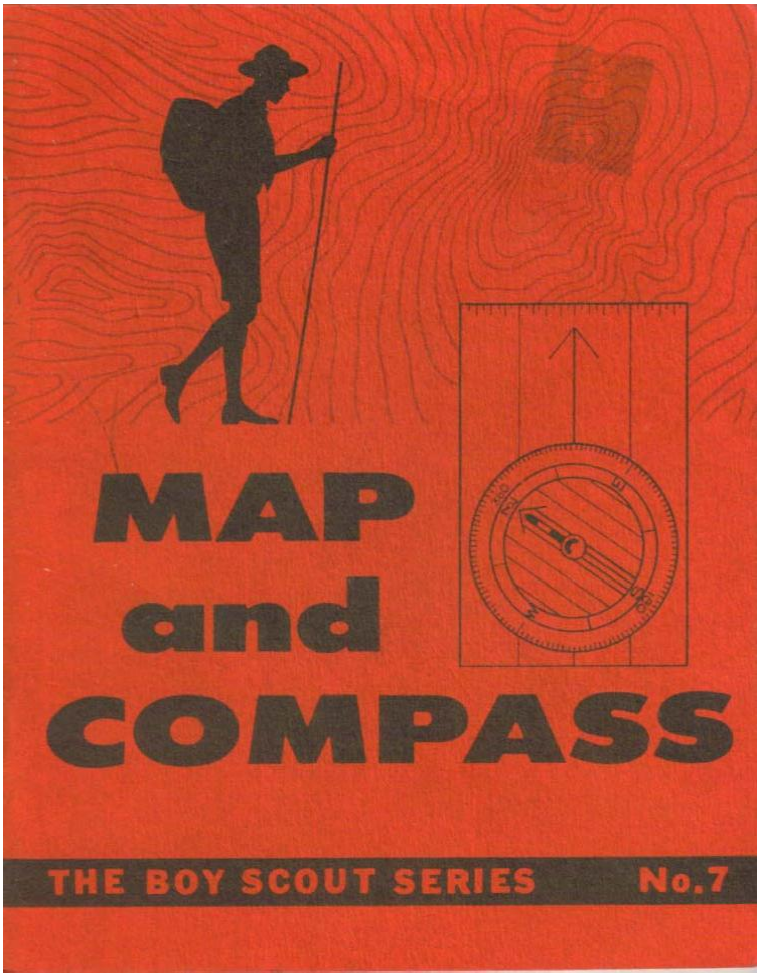


1964

Editor's Note:

The reader is reminded that these texts have been written a long time ago. Consequently, they may use some terms or express sentiments which were current at the time, regardless of what we may think of them at the beginning of the 21st century. For reasons of historical accuracy they have been preserved in their original form.

If you find them offensive, we ask you to please delete this file from your system.

This and other traditional Scouting texts may be downloaded from The Dump.

CONTENTS

WHAT IS A MAP?

Imagine yourself travelling in a jet on a bright day — visibility unlimited.

If you took a camera shot of what you see below, and enlarged it, you would have a "photographic" map of the area over which you flew. There would be many confusing details and there would be distortions towards the edges because of the perspective, but it would be a "map" nevertheless: a reproduced representation of a portion of the surface of the earth.

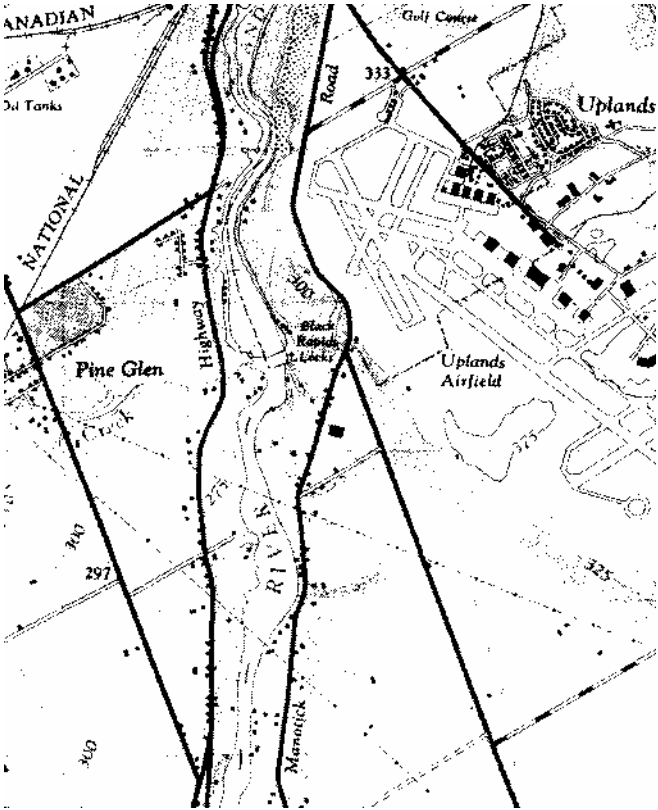
Modern map makers, use aerial photographs in map making and checks them through surveys in the field. But in the final map, details are simplified by "map symbols" and the perspective is flattened so that the entire map looks the way it would if you were looking straight down on it.

There are many kinds of maps and many uses to which maps are put: highway maps for motoring, city maps for the use of city departments — fire, sanitation and others, nautical charts for sea travel, maps for air travel, etc.

Topographic Maps

Topographic maps are the maps that will serve you best — from the Greek "topos" — place, "graphin" — to write or draw: a drawing of a picture of a place or an area.

Such topographic maps are available for large areas of Canada. They are prepared and may be obtained from the Survey and Mapping Branch of the Department of Mines and Technical Surveys.



