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MAPS: CONCEPTS AND SKILLS

It happened only yesterday, I was passing through a road crossing, when I saw four-five foreign tourists studying the map of Delhi stretched on their palms very carefully at the crossing. Inquisitively I stopped to see what they were doing. I saw them looking for a place on the map. Once they located it on the map, they marked the route on it and started walking towards it. As soon as they left, I went on my way. Little further I met another person new to the city, who inquired from me the way to the Red Fort. After explaining him how to reach the Red Fort. I thought for a moment that if this person also had a map. He could also locate places of his destination. Maps, as you know play a very useful role in our daily life. We use variety of maps in our day to day life. We will study about maps, usefulness, history and types in this lesson. We will also study about certain elements of map such as scales of the map, latitudes and longitudes, distance and directions on the map. Maps also have conventional signs and symbols. Map reading calls for certain skills, which you will be able to acquire after studying this lesson.

OBJECTIVES

After studying this lesson, you will be able to:

- define a map;
- explain multifarious uses of maps in various walks of life;
- describe history of map making in India;
- state elements of a map and their usefulness;
- identify different types of maps;

- identify directions on the map;
- explain the importance of scale and the different ways of representing them on a map;
- construct a linear scale;
- explain merits and demerits of each type of scale;
- locate places in the world with the help of latitudes and longitudes;
- establish relationship between longitude and local time of a place;
- differentiate between topographic sheets, wall maps and atlas maps.

1.1 WHAT IS A MAP?

A map is the two dimensional (length and breadth) representation of the earth's surface or a part of it, drawn with the help of conventional signs and symbols, to a scale on a flat surface. The scale is the most important element of a map. This means that the actual area represented on the map is much larger than that is shown on the map but at the same time, it is proportionate in every detail to the original surface. The ratio between the distance on the map and the actual distance on the ground is the scale of the map. You will study about scale of the map later in this lesson.

> A map, firstly is the representation of the earth or its part and, secondly, it is drawn to a scale.

1.2 IMPORTANCE OF MAPS

A map at a glance gives so much information which if written in words would cover several pages. Maps have been in use since ancient times. In recent years, their importance has increased manifold. The advancement in the field of transport and communication has made our world smaller and men have become more mobile. Hence our dependence on maps has increased tremendously. In this connection, J.B. Harley, a renowned Cartographer stated the following about the utility of maps:

"A map says to you
Read me carefully,
Follow me closely,
Doubt me not,
I am the earth in the palm of your hand
Without me you are alone and lost."

Now let us discuss the importance and use of maps to the people from different walks of life.

Patwari or *Lekhpal* uses maps to solve disputes of farmers regarding their land properties. Maps are used by tourists. Now a days, newspapers also give maps along with their news showing the place where a particular incident took place. Television newscast also shows maps along with their news lines. Engineers, before constructing any building, bridge or a road, prepare a map or plan of the same. No construction is taken up without a map or plan. Soldiers also use maps to plan their war strategies. Historians also require maps to show the extent of an empire, sites of archaeological excavations, routes of expeditions etc. Economists need maps to plan projects for the development of a country. Drivers and navigators use maps to find their way to unknown areas. Since ancient times, traders have been using maps to find out new trade routes and markets for their goods. Industrialists take the help of maps in selecting a place for setting up an industry. Politicians and Administrators use maps to plan and co-ordinate the project works in their areas. Maps are also required for maintaining peace and harmony in the world. Maps are the basic tools of geographers. Geography is incomplete without maps. Geography books studded with beautiful maps help learners to understand the subject better.

1.3 HISTORY OF MAP MAKING IN INDIA

The modern map making in India began after the arrival of Europeans in India. Till the beginning of the nineteenth century, the maps of India has been based mainly on route surveys, military or otherwise. With the advancement in the science of map making and the improvement of the instruments used, map maker discover ways to prepare accurate and perfect maps based on various ways of surveys. The scientific map making efforts started with the inception of the survey of India in 1767, during British rule. In those days making of land record become important to collect revenue from the landowners. Hence, the East India company appointed James Rennell as the first Surveyor General of India in 1767. Later on, he was said to be the father of the Indian Surveys. Today all the maps are to be authenticated by the Survey of India, if it is not prepared by itself as it is the mouth piece of government decision. Its headquarters is located at Deharadun.

The pioneering work of the National Atlas and Thematic Mapping Organisation (NATMO) is also commendable. It surveys the area, prepares the map and provides authentic information to the common people through maps. Its headquarter is located at Kolkata.

It is the age of science and technology, which have helped all in preparing maps with less involvement of money having very accurate and time efficient.

In this regard, National Remote Sensing Agency (NRSA), Hyderabad is the pioneering organization in India. It uses the digital data received from satellite to prepare maps. Other concerned agencies like India Meteorological Department (IMD), Pune; Geological Survey of India (GSI), Dehradun etc. are important among various organiastions. These institutions prepare maps for their concerns.

- Can you think of some more uses of maps?

1.4 TYPES OF MAPS

Today, different types of maps are prepared to fulfill varying needs and functions. To understand them, it is better to classify them first. Maps can be classified into two categories:

(a) According to scale

(b) According to functions

(a) CLASSIFICATION OF MAPS ACCORDING TO SCALE

According to scale, maps are of four types:

(i) Cadastral maps

(ii) Topographical maps

(iii) Wall maps

(iv) Atlas maps

(i) Cadastral Maps

Cadastral maps are drawn on a very large scale to show accurately the extent and measurement of every field and plot of lands as well as properties and buildings of individuals. These maps are accepted as legal documents for local administration, levying taxes, management of estates and for defining boundaries of properties.

(ii) Topographical Maps

Topographical maps depict both natural and man-made features. Topographical maps are also prepared on large scale but their scale is smaller than that of cadastral maps and larger than that of atlas maps. Therefore, it is easier to depict both natural and man-made features such as plateaus, drainage, forests, roads, railways, canals, villages, cities, bridges, and telegraph lines etc. Surface height is shown by contours in these maps. Any feature shown on the map can be recognised on the land surface by its shape and location. As these maps are drawn on a smaller scale than the cadastral maps, the boundaries of any property or building cannot be shown by them. Topographical maps are very useful for engineers, scientist, soldiers and geographers. These maps help in studying the regional geography of the area in detail.

