CHAPTER 1

Globes and Maps

1. GLOBES

A globe is made either to represent the earth or the celestial bodies. The globe which represents the earth is called a *terrestrial globe* and the one which represents celestial bodies, a *celestial globe. We* shall discuss only the terrestrial globes in this chapter.

A globe is a spherical model of the whole earth. Our earth is spherical in shape. It is, therefore, a globe which represents the earth truly. A mere glance at a globe suggests that our earth is a spherical body and not flat as suggested by a map. It represents correctly all the aspects of the earth such as its spherical shape, shapes and sizes of the countries and continents, direction of one object from the other and distances. The parallels of latitude and the meridians of longitude are also correctly shown on a globe. Thus it is only the globe which represents all the earth relationships correctly.

A globe is commonly used for understanding the formation of day and night, seasons, planetary winds and climatic zones. It is also used for planning air and sea routes.

It is, however, not without drawbacks. They are as follows:

1. A globe is a spherical body. We can, therefore, see only half of the globe at a time. Thus all the continents and the oceans of the world cannot be seen at a glance.

2. A globe of sufficiently large size can give a fairly detailed information of the earth. But large-sized globes are not only difficult to construct but also difficult to handle, store and carry. Since globes are generally of small size (diameter varying generally from 30 cm. to 50 cm.) they show only very essential geographical information of the earth. A map, on the other hand, is very easy to handle, store and carry from place to place and the entire earth represented on a map can be seen at a glance.

If we construct a globe so that a distance of 10 km. on the earth is represented by a distance of 1 cm. on the globe, the diameter of the globe will be approximately equal to 12.74 metres. A globe of such a large diameter is evidently difficult to carry from one place to the other. On the other hand, we can construct maps showing ground distance of say ½ km. and even ¼ km. by 1 cm. Thus globes, no doubt, are useful, they cannot compete with maps from the point of utility.

3. The surface of the globe being spherical in shape, it is difficult to measure distances on it.

4. We have to construct the entire globe even for showing a part of the earth, whereas a map can be drawn to show a part of the earth.

Classification of Globes

Globes are classified broadly into four classes, namely political globes, relief globes, climatic globes and outline globes.

1. ***Political globes.*** As the very name suggests, they show countries of the world. The countries are shown in different colours to distinguish one from the other easily. Important towns, ocean routes, air routes, railways and roads are also shown on these globes.

2. ***Relief globes.*** These depict relief of the land as well as of the ocean beds. Elevations are shown in colour generally by altitude tints. Ocean depths and ocean currents are also given.

3. ***Climatic globes.*** These globes show temperature, atmospheric pressure and rainfall of different seasons.

4. ***Outline globes.*** These are generally of two types. The one shows the continents on black surface and the oceans and seas on blue surface. The other type is a black globe having only the parallels of latitude and the meridians of longitude. An outline globe has a matt surface which takes chalk easily.

Construction and special features of a globe

A sphere in the form of a shell is made of a metallic sheet, plaster or papier-mache. On the surface of this shell is shown the surface of the earth. In some cases the two halves of a globe are made separately with the help of a mould and joined together at the equator. On the surface of the sphere so formed a map of the world prepared in 12 globe gores (Fig. 1) is pasted carefully.

A large-sized globe can be turned on its axis. The axis of such a globe is generally metallic. Both the ends of the axis are set in a metallic ring known as a meridian ring. A small-sized globe has, however, sockets at the poles and no metallic axis. Two rivet-like metallic pieces projecting from the meridian ring and serving as pivots rest in the sockets and thus hold the globe in position.

The axis of our earth is inclined at an angle of 66½° to the plane of ecliptic (the plane in which the earth's orbit and the sun lie) and passes through the centre of the earth. As a result of this position of the axis of the earth, the axis of the globe is inclined at 23½° from the vertical. The meridian ring is mounted on a heavy metallic base.