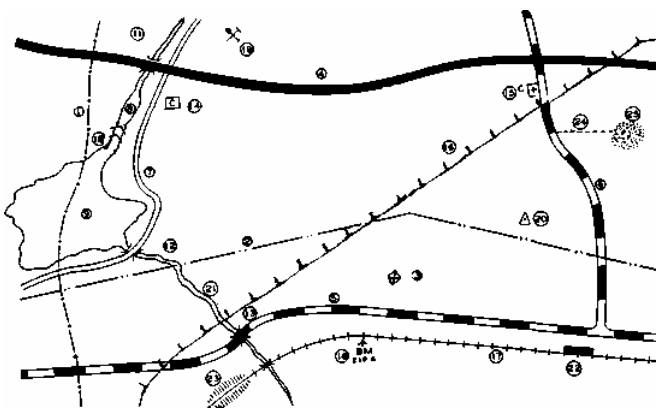
This map's scale is 1:50,000 which means one inch on the map equals 50,000 inches on the ground. (1¼ inches to one mile). This scale and the 1:125,000 scale are the best for Scouting purposes.

MAP SYMBOLS

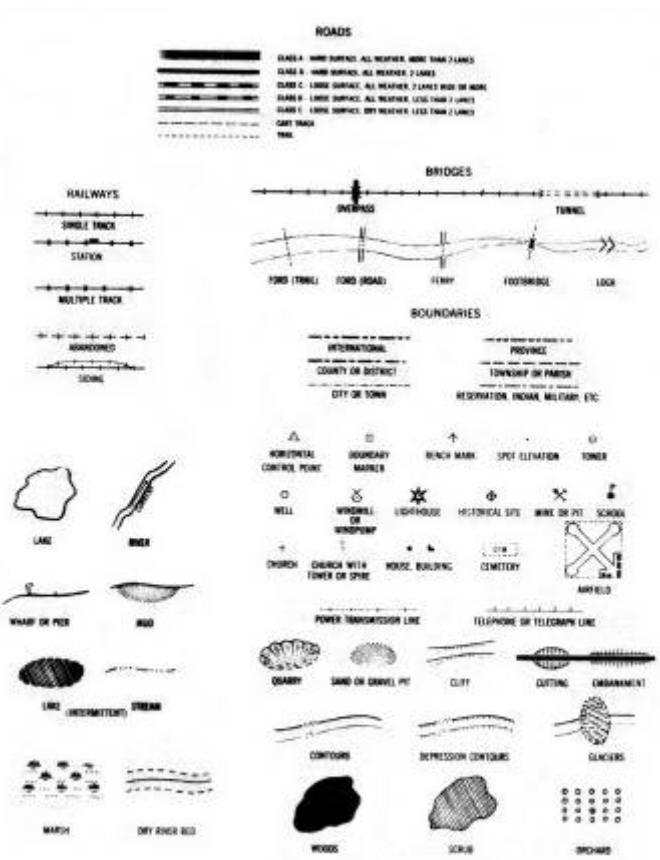
The details of the terrain are shown by conventional signs or map symbols. On a topographic map, these signs are usually printed in three colours.

Everything in black indicates the work of man — roads, railroads, cities and towns, bridges, boundaries and names. Water such as rivers, lakes, swamps, is blue. The signs for valleys, hills and mountains are in brown. On some maps woodland areas are further shown in green, main highways in red.

Study the map symbols on the facing page and then look at a topographic map of your area and see how many of these you can pick out on the map. Make yourself familiar with the conventional signs so that at a glance you can recognize what they represent.



Try this game. Find the numbers 1 to 25 on the map above. After each number write what the map symbol nearest to it represents. Answers on page 33.


ROADS
CART TRACK
TRAIL
RAILWAYS
SINGLE TRACK
STATION
MULTIPLE TRACK
ABANDONED
SIDING
BRIDGES
OVERPASS
TUNNEL
FORD (TRAIL)
FORD (ROAD)
FERRY
FOOTBRIDGE
LOCK
BOUNDARIES
INTERNATIONAL
COUNTY OR DISTRICT
CITY OR TOWN
PROVINCE
TOWNSHIP OR PARISH
RESERVATION, INDIAN, MILITARY, ETC
HORIZONTAL CONTROL POINT
BOUNDARY MARKER
BENCH MARK
SPOT ELEVATION
TOWER
WELL
WINDMILL OR WINDPUMP
LIGHTHOUSE
HISTORICAL SITE
MINE OR PIT
SCHOOL
CHURCH
CHURCH WITH TOWER OR SPIRE
HOUSE, BUILDING
CEMETERY
AIRFIELD
POWER TRANSMISSION LINE
TELEPHONE OR TELEGRAPH LINE
QUARRY
SAND OR GRAVEL PIT
CUTTING
EMBANKMENT
CONTOURS
DEPRESSION CONTOURS
GLACIERS
WOODS
SCRUB
ORCHARD
LAKE
RIVER
WHARF OR PIER
MUD
LAKE (INTERMITTENT)
STREAM
MARSH
DRY RIVER BED

CONTOUR LINES

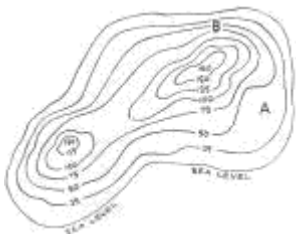
In the beginning, many thin brown lines that run across the map may confuse you. These are contour lines.

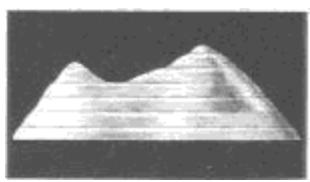
Every point along one of these lines is the same number of feet above sea level. If you follow one of the heavier brown lines on your map, you will find a number, such as 300. This means that everything on that line lies 300 feet above sea level. If you could imagine the sea rising 300 feet, this line would become the new shore line.