(iii) Wall Maps

Wall maps are general maps with bold letters and lines depicting a large area. They may show relief, elements of climate, vegetation, population, trade routes, major cities etc. Like wise natural and man made features are also shown on them. These maps are very useful for teaching in the classrooms because they can be hung on the wall and can be read from a distance. In tourist offices and information centres large wall maps are very useful for providing at a glance general information to tourists and travellers.

(iv) Atlas Maps

Atlas maps are drawn on yet smaller scale. Atlas maps represent a bird's eye view of a large area. They represent a fairly large area. Therefore, they do not depict as many details as shown in the topographical maps. Even then, the atlas maps serve as a graphic encyclopaedia of geographical information about different parts of the world. They give information about the geographical location of continents, countries and states. They also represent relief, climate, soils, vegetation etc. and distribution of crops, minerals and population of different countries and states on separate sheets. These maps help us in understanding the major economic activities as well as political events discussed in daily newspapers.

(b) CLASSIFICATION OF MAPS ACCORDING TO FUNCTIONS

The second classification of maps is based on their functions, objectives or descriptions. On the basis of functions maps can be classified in two types: Physical maps and Cultural maps. These physical and cultural maps can further be sub-divided on the basis of the information depicted on them.

Maps according to Functions

- Physical
  - Geology
  - Relief
  - Climate
  - Vegetation
  - Ocean depth
- Cultural
  - Population
  - Language
  - Economic
  - Commercial
  - Industrial
  - Historical
  - Tourist

1.5 DIRECTIONS ON THE MAP

The directions on the map is shown with an arrow pointing to the north. Sometimes, there is no arrow mark on the map. In such maps, ordinarily, north is towards the top. Just opposite to it is south. Towards the left is west and towards the right is east. In the right hand corner of the map there is north-east and just opposite to it is the south-west direction. In the same way in the left hand corner is north-west and just opposite to it is the south-east direction. (see fig. 1.1)

Fig. 1.1 Directions on the map

1.6 GEOGRAPHICAL NORTH AND MAGNETIC NORTH

If you carefully see the lower margin of a topographical map you will find geographical north and magnetic north drawn on it. Let us try and understand what they are.

There is a little difference between geographical north and magnetic north. Geographical north is that direction which is determined by the geographical location of North Pole. As you know Pole Star is just above the North Pole. Therefore, in the night, geographical north can easily be located by finding the Pole Star. The direction indicated by Pole Star or North Pole is considered as north direction or geographical north.

The magnetic north is the direction in which the needle of the magnetic compass points. The magnetic north pole is not a permanent point. It keeps on changing its position from place to place and from time to time. Presently (2006) the magnetic north lies between the islands of Forden and Ellef Rengnse in the north of Canada.

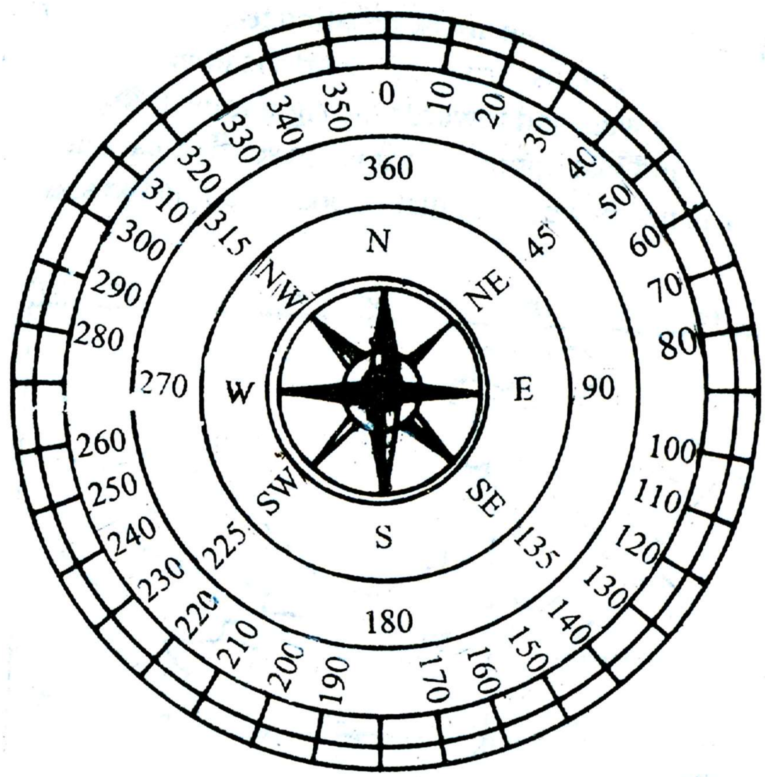


Fig. 1.2 Dial of magnetic compass

- The four main directions are North, South, East and West.
- Geographical North indicates the true direction of the North Pole.
- Magnetic North indicates the direction to which a magnetic compass will point. It changes its position with the passage of time.

1.7 MAP SCALE

If a map is to be of any use it must be an accurate representation of the surface of the area it shows. There are two basic factors involved-the size of the paper on which the map is to be drawn and the size of the area of the land to be drawn. If you were asked to draw a map of the world on a piece of paper and a map of your room on another paper of the same size, the details that you can show on both the maps will differ. On the world map you will show a city of five million people with a dot and on the map of the room you will probably be able to show all the furnitures etc.

The amount of detail you can show on a piece of paper is determined by the scale of the map. A map that can show a large area but not in detail is called a small scale map. A map that can show much more detail of a small area will be called a large scale map.

- A small scale map means that the map will show a large area but not in much detail e.g. a map of world.
- A large scale map means that the map will show much more detail on the map of your locality.

WHAT IS A SCALE?