Of late balloon type globes made of silk, rubber and plastics have been made. They assume spherical

WORLD GLOBE IN GORES

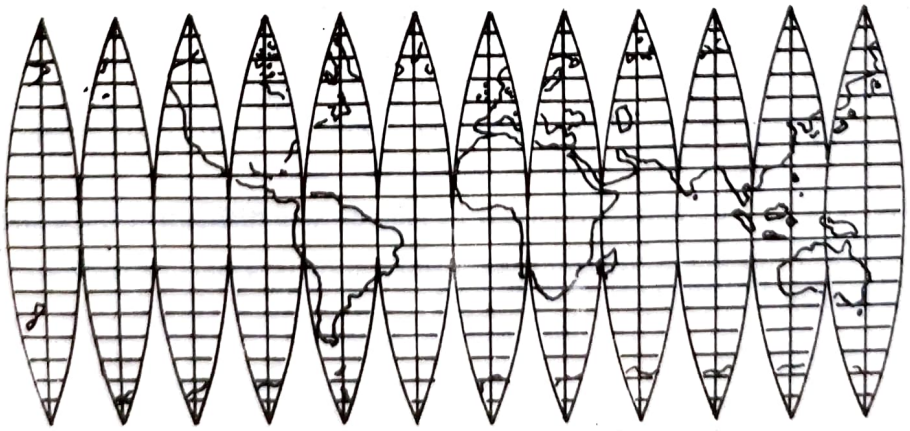

Fig. 1

shape when inflated. They are not durable and are more or less gadgets. Ecliptic circle (imaginary circle around the earth where the plane of ecliptic touches the earth) is also drawn on a globe. Like the centre of the equator, the centre of this circle passes through the centre of the earth. One half of it is, however, to the north of the equator where it reaches the Tropic of Cancer and the other half is to the south of the equator where it reaches the Tropic of Capricorn. It cuts across the equator at two points which are diametrically opposite to each other. The ecliptic circle is drawn on a globe to illustrate that the plane of the equator is inclined at 23½° with the plane of the ecliptic.

There are two small metallic dials, one at the North Pole and the other at the South Pole. The dials are free to turn around the poles and are marked with divisions showing time in hours. Either of these two dials enable us to know local time* at any one of the meridians of the globe when the local time at a particular meridian is known. To illustrate this point, bring the figure of 12 noon marked on the dial at the meridian passing through say station A where it is 12 O'clock noon. The dial in this position indicates that when it is noon at station A, it will be 1 p.m. at the meridian 15° east of this station, 2 p.m. at the meridian 30° east of this station and so on, and 11 a.m. at the 15° meridian west of this station, 10 a.m. at the meridian 30° west of this station, and so on. In other words when it is 12 O'clock noon at station A, it was 12 O'clock noon at 15° east meridian 1 hour earlier and it will be 12 O'clock noon at 15° west meridian 1 hour later. Thus the local times of stations at different meridians can easily be found out when we keep in mind that the noon meridian covers 1° of longitude in 4 minutes.

Analemma. An analemma is also drawn on a globe. It is a graph drawn in the central part of the Pacific Ocean because it offers a large patch of empty area. It looks like the figure of 8 and it lies astride the equator and reaches the Torpic of Cancer and the Tropic of Capricorn. We can determine the sun's daily declination and the daily equation of time with the help of an analemma.

II. MAPS

Though a globe represents the earth truly, it is of limited use. We, therefore, represent the whole earth or a part of it on a plane surface say, for example, a flat sheet of paper, card-board, etc. But before attempting to represent the earth on a plane surface, we decide how much ground distance in kilometres, metres, etc., should be shown by a centimetre on the plane surface, i.e. we fix a relation between the distance on the ground and the distance on the plane surface. This relation between the distance between two points on the ground and the distance between the same two points on a plane surface is called a *scale*. For example, if a ground distance of 4 km. is represented by 1 cm. on a plane surface the scale of the plane surface is 1 cm. to 4 km.