The difference in the height of land shown by each contour line and the one next to it is usually 25 feet. Look in the bottom margin of the map for the contour interval.

The contours tell you the ups and downs of the country. Where they are far apart, the ground is gently sloping — suitable for a campsite. Where the lines come close to each other, the hill is steep and hiking may be difficult. If they come together they indicate a cliff or a mountain face. The top of a hill is indicated by a dot and a number. The number is the height of the hill at its highest point.

Look at your topographic map. Pick out the highest points in your area. Plot a series of signalling stations visible to each other over as large an area as possible. Take distance into consideration.





To get a good idea what con-
to»rv are liEe, note n reliet
map of an actual hill. Copy the
contour lines of a map iiiiough
carbon paper. Cut a piece of
plywoudJ-ie sJ»e go each hon
Four. Mant the edges and ataeh
piecea ozi top of each other.
— at A or B?

An»utee way te dmnonstrate center liner eimply is to aip a rocli pen Wsy in water act dna the »'ater line. file one inrh deppey; dtaw aao.ther line and so nn. The diagram above ghovs this medal .

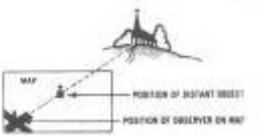
SETTING YOUR MAP

The map is set when it is made to correspond with the ground it represents. North is the top of the map.

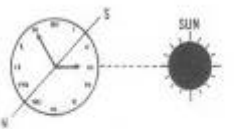
Here are four ways to set a map:

By Compass — Place the compass on the magnetic north and south line of the map. Turn the map and compass together slowly until the magnetic needle of the compass points to the magnetic north on the map.

By Objects — When you know your position on the map and can identify the position of some distant objects you may turn the map so that it corresponds with the ground.



By Watch and Sun — If it is summer first set the watch back to standard time. Place watch flat, with hour hand pointing at the sun. True south is midway between the hour hand and twelve. True north is directly opposite. This method is very rough.

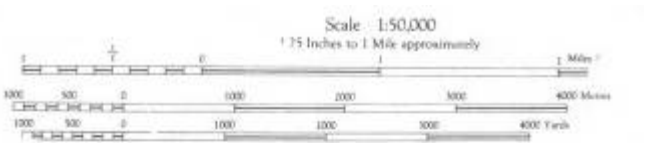


By the Stars — In latitudes below 60° north, the bearing of Polaris is never more than 2¾° from true north.

MAP SCALES

Maps are made "to scale", which means using a ratio for the distance on the map to the actual distance on the ground.

The scales in the bottom margin on your map give you the means for measuring distances on the map. These scales are usually given in four ways:



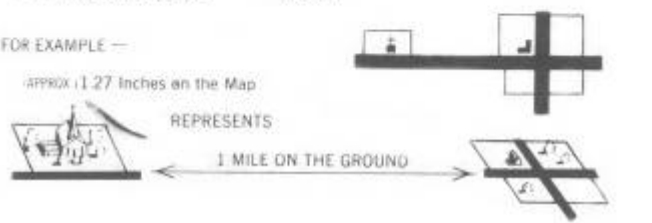
1. As a fraction — 1:50,000 or 1:125,000;
2. As a ruler divided into miles and fractions of a mile;
3. As a ruler divided into thousands of feet;
4. As a ruler divided into kilometers and fractions of kilometers.

In the example in the drawing below the scale would be (approx.)

1.27 inches = 1 mile

or

$$\frac{\text{Distance on map}}{\text{Distance on ground}} = \frac{1}{50{,}000}$$



MAP REFERENCES

Find O'Connor Island at the top of the map on the facing page. Do you see the two thin lines that cross at its western end? Follow these lines north and south, east and west. Now note the other vertical and horizontal lines drawn in the same way making a series of squares that cover the map. These lines and squares are drawn on the map to help you "refer" to places on it easily. Because the squares look like a grid iron or grating they are called a grid, and the lines are called grid lines.

Look at the house shown directly south of O'Connor Island. It is just where two grid lines cross. Follow the vertical grid line to the top of the map. What number is there? Follow the horizontal grid line to the east side of the map. What is the number? We can say that the house is just where grid lines 60 and 37 cross.

Now look where Bilberry Creek runs into the river. In order to pinpoint this location we divide the square mentally into tenths. We now find that the mouth of the creek is 3/10 east of grid line 58. The number, therefore, would be 583. But this only locates the point in one direction. We also have to follow the same procedure horizontally. Now we find that the mouth of the creek going in a northerly direction from grid line 37 is approximately 4/10. We would give this the number of 374. Now to refer to the point where the creek empties into the river, we simply say: the creek at 583374.

The house mentioned previously below O'Connor Island would be map reference 600370. Map references are always given in six figures. And, we must remember to put the vertical grid line number before the horizontal.

Numbers on the vertical grid lines tell us how far east a place is — or its easting. The numbers on the horizontal line tell us how far north the place is — or its northing.

The six figures give us the map reference.

Try your hand at giving six-figure map references of:

a. Where Blanche River empties into large river.
b. The dock at Hiawatha park.
c. The juncture of the Russell County and Carlton County line and Highway 17.

What is marked on the map at map references:

d. 577352 e. 588345 f. 593355

Answers on page 34.

THE COMPASS

The first compass was, no doubt, a magnetized ore-bearing rock or stone which, when suspended on a thong or vine, would always point in the same direction.

No one knows who first discovered the compass. The Chinese seem to have understood its use 3,000 years before Europeans learned to travel without the aid of the sun and the North Star. According to some authorities, Marco Polo, returning from Cathay in 1260 brought to Europeans their first knowledge of the compass as an aid to navigation.