We all know that all maps are drawn to scale. The scale is the ratio between the distance of any two points on a map and the actual distance between the corresponding points on the ground. In other words, scale is the ratio between the distance on the map and the actual distance on the ground which is represented on the map. Therefore, when we say one centimetre represents one kilometre, we mean that the distance of one centimetre between any two points on the map corresponds to a distance of one kilometre between the same points on the ground.

- Scale is the ratio between the distance of any two points on the map and the actual distance between the corresponding points on the ground.

1.8 TYPES OF SCALE

If you open your atlas, you will see at the bottom or on the side of any map given there the scale of the map. It may be shown in different ways. Now we will study the different ways of representing scales on maps.

The scales are expressed on the maps in three different ways:

(i) By a statement

(ii) By a Representative Fraction, and

(iii) By a Graphic scale/Linear Scale

Let us now see what each one of them stands for and what are their merits and demerits.

(i) BY A STATEMENT

In this method, the scale is expressed in words. For example one centimetre to one kilometre. This statement means that a distance of one centimetre on the map represents a distance of one kilometre on the ground.

Merits

1. This method is very easy and simple.
2. It is easy to understand.
3. It is easy to use.
4. Its conversion is easy into other forms of scales.

Demerits

1. A scale represented by this method can be used only in those countries in which the unit of measurement used in the statement are followed. for e.g. Kilometres or miles.
2. In this method the difficulty arises when one wants to convert one unit of distance into another unit of distance.
3. It becomes incorrect when the original map is enlarged or reduced.

(ii) BY A REPRESENTATIVE FRACTION OR R.F.

This method of expressing a scale is commonly called a Representative Fraction or R.F. In this method, the distance on the map and the corresponding distance on the actual ground are given in the same unit of measurement. The numerator and the denominator of the fraction are given in the same unit of measurement. The numerator of the fraction represents the distance on the map and the denominator represents the actual distance on the ground. Therefore, representative fraction is written as:

$$\text{R.F.} = \frac{\text{Distance between two points on the map (map distance)}}{\text{Distance between the corresponding points on the actual ground}}$$

POINTS TO REMEMBER

1. The numerator of the fraction is always one, while the denominator keeps on changing, as:

   1/1000,000 or 1: 1000,000

   1/63,360 or 1 :63,360

   1/2500 or 1 :2,500

2. The numerator and the denominator of the fraction represents the same unit of measurement. The unit may be used in centimetres or inches or any other unit.

   1/1000,000 may mean one centimetre = 1000,000 centimetres or one inch = 1000,000 inches.

Notes

1/2,500 may mean 1 centimetre = 2500 centimetres or 1 inch = 2500 inches.

1/63,360 may mean 1 inch = 63,360 inches or 1 centimetre = 63,360 cm.

3. The numerator always represents the distance on the map and denominator always represents the ground distance for example 1/1,000,000 means that a distance of one centimetre on the map represents a distance of 1,000,000 centimetres on the ground.

Merits

1. The most significant advantage of this method is that a map drawn on this type of scale can be understood universally.
2. Due to the above advantage, countries of the world using different units of measurement find no difficulty in using this method of scale.
3. It remains correct even if a map is enlarged or reduced.

Demerits

1. Representative fraction is a difficult method of representing the scale.
2. A common person cannot easily understand the scale represented by this method because the conversion of the smaller unit of measurement into the larger unit of measurement involves multiplication and division.

- In Statement of scale, the scale is expressed in words, such as, one centimetre to four kilometres.
- In Representative Fraction, the distance on the map and the distance on the ground are shown in the same unit of measurement.
- The numerator of this fraction represents the distance on the map and the denominator represents the actual distance on the ground.

(iii) LINEAR SCALE

A linear scale is represented by a straight line which is divided into a number of equal parts. The main divisions are called primary divisions and the sub-divisions are called secondary divisions. The scale is divided in such a manner that the distances on the map can be easily measured in terms of actual distance on the ground.

Merits

1. In this method, the distance on the map can be directly and easily read in terms of the distance on the ground.
2. The scale has the advantage of remaining true even after enlargement or reduction of a map.

Demerits

1. This scale can be understood only by those people who are familiar with the units of measurement used in the scale.
2. It is difficult to draw this scale.

Linear scale is represented by a straight line which is divided into primary and secondary divisions.

INTEXT QUESTIONS 1.1

1. What is scale?

   ____

2. Name three methods of representing the scale on the map.

   (i)________________(ii)________________(iii)________________

3. On which type of scale are the map distances and the ground distances shown in the same units of measurement?

   ____

4. Which type of scale is expressed in words?

   ____

5. Name the scale represented by a straight line.

   ____

1.9 CONSTRUCTION OF A LINEAR SCALE

For constructing a linear scale, a line is drawn with the help of arithmetical calculations, based upon the statement of scale. If the scale of the map is represented by R.F., the fraction is first converted into a statement scale. The most important aspect to remember in this is that the units of measurement should be shown in round numbers. The straight line is divided into required number of divisions. For convenience, the primary divisions are shown on the right hand side of the zero while secondary divisions (sub-divisions of the first primary division) are marked to the left side of the zero mark. (see fig 1.3)

POINTS TO REMEMBER WHILE DRAWING THE LINEAR SCALE

While drawing a linear scale, the following points should be kept in mind:

1. The length of the scale should be sufficient so that distances represented on the map can be read easily. Generally, the line is about 12 centimetres to 20 centimetres long.

2. The primary divisions in the scale are marked in round figures so that it can be easily further divided into secondary divisions.

3. Zero is marked leaving the first left hand side primary division. The divisions on the right hand side of the zero mark are called primary divisions. The left hand side division is sub divided. These smaller divisions are called the secondary divisions. (see fig. 1.3)

4. The width of the linear scale should be less than half a centimetre.

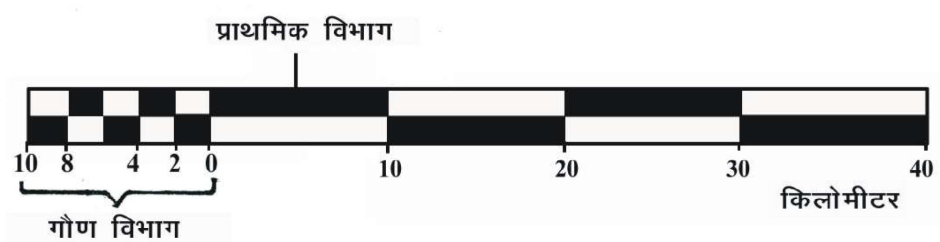


Fig. 1.3 Linear Scale

EXAMPLE

The R.F. of a map is 1: 10,00,000. Convert it into the statement of scale and draw a linear scale on which a distance of 125 kilometres can be read easily.

