squad is on an ambush patrol. Early in the day the squad leader was wounded and evacuated. You are presently the acting squad leader. Your squad is located somewhere in grid square 3008 and you want to know the exact location. The squad leader's mortar overlay shows that mortar concentration "A" is located at coordinates 309096 and concentration "B" is located at coordinates 296098. You request a fire mission in which the company mortars will fire a marking round on concentration "A". You determine the grid azimuth from your position to the marking round to be 27 degrees. You then request a marking round to be fired on concentration "B". You determine the grid azimuth from your position to the marking round to be 334 degrees. What is the location of your squad? 303083

32. ELEVATION AND RELIEF:

a. Complete the following statements:

(1) Contour lines, when crossing valleys, from U's and V's, the bases of which point toward higher ground.

(2) Contour lines, when crossing ridges, from U's and V's, the bases of which point toward lower ground.

(3) Contour lines that are closely spaced indicate a steep slope and widely spaced contour lines indicate a gentle slope.

b. What types of terrain features are found at the following coordinates:

(1) 218072 Depression

(2) 246152 Hilltop

(3) 229098 Ridge

(4) 244158 Valley

c. What is the elevation at the following coordinates:

(1) 253125 360 ft

(2) 283137 380 ft

(3) 229098 300 ft

(4) 332105 380 ft

(5) 226086 140 ft

33. DETERMINING DISTANCE IN THE FIELD:

a. Give two conditions that will lengthen your pace count: Walking down hill and having a tail wind blowing.

b. Give six conditions that will shorten your pace count: Walking up hill, head wind blowing, walking on soft surfaces, walking in rain or on ice, excessive weight of clothing or equipment, and fatigue.