All pocket compasses are alike in their use of the magnetic needle or card to show the north-south direction. The north end of the magnetic needle of your compass always points to the magnetic North Pole.

For map-reading and orienteering any type of compass can be used, but the orienteering compass is the type found best for Scouting work.

You know the compass directions, the cardinal points: north, south, east, west. But, can you locate them out in the woods?

It is an easy job with the compass.

The important part of the compass is the magnetized steel needle supported in the middle. When you move the compass, the needle swings until it comes to rest with one end always pointing to the magnetic north pole.

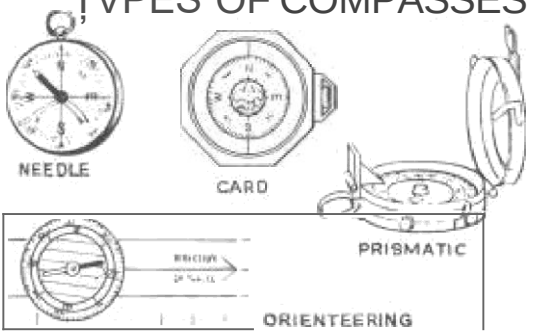
On the inside of the compass case, all around the edge you will find marked the 360° of the circle.

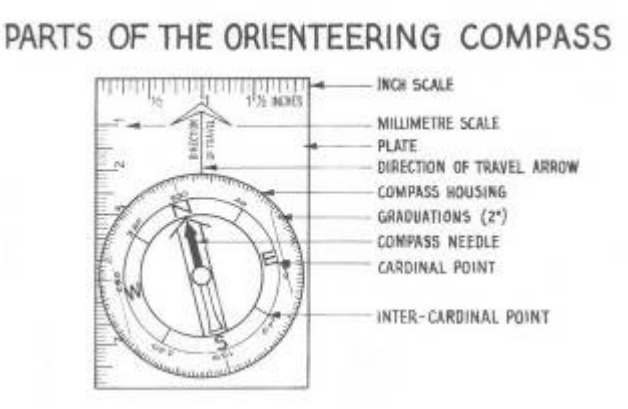
These degrees are used to indicate and find directions. A direction expressed in this way, in degrees, is called a **Magnetic Azimuth,** from the Arabic **al,** the, and **zimut,** way: "the way."

Since north is found at 360°, east becomes magnetic azimuth 090, south becomes 180, west 270, and so on.

Learn to give readings in degrees rather than by the cardinal points. It is more accurate.

TVPES OF COMPASSES





Parts of the Orienteering Compass

This compass has three parts: the magnetized needle, the metal housing, and the transparent plate.

The compass housing, so called because it "houses" the needle, rotates easily on the transparent plate. On top of the housing the four cardinal points of the compass are clearly marked. The inter-cardinal points are marked by a line drawn between each of the cardinal points.

The sloping rim of the housing is graduated into the 360° of the circle. There are two degrees between each of the small strokes.

On the bottom of the inside of the housing is a black, printed arrow which corresponds with the north marking on the housing, fixed at 360°. This is the "orienting arrow".

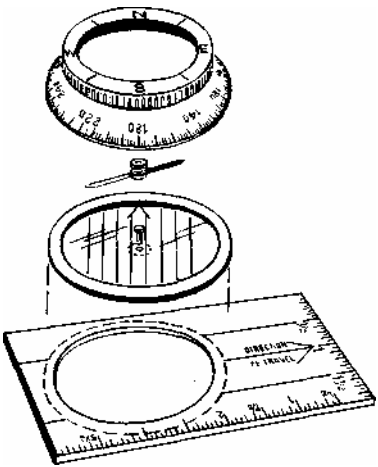
Above the orienting arrow the compass needle swings on its sapphire bearing. The end that points north is coloured red, the other end, white.

On the transparent plate is shown a red arrow which indicates the direction of travel or the line of sight. Along one short side is a scale in inches to be used in measuring distances on Canadian maps. On one long side is a millimetre scale useful when working with some foreign maps.

The compass is a delicate instrument

Place the compass on a flat surface and let the needle come to rest. Now hold a knife, or anything made of iron or steel close to it. Watch the compass needle. Move the knife around the compass. What did the needle do?

The compass needle moves' because it is a small magnet and is attracted by iron. Remember this when using the compass — keep it away from knives, bicycles, wire fences and even zipper fastenings.



TOP OF COMPASS HOUSING - WITH CARDINAL POINTS ON UPPER RIM, DEGREE DIAL AROUND LOWER RIM.
COMPASS NEEDLE WITH COLOURED NORTH PART

BOTTOM OF COMPASS HOUSING (TRANSPARENT ON SOME MODELS) WITH ORIENTING ARROW.

BASE PLATE WITH DIRECTION-OF-TRAVEL ARROWHEAD, DIRECTION LINE (INDEX POINTER) AND RULED EDGES.

THE COMPASS POINTS MAGNETIC NORTH

The compass points to magnetic north and that is not always the same as true or geographic north. It depends on your locality.

If you live close to a line that runs near Port Arthur and Fort William, Nelson and Churchill, you're in luck. Here your compass north is approximately the same as true north. But if you live east of that line, your compass points off to the west, while west of the line it points off to the east.