SOLUTION

The first step will be to convert the R.F. into the statement.

Convert the denominator 10,00,000 centimetres into kilometres.

Since one kilometre is equal to 1,00,000 cms, divide 10,00,000 centimetres with it to get kilometres.

$$\frac{1,000,000}{1,00,000} = 10\,\text{kms}$$

Thus the statement of the scale is 1 cm. to 10 kms.

Now calculate the length of the linear scale in the following manner:

Since 1 cm on map represents 10 kilometres on the ground, therefore 15 centimetres on map will represent 15 x 10 = 150 kms. on the ground.

Now draw a straight line of 15 centimetres and divide it into 15 equal parts by geometrical method.

Thus, one primary division of the scale will represent a distance of 10 kms. on the ground. Divide the first primary division on the left hand side into two parts and each of these secondary divisions will represent 5 kms. In order to read a distance of 125 kms. on this scale, add one secondary division i.e. 5 Kms and 12 primary divisions i.e. 12 x 10 = 120 Kms. This total length of the scale will represent a distance of 125 kms. i.e. 120 + 5 (see fig. 1.4).

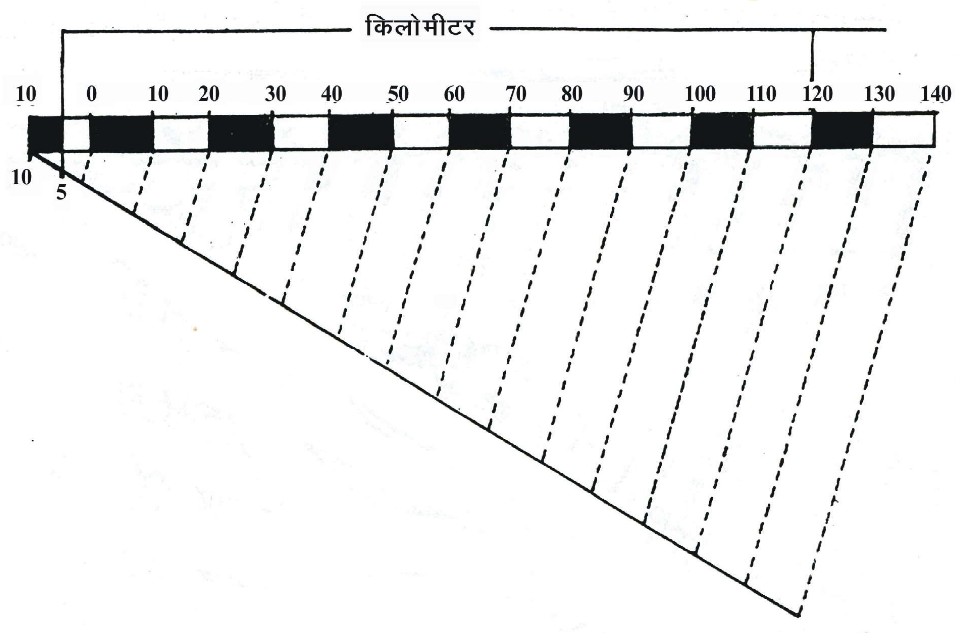


Fig.1.4 A Linear Scale representing one hundred twenty five Kilometres

- Do you know how to divide a straight line into equal parts by geometrical method. If you don't know we have given it as Enrichment Material at the end of the lesson.

Notes

INTEXT QUESTIONS 1.2

Fill in the blanks with suitable words/figures from those given in the brackets:

1. On a linear scale we show_________________________numbers. (whole/fractions)

2. The larger divisions on the linear scale are called the____________________divisions. (primary/secondary)

3. The secondary divisions on a linear scale are shown on the____________________hand side. (right/left)

4. A line of 15 cms. length represents 150 kms. It is divided into 15 primary divisions. A primary division is further divided into two secondary divisions.

   Then

   (i) Each primary division represents ________________kms. (15/10)

   (ii) Each secondary division represents _______________kms. (3/5)

1.10 LATITUDES AND LONGITUDES

If you look at any map in your atlas, you will find it divided into squares by lines. These lines are called grids. The lines which are drawn from east to west direction are called parallels or lines of latitudes and lines which are drawn from north to south direction are called meridian or lines of longitudes. With the help of these two types of lines, we know the exact location of a place, area, or any particular feature. Hence, the knowledge of these lines is essential for the study of a map.

(a) Latitudes

You know that there are two basic points of reference - North and South Poles on the earth. The imaginary circle drawn around earth exactly halfway between the two poles is called the equator. Equator divides the earth into two equal hemispheres. These are Northern Hemisphere and Southern Hemisphere. Imaginary circles drawn parallel to the equator in both the hemispheres are called parallels or lines of latitudes. All the parallels or latitudes except the equator go on becoming smaller towards the poles where each pole in reality is no more than a mere point. Latitudes run always in the east-west direction. Parallels of latitude intersect the longitudes at right angle. Many parallels of latitude can be drawn on a globe. Hence, any point on the globe is located on one or the other latitude. (see fig. 1.5)