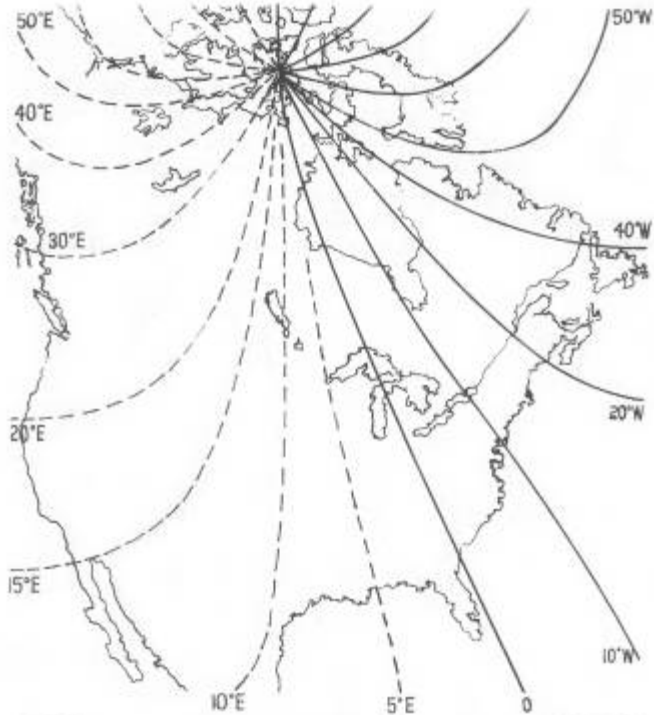
The reason is that the magnetic north pole, which attracts the compass needle, is situated about 1,400 miles south of the real north pole — near the west coast of Boothia Peninsula, the northern most point of the North American continent.

Finding True North

To find true north you must know how much off true north the compass shows in your locality. Look at the chart on the opposite page which gives the compass "declination", in degrees. The rule is: add westerly declination, subtract easterly to proceed true by compass. It works this way: if you live in Ottawa, the compass points 15° off true north towards the west. So, according to the rule, you figure true north 15° further east than the compass indicates it. In Vancouver, it is just the other way around. Since here the compass is 24° off in easterly direction, the true north will be 24° west of the spot towards which the compass points.

Example: A compass bearing in Ottawa is 34°, true north is where the compass reads 49° (15° added to 34°).

Check the map on the opposite page and find the declination in your part of the country.



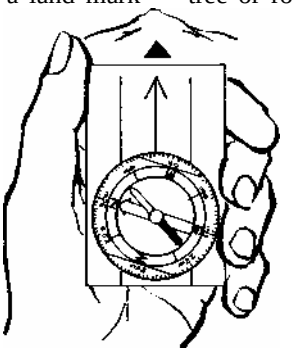
COMPASS DECLINATIONS

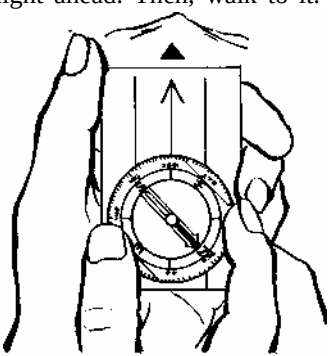
THE COMPASS POINTS TO WEST OF TRUE NORTH IN EASTERN CANADA; TO EAST OF TRUE NORTH IN WESTERN PARTS. REMEMBER NUMBER OF DEGREES IN YOUR LOCALITY.

USING THE COMPASS

Following a Bearing

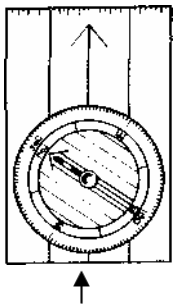
Follow a degree reading by first deciding on the direction you want to follow. Set the compass to that number by turning the compass housing until the number is opposite to the direction arrow line. Now hold the compass in front of you. Turn your whole body until north part of needle fits north of compass housing. Direction arrow shows you the way to go. Raise your eyes and find a land mark — tree or rock — straight ahead. Then, walk to it.





Finding a Bearing

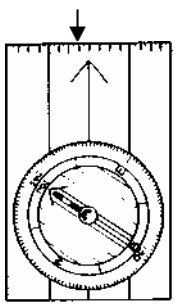
Take a degree reading by facing in the direction for which you want to learn the bearing. Hold the compass in front of you with direction arrow of base plate pointing in the right direction. Twist compass housing until north part of needle lies over the north marker on the bottom of the housing. Then, read the degree number on the edge of the housing where this touches direction arrow line.

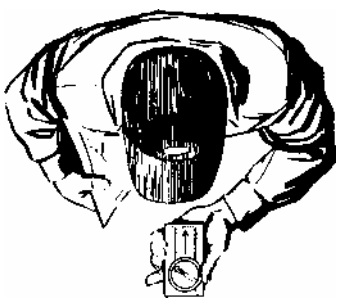


Returning to Start

Hold the orienteering compass with the direction-of-travel arrow pointing **towards** you instead of away from you! Orient the compass by turning your whole body until the north end of the compass needle points to north on the compass housing. Locate a landmark in front of you and walk to it. Orient the compass again, pick another landmark — and so on until you are back at your starting point.

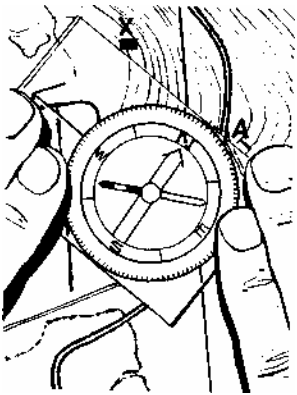
All you have to do is use your compass backwards!





COMPASS & MAP

There are three simple steps in using the orienteering compass and a map together.

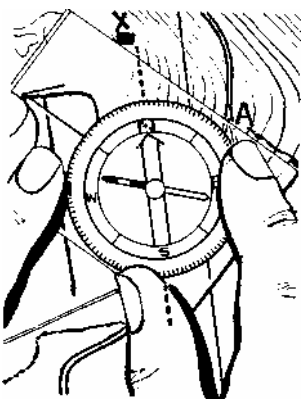


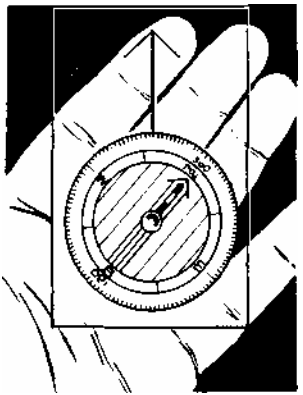
Step 1 —

Place edge of base plate of the compass on route from starting point A to destination X.

Step 2 —

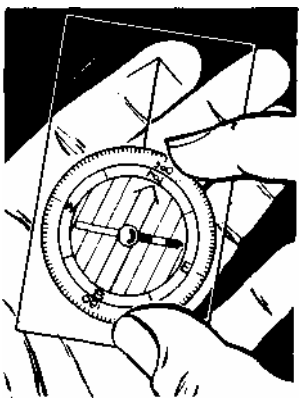
Holding the base plate firmly on the map, twist the compass housing until the north-south lines that run through the housing are lined up with the north-south lines of the map. Disregard compass needle. Your compass is now set.





Step 3 —

Hold compass level in front of you, with direction arrow straight ahead. Turn your whole body until north point of needle lies over north arrow of compass housing. Direction arrow now points at your destination.



Extra Step —

To provide for declination, find degree number at base of direction arrow. Add westerly declination to this number, or depending on your locality, subtract easterly declination, then reset compass housing to new number.

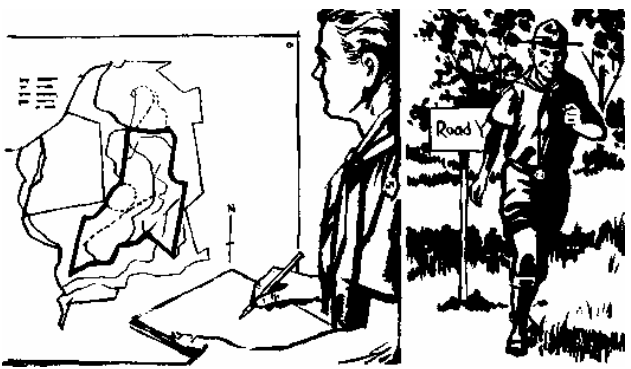
ORIENTEERING EVENTS

After you have become proficient with your compass and your map, you and your patrol will want to test your newly acquired skills in competition with other patrols. That is when you should try to get into an orienteering event, arranged by your district or council or arrange one yourself with another Scout Troop.

Here are some of the more common orienteering events.

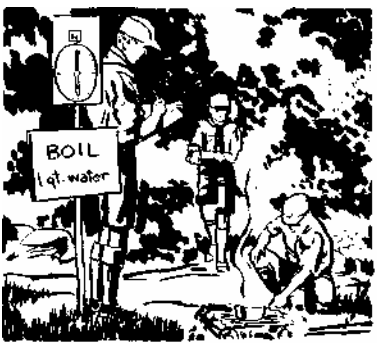
Route Orienteering

Here you follow a route decided on by the organizers of the event. This is indicated on a master map put up and from this map you copy out the route on your own map. As you follow the route, you pass *a* number of stations. The object is to mark the location of each of these stations on your map. The winner is the person who finds and indicates the most stations.



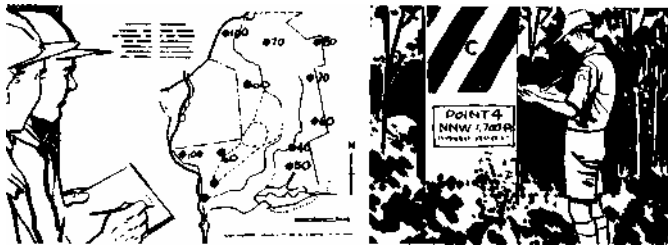
Project Orienteering

This tests your map and compass skills and Scout-craft skills as well. As you follow the route laid out as for route orienteering, you arrive at various stations where signs tell you what to do. These may be anything from collecting leaves, boiling a quart of water, deciphering a morse-code message or chopping through a log. The separate scores you receive from the judges located at the different project stations are added to your orienteering score.



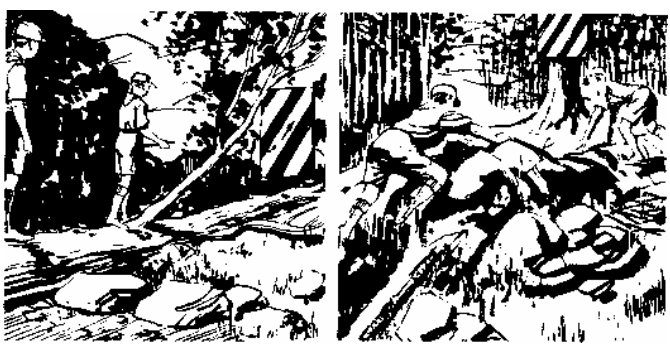
Point Orienteering

Here you are not given a definite route to follow, only the location of the number of points that you have to reach one after the other in numerical order. You figure out your own route from one point to the next and decide on the quickest and easiest way of getting there.



Score Orienteering

A map is put up at the starting point with a number of stations marked on it. Next to each station mark is a score you receive if you succed in finding that station. The nearby, easily reached points give you low scores; the far away, tough-going points give you high scores. You have to lay out your own route, planning it in such a way that you get the biggest possible score within a certain time limit.