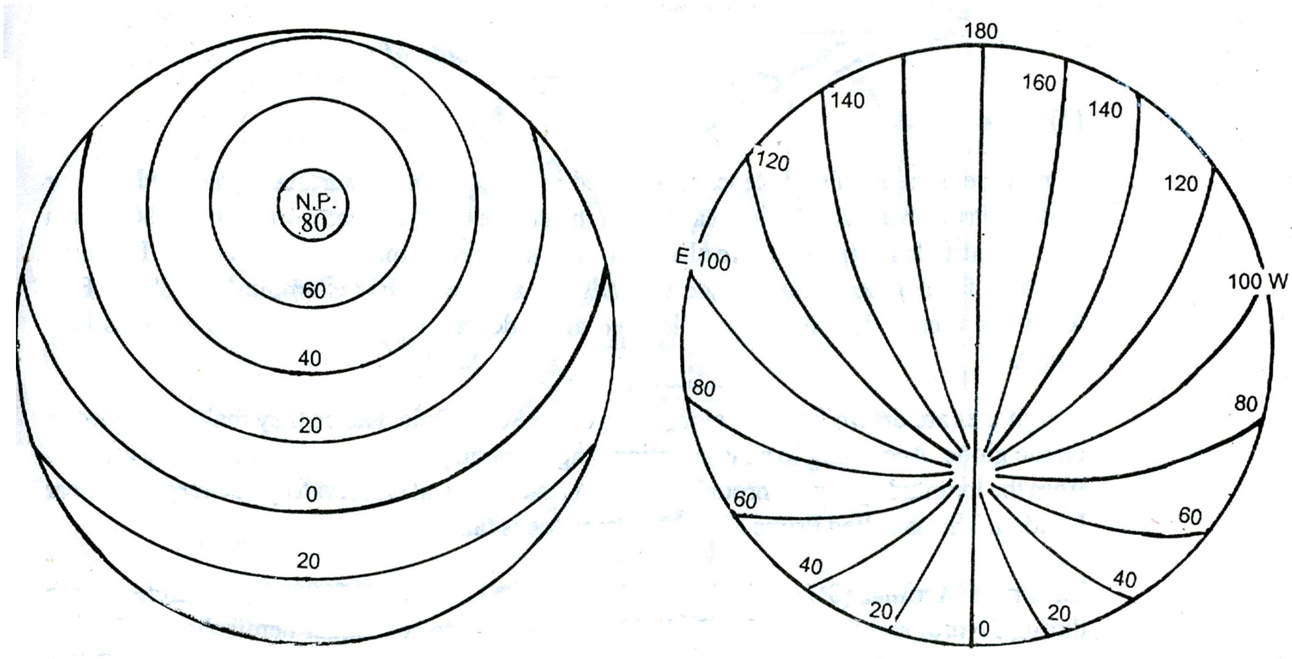


Fig. 1.5 Parallels of Latitude and Maridians of Longitude

The angular distance of any point located on the earth's surface in the north or south of the equator is called the latitude of that point. The angular distance is calculated from the centre of the earth to the longitude of that place in degrees, minutes and seconds. The symbol used for degrees is a small circle put above the figure e.g. 8°. The symbol for minute is (') and for seconds (") for example 8° 12'33" North latitude. This means that this place is located to the north of equator at 8 degrees, 12 minutes and 33 seconds.

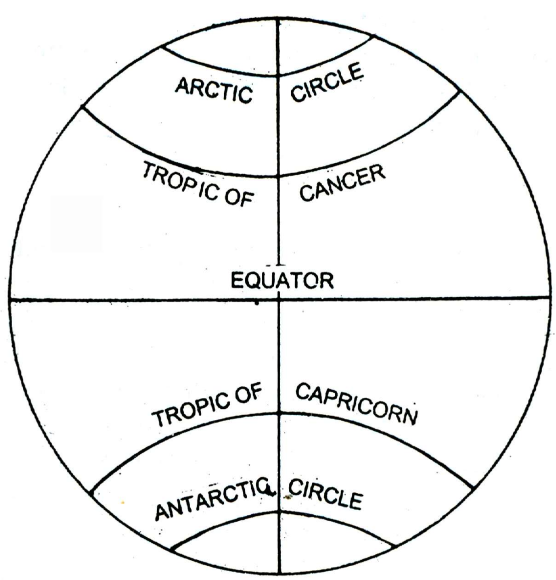


Fig 1.6 Major parallels of latitude of the earth

The Equator is zero degree (0°) latitude. North Pole is at 90° north and South Pole is at 90° south. These two poles are merely points and not circles. Tropic of Cancer is at 23° 30' north latitude. The Tropic of Capricon is 23° 30' south latitude. Arctic Circle is at 66°30' North latitude and the Antarctic circle is at 60°30' south latitude. (See fig. 1.6)

(b) Longitude

Longitude is an angular distance measured in degrees on the surface of the earth east or west of Prime Meridian. It is measured at the centre on the equator from 0° to 360°. As in case of latitudes, longitudes are also measured in degrees, minutes and seconds. The same symbols for degrees, minutes and seconds are also used. For example 15° 18' 35" East longitude means that the place is located at 15 degree, 18 minutes and 35 seconds East longitude.

Longitudes are drawn from the North Pole to the South Pole. Hence they make semi circles on the globe. According to an international agreement, meridians of longitude are counted from the longitude passing through the Old Royal Astronomical Observatory at Greenwich, near London. This is called Prime Meridian. Its value is taken to be 0°.

The Prime Meridian (0° Longitude) together with the Longitude of 180° form a circle passing through North and South poles. It divides the earth into two equal hemispheres- Eastern Hemisphere and Western Hemisphers. 180° longitudes can be drawn to the east of the Prime Meridian at a regular interval of one degree each. The value of each degree in this case is followed by the letter E indicating that all belong to the Eastern Hemisphere. Similarly at the same regular interval of 1^0 each other 180^0 longitudes can be drawn west of the Prime Meridian. In this case the value of each longitude is followed by the letter W to indicate that they all belong to Western Hemisphere. However to maintain the neutrality of the 0^0 and 180^0 longitudes (being covered in both the hemispheres), no letter either E or W is written against them. The actual distance between any two consecutive longitudes is the largest at the equator and it goes on decreasing till it becomes zero at the Poles.

- The angular distance of any point on the surface of the earth located north or south of equator is called a latitude.
- There are five major parallels of latitude viz. Equator, Tropic of Cancer, Tropic of Capricorn, Arctic Circle and Antarctic Circle.
- The angular distance measured in degrees on the surface of the earth east or west of the Prime Meridian is called longitude.
- The longitude passing through the Royal Arstronomical Observatory at Greenwich near London is called Prime Meridian. It is 0^0 longitude.