ORIENTEERING GAMES

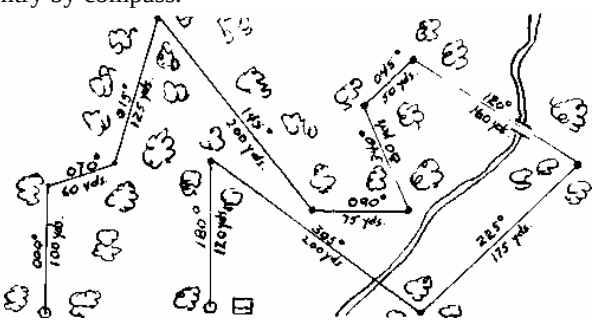
Silver Dollar Game

Place "silver dollar" (1½" circle cut from tin can on the ground.)

Set compass for a bearing of less than 120°. Walk 100 feet in that direction. Add 120° to original bearing, and walk 100 feet in new direction. Again, add 120°, again taking bearing and again walk 100 feet. Stop. Place marker in the ground. How close are you to the "silver dollar"?

Miniature Compass Walk

This game can give excellent training in walking cross-country by compass.



The course can be laid out very quickly and easily by two Scouts working together each with a marking pencil. Tack marker no. 1 on a tree and decide on a certain compass bearing. Write the degree number on the marker, then proceed in that direction leaving your helper at no. 1, measuring the distance of your steps until you reach another tree that can appropriately be post no. 2. Yell the distance to your helper waiting at post no 1, who thereupon writes this distance on the no. 1 marker, and joins you at post no. 2. Follow this procedure for at least a dozen posts over the area. The participants are started with two-minute intervals.

Compass Walks

An excellent method of practising following cross-country bearings is the compass walk.

To lay out the course, locate a stretch of straight road lined with fence posts, or put up your own posts. Tack markers numbered 1 to 10 on 10 of these posts about 100 feet apart. At one of these markers — no. 4 for instance — face at right angles to the line of posts, take a bearing of the direction in which you are faced, proceed in that direction as carefully as possible for one-half mile or about 15 minutes.

Place a marker here. This is the starting point for the players. Then, add a 180° to your bearing if it is below 180°, or subtract 180° from the point if it is above 180°. This is your back bearing — the direction from the point where you now are to the post from which you set out — and the bearing participants are to follow to reach the correct spot.

Each player is provided with a compass, is given a bearing to follow and sets out on a half mile course, a margin of 100 feet must be allowed for unavoidable errors. This means that any participants hitting the road between 3 and 5, if your original post was no. 4, scores a possible 100 points.

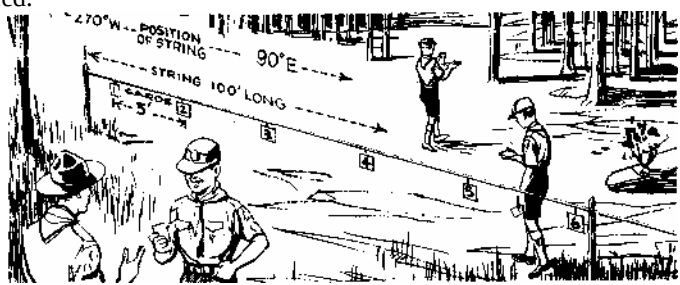
Compass Competition

Here's a good way to train in following compass bearings and measuring distances by walking.

All participants need to know the length of their step. So mark off the distance of 200 feet on the ground over which the participants can walk to determine the length of their steps.

Compass course for the competition consists of 20 markers placed at 5 feet apart on a straight magnetic east-west line. Number the markers consecutively from 1 to 20, with no. 1 on the most westerly marker.

Each participant is provided with a compass and with an instruction card telling him at what mark to start and how to proceed.

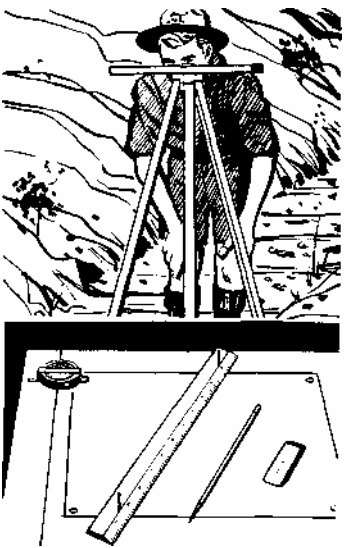


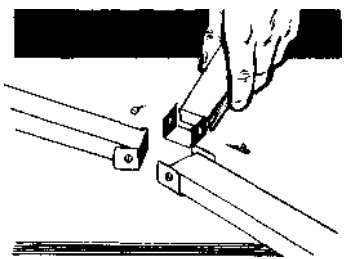
Here's an example of the instructions.

Start at point 1.
Go 36° for 122 feet.
Then 149° for 58 feet.
Then 235° for 86 feet.
Then destination reached:

LET'S MAKE A MAP

One of the best ways of making a map is with a plane table. This is just a flat surface put up on legs. You can make your own according to the suggestions in the drawing. Attach 3 legs, about 4' long, to bottom of 1" thick board 12" x 14". Use hinges or strips of brass bent into U-shape and brass screws, or make leather hinges. On top of table hold compass in position with a strip of brass. Draw line directly under centre of compass parallel with table edge. This is magnetic north checking line.





For sighting you need a sight ruler, an "alidade". Use an ordinary ruler with 2 finishing nails driven in at either end and same distance from edge of ruler.

You need a compass to determine and check directions; your legs to pace off distances; pencil to draw in details; paper, thumb-tacks and a couple of straight pins.

There are three D's to map-making: direction — distances — detail.