INTEXT QUESTIONS 1.3

Tick the correct alternative for the statements given below:

1. Which of the following is true of lines of latitude?

   (a) They are great circles.

   (b) They are numbered from 0 to 180.

   (c) They are circles on a globe which are parallel to the Equator and which are to the north and south of the Equator.

   (d) They are concentric circles numbered from 0 to 90.

   (e) They are semi-circles on a globe.

2. Which of the following statements best describes longitude?

   (a) An imaginary line on the Earth's surface joining the North and South Poles.

   (b) The angular distance east or west of the Greenwich Meridian.

   (c) The distance of a place east or west of the Greenwich Meridian.

   (d) The position of a place on the Earth's surface with reference to the Prime Meridian.

   (e) A line on a map that cuts the Equator at right angles.

(c) Longitude and Time

There is direct relationship between longitude and time. If we know the one we can find out the other with simple mathematical calculations.

(i) Local Time

Time, calculated according to the position of the mid-day sun at a given place on the earth's surface is called its local time. The noon of a given place is determined when the sun is at its highest point in sky and consequently the shadows for that day are at their shortest. At this point of time a watch is set to show 12 O'clock of the noon. The time shown by such a watch is taken to be the local time of the place. Due to the rotation of the earth on its imaginary axis, the places on the same meridian will have the same local noon time, although the timings of sun-rise and sun-set would vary from latitude to latitude according to the varying durations of the day. It remains exact on Equinoxes i.e. 22^{nd} March and 23^{rd} September. However, the places located east or west of this longitude will show different local time. Due to rotation of the earth from west to east, the local time of the places located in the east will be ahead whereas the local time of the places in the west will be behind at the rate of 4 minutes per degree or 1 hour per 15 degrees.

(ii) Greenwich Mean Time (G.M.T)

The local time of 0° Longitude is called Greenwich Mean Time or GMT. This is also the standard time for the United Kingdom.

DETERMINING TIME WITH THE HELP OF LONGITUDES OF DIFFERENT PLACES

The earth completes one rotation in 24 hours. Since the earth's circumference consists of 360 degrees, the earth covers 15 degrees in one hour. Likewise the earth can be said to cover each degree of longitude in 4 minutes. The places lying to the east of the Prime Meridian i.e. 0° Longitude are always ahead of the Greenwich Mean Time since the earth rotates from west to east. For the same reasons places lying west of the Prime Meridian lag behind the G.M.T. For instance 1^0E longitude will have its local time 6:04 a.m. when it is 6:00 a.m. at London as per G.M.T. A place 1^0W longitude will have 5:56 a.m., when 15°E longitude will have 7:00 a.m. (G.M.T.) and the 15°W will have 5:00 a.m. as our local time is ahead of Greenwich time, it means that our place is in the east of Greenwich.

In the same way, if we know the longitude of a place and G.M.T., the local time of that longitude can easily be calculated.

Example – If the time at London is 12 noon, then the local time of Kolkata located on 90^0 East can be calculated in the following manner.

The difference of time after 15^0 Longitudes is 1 hour

The difference after 90^0 Longitude would be $\frac{90}{15} = 6$ hours

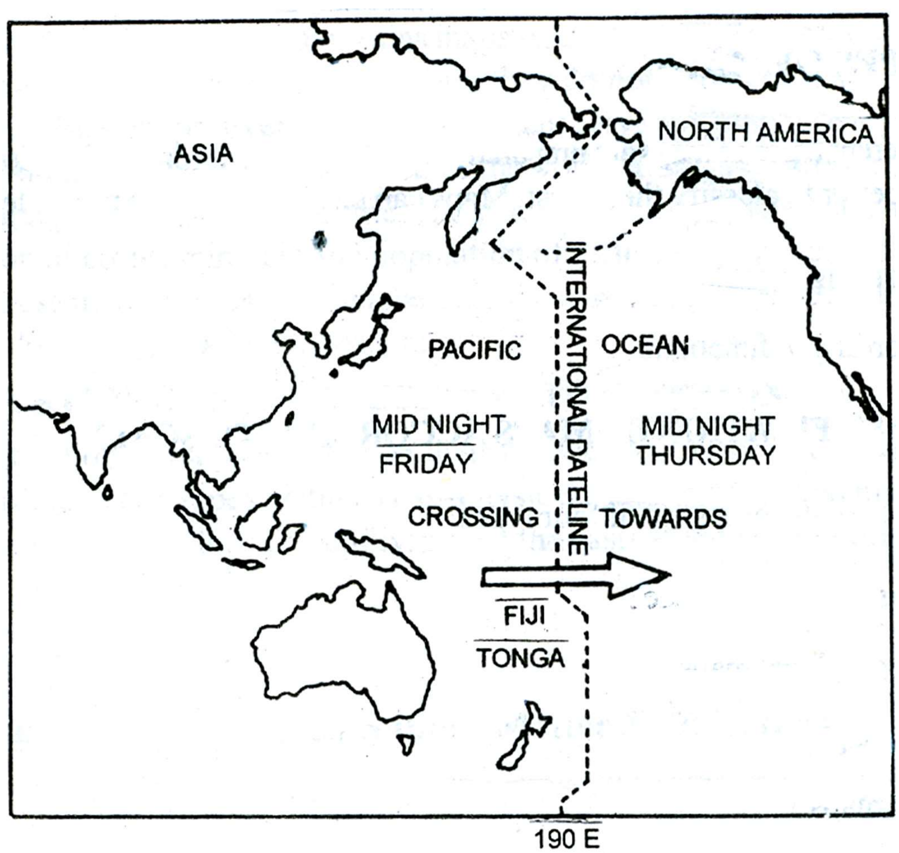
As Kolkata is in the east of London, the local time of Kolkata would be ahead of London by 6 hours. It means the local time at Kolkata would be 6 p.m.

(iii) Indian Standard Time (I.S.T.)