Here's how to make a plane-table map. Pick a suitable point on the paper for your starting point and call it station 1. Place

your plane table here on a level position so that the compass needle lies directly north-south on the checking line. If, for instance, the area you want to map lies to the north-east, you will mark the starting point close to the south-west corner or lower left hand of your paper. Place a pin in the table at the starting point and push the left edge of the sight ruler against it.

First piece of road that you want to map lies before you so you take your first sight. Sight over the nails with the sight ruler towards the spot where the road bends. Station 2 is where you will be taking your next sight. Keeping the edge of the sight ruler against the pin, line up the tops of the two nails on it so that they are in a direct line towards the road bend. Then draw the first line or ray on the paper, from station 1 towards station 2.

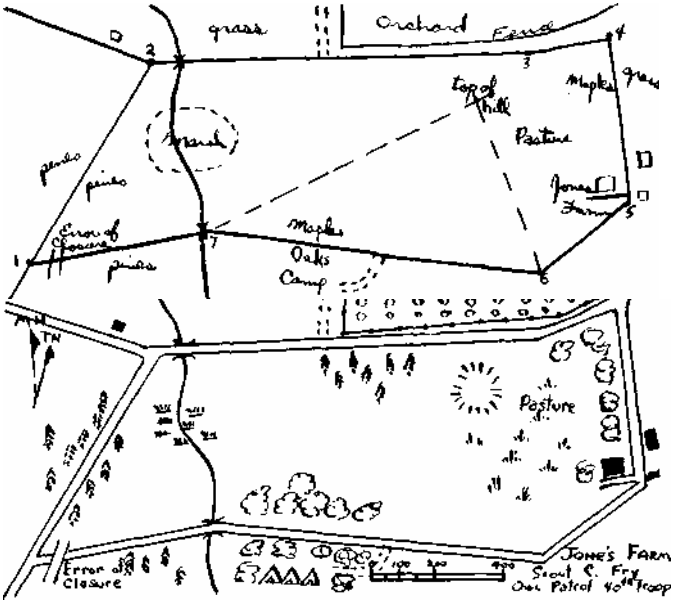
Pick up your plane table and measure by walking the distance between station 1 and station 2.

Let's say there are 80 paces to station 2. These 80 paces we turn into a suitable scale for your map. A good scale is one inch to 40 strides. Using that scale, 80 paces is two inches. Measure two inches along the line on your map from station 1 and make a pencil mark here to indicate station 2.

Put up the plane table and orient. This is done by back sighting: place a pin in the point indicating station 2. Push the sight ruler up against this pin and sight backwards to your first station. Then check on the compass. The needle should run north-south along the checking line. If it doesn't, the table should be further adjusted.

Now, change the position of the sight ruler so that it points to the next turn in the road, station 3. Push the left edge up against the pin marking station 2, sight station 3, draw in the course, pace off the distance, measure it on the map, put up the plane table again on station 3, back-sight it, check it with compass then sight toward station 4.

Proceed in this manner until you come to the end of the road, or until the road has brought you back to your starting point.



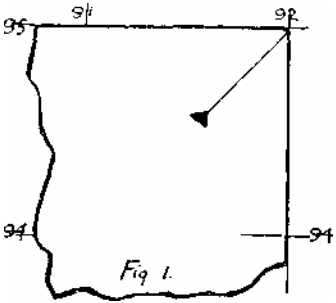
To put in detail, begin at the starting point and go over the course, and as you go draw in pencil map symbols for buildings, roads, paths, bridges, streams, woodlands, marshes, etc. Distances to these details that lie along your map should be measured. Do not measure distances to details that lie outside your map. Judge the distance and put in the appropriate signs.

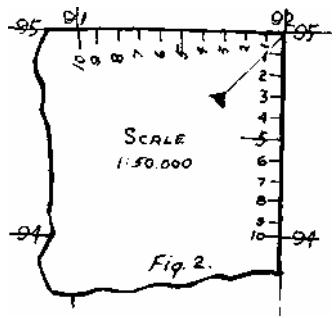
Remember that a map is of little use without the names of the area covered, north indication and scale.

Letter in the names of villages, streams, forests, etc. Finally, write on the map your own name, the name of your patrol, number of your troop and date on which the map was made.

Put in the magnetic north arrow.

MAKE A "ROMER"



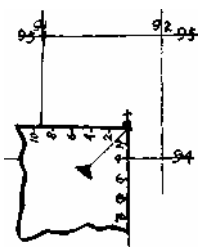


Estimating the third figure of a map reference is quite easy. Sometimes, however, particular accuracy is essential and this is where a "romer" comes in handy. You can also use it to read map references. Here's how to make your own "romer".

Take a piece of stiff cardboard and fit it exactly into the upper right hand corner of any grid square on your map and mark off on each edge the spot where the first grid line crosses, (figure 1)

Divide these distances along top and right side into tenths and number 1 to 9 starting with 0 at square corner, (figure 2)

Write on the "romer" the scale of the map for which it is to be used.



To use, place the square corner on the point you wish to give or find map reference for with edges parallel to side of grid squares. Read scale where cut by grid lines, (figure 3). This reading is 919944. Remember to read across (Easting) and up (Northing). Go in the door and then upstairs is an easy way to remind yourself.

Answers to conventional signs quiz: (page 4)

1. county boundary
2. provincial boundary
3. historical site
4. class A road
5. class D road
6. class C road
7. class E road
8. river
9. lake
10. lock
11. bridge
12. bridge
13. bridge
14. cemetery
15. church with cemetery
16. telegraph or telephone line
17. single track railway
18. bench mark (219.6 ft. above sea level)
19. mine or pit
20. horizontal control point
21. river
22. station
23. embankment
24. trail
25. sand or gravel pit

Answers to map reference quiz: (page 10)

a. 577378 b. 570366 c. 595362

d. transformer e. radio tower f. church

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