The longitudinal extent of our country is about 30°. Hence, the sun rises in the eastern part of Arunachal Pradesh is ahead by two hours from Dwarka located on the western tip of Gujarat state. This also means that the local time of Arunachal Pradesh is ahead of Gujarat by 2 hours. Hence, to remove this anomaly of time of different places of our large country, 82° 30' East longitude, has been selected as standard meridian for India. When there is 12 noon on this longitude it is presumed that all other places in India also have the same time i.e. 12 noon. It means that the local time of this longitude has been accepted as the Indian Standard Time. Two things are kept in mind while selecting a standard meridian. Firstly, it should pass through approximately middle of the country and secondly, it should be divisible by 15° (1 hour) or 7°30' (half on hour). 82°30' East longitude satisfy both these conditions. However, large countries like Russia, U.S.A. etc. have more than one standard meridians.

(iv) International Dateline

The international date line has been drawn mainly along 180^0 longitude. The dates are changed as soon as one crosses this line. The term international date line is self explanatory. 180^0 longitude passes through some countries and islands. Hence, to avoid confusion of two different dates on the same day in a country, international date line has been drawn in such a way that it does not pass through any island or a country. When a traveller crosses international date line, he is confused with gain or loss of a full day. To remove this confusion the travellers, going from Japan towards America, count the same day again (a gain of a full day) after crossing this line, whereas the travellers going from America towards Japan drop or lose one full day after crossing this line. (see fig. 1.7)



- Local time- The time calculated according to the position of the mid-

Notes

day sun at a given place on the earth's surface is called local time.

- Greenwich Mean Time (G.M.T.)- The local time of 0° Longitude is called Greenwhich Mean Time or G.M.T.
- To prevent the confusion created by the variations of local time, standard time is adopted. The standard meridian of India is 82°30' East and the local time of this meridian is taken as Indian standard time.
- International date line has been drawn mainly along 180° Longitude. The date is repeated or dropped on crossing it from west to east and east to west respectively.

1. If it is 12 noon in London, what will be the time at 120° East [redacted]

____

2. Along which longitude is the international date line mainly drawn?

____

[redacted] bound into a volume is called an atlas. Atlas is extremely useful in our day to day life. Student of geography always need the help of an atlas. A number of good atlas are now available in our country. Colourful maps on a glossy paper are not only a treat to the eye but are also extremely useful. However, most of us do not know how to make the best use of our atlases. Let us find out how to use an atlas.

Suppose you have to find out the location of Bikaner on the map of India. First of all you will find the entry of Bikaner under the major alphabet B of the index given at the end of the atlas. Next look for the page number, and of the state, latitude and longitude. Now open the atlas on the page mentioned and with the help of latitude and longitude you can find out the location of Bikaner. (see Fig. 1.8).

After a little practice you can findout any place on the map. We often come across many new place names in the newspapers. We can find their geographical location with the help of an atlas within no time.

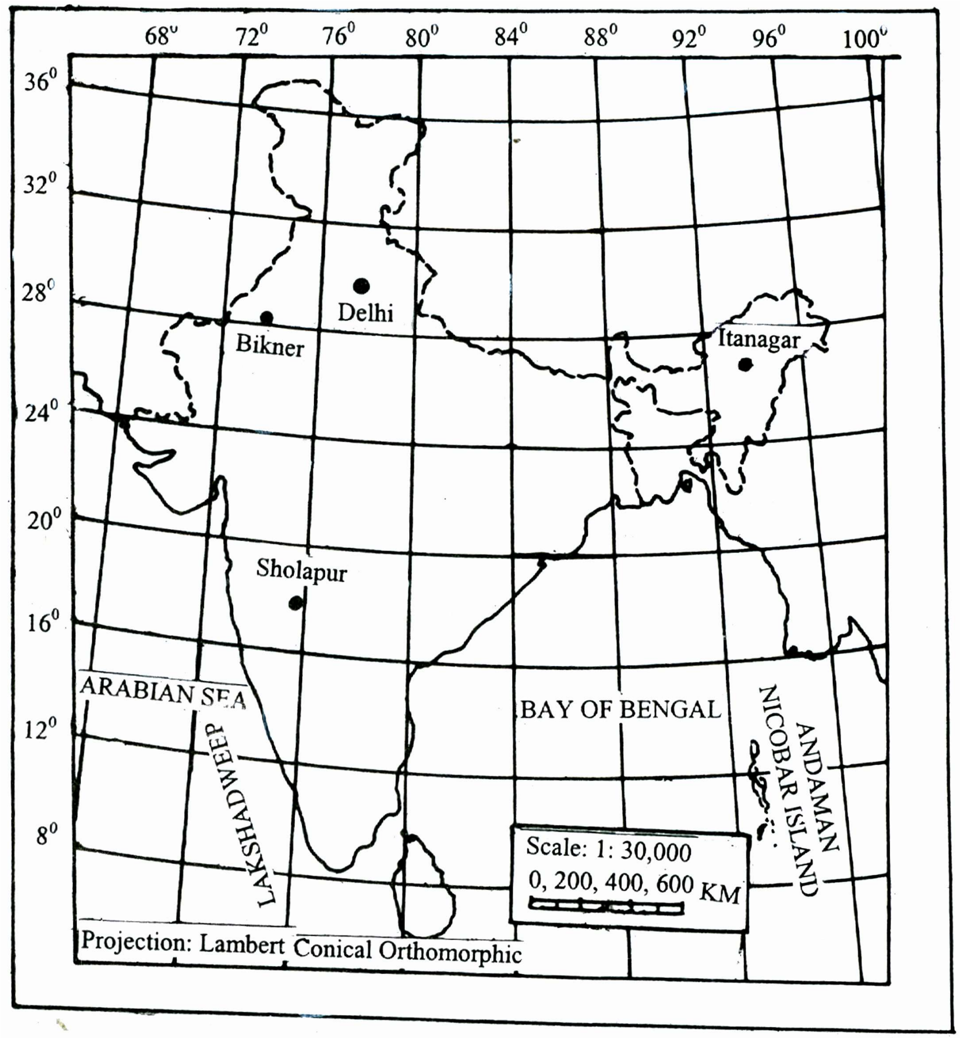


Fig. 1.8 Map of India

INTEXT QUESTIONS 1.5

1. Arrange the following towns from Rajasthan in a correct alphabetical order: Jodhpur, Bhilwara, Churu, Bikaner, Jaisalmer, Bundi and Ajmer.

   ____

2. Look at the maps of India in the atlas and complete the following table

Name of the city	Nearest latitude	Nearest longitude
1. Jaipur	__________	76° East
2. __________	29° north	77° East
3. __________	19° north	73° East
4. Chennai	13° north	__________
5. __________	27° north	81° East

EXERCISE FOR PRACTICAL RECORD BOOK

1. A car running at a speed of 45 Kilometres per hour to reaches Ghaziabad from Delhi in 20 minutes. If the distance between Delhi and Ghaziabad is shown on a map by a distance of 2.5 cms draw a graphic scale for this map and calculate the R.F. also.

2. Construct a graphic scale on a R.F. of 1:40,000 so that one can read kilometres and metres directly on it.

ANSWERS TO INTEXT QUESTIONS

1.1

1. The scale is the ratio between the distance of any two points on a map and the actual distance between the corresponding points on the ground.

2. (i) By a statement

   (ii) By a Representative Fraction, and

   (iii) By a Graphic scale/Linear Scale

3. Representative Fraction

4. Statement Scale

5. Linear Scale

1.2

1. Whole

2. Primary

3. Left

4. (i) 10, (ii) 5

1.3

1. (a) False (b) False (c) True (d) False (e) False

2. (a) False (b) True (c) False (d) False (e) False

1.4

1. 8 p.m.

2. 180^0

1.5

1. (i) Ajmer, (ii) Bhilwara, (iii) Bikaner, (iv) Bundi, (v) Churu, (vi) Jaisalmer, (vii) Jodhpur.
2. (i) 27^0N, (ii) Delhi, (iii) Mumbai, (iv) 80^0E, (v) Lucknow.

ENRICHMENT MATERIAL

MEASUREMENT TABLE

10 Millimetre	=	1 Centimetre
10 Centimetre	=	1 Decimetre
10 Decimetre	=	1 Metre
1000 Metre	=	1 Kilometre

TO DIVIDE A LINE SEGMENT IN ANY NUMBER OF EQUAL PARTS

Suppose we want to divide the line AB in 6 equal parts. Draw a line AP making acute angle with AB. Along AP mark 6 points c_1, c_2, c_3, c_4, c_5 and c_6 at equal distances using compass. Join the last point c_6 to B. From other points c_1, c_2, c_3, c_4 and c_5 draw lines paralled to c_6 B. If these lines meet AB at D_1, D_2, D_3, D_4 and D_5 respectively, they divide AB in 6 equal parts.

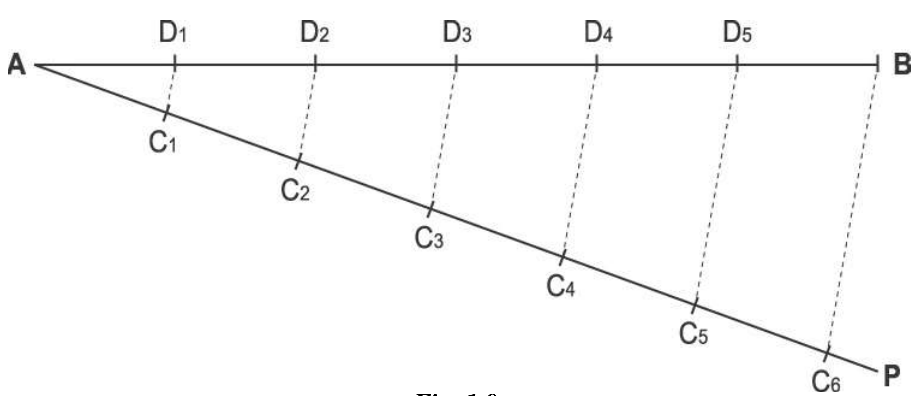


Fig. 1.9

Note that the number of points c_1, c_2 taken along AP is the same as the number of parts into which we want to divide AB.

TO DRAW LINES PARALLEL TO A GIVEN LINE

Suppose we want to draw lines through the points B and C parallel to the line AL. Draw an arc with the help of compass with A as centre meeting the lines AP at R and AL at M. Draw arcs with B and C as centres with the same radius, meeting the line AP at S and T respectively. Taking radius equal to RM, draw arcs SN and TQ with Sand T as centres. If these arcs cut the earlier arcs at N and Q respectively then the line BN and CQ are parallel to the line AL.

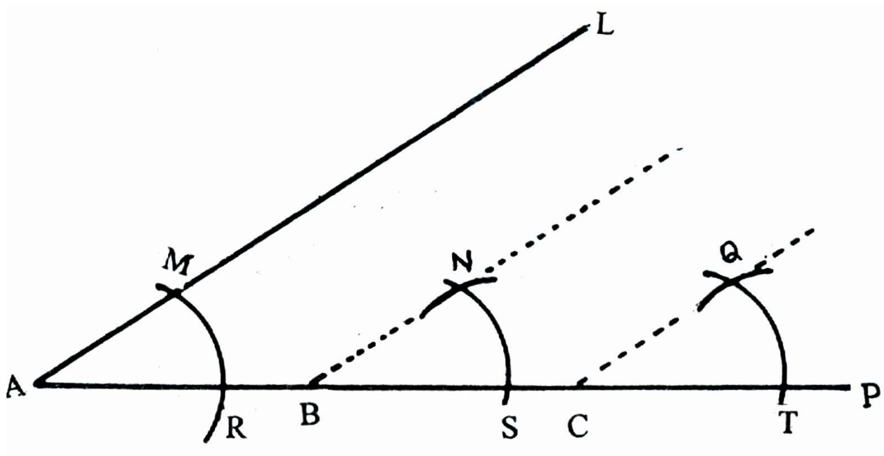


Fig. 1.10