A *map* is defined as a representation to scale of the features of the whole earth or a part of it on a plane surface. Size of a map is, however, very small as compared with the size of the earth it represents. It, therefore, represents only important features of the earth.

Natural and man-made features, and district, state and international boundaries are depicted on maps by symbols called conventional signs. Distribution of population, crops, etc., are shown on maps with special symbols such as dots, circles, colours and shading. A key explaining all the symbols used on a map is appended to it. Parallels of latitude and meridians of longitude are also drawn on a map. These lines are drawn on all maps except those which show distributions. In the case of distribution maps the lines of latitude and those of longitude are marked just on the marginal lines bounding the maps and not continued into the interior of the map. The title of the map and the scale on which it is drawn are also given on it.

*The local time of a place is that time when the shadow of a vertical rod fixed in the ground at that place points towards true north that is when the sun is at its maximum height above that place.

It may be pointed out here that a *plan* and a *chart* are also maps. Distinction is, however, made between a map, a plan and a chart. A *plan* is a large-scale map on which every object of the ground is drawn to scale. For example, on a topographical map, the conventional signs representing roads, railways, wells, temples, etc., are not drawn to scale whereas on a plan they are drawn to scale. Maps used for air and marine navigation are called *charts*. A map showing weather conditions is called a weather chart in some countries. An air navigation chart also called aeronautical chart delineates landing-grounds, and hills, peaks and high towers which may prove dangerous to aeroplanes. The sea navigation charts depict coast-lines, depths of the seas, light houses, etc. A weather chart shows weather conditions such as atmospheric pressure, wind direction, precipitation, etc.

Types of Maps

Earth's features whether natural or man-made are numerous and it is not possible to represent all of them on one map. If we do it, the map will become unintelligible and rather purposeless even if it is drawn on a large-scale. Maps are made for a great variety of users. They are used not only by geographers but also by military personnel, economists, planners, air and marine navigators and a host of other users. Many types of maps are, therefore, drawn for various kinds of users. They are drawn on various scales to suit various requirements. Many maps have thus only selected information.

Attempts have been made to classify maps either on the basis of scale or on the basis of their usefulness. *On the basis of scale,* maps are categorised as small-scale maps and large-scale maps. The small-scale maps are wall maps and atlas maps, and large-scale maps are topographical maps, cadastral maps and plans.

*1. **Wall maps.*** A wall map is used as a teaching aid in a class-room. Its size is, therefore, much larger than that of an atlas map. Like atlas maps they are small-scale maps and represent relief, climate, vegetation types, soil types, minerals, roads, railways, etc., of a country, a continent or the whole world. The details given on a wall map are, however, boldly drawn.

*2. **Atlas maps.*** *An atlas* is a bound volume of different types of maps arranged in a systematic order. The maps are drawn on scales much smaller than that of topographical maps and they represent the world, continents and countries. The atlas maps depict various features such as relief, drainage, climate, vegetation types, soil types, distribution of minerals, crops and population, roads, railways, etc. Insignificant details are omitted and only prominent relief features, main roads and railways, and important towns are shown on atlas maps. Relief is shown generally by layertints. The information represented by an atlas thus lacks details and is generalized.

An atlas map as already mentioned gives information of a large area. Therefore, study of geographic characteristics of a large area is possible at a time with the help of an atlas.

Contents of atlases vary according to the purpose they serve. Generally we come across the following categories of atlases :

(i) School Atlas, (ii) Advanced Atlas, (iii) Regional Atlas, and (iv) National Atlas.

This classification of atlases is based on their contents. In the school atlas the maps giving sufficient details of the home-country are given. The maps of continents and the world delineate only prominent features. Advanced atlases contain detailed maps of even small regions of the continents and are used as reference atlases. A regional atlas contains detailed maps of small areas, prepared with a view to helping in regional planning. Many nations have published atlases containing detailed maps of their countries. These atlases are called 'national atlases'. The maps of a national atlas are comparatively large-sized and they depict general and characteristic features of the geography of the country. Apart from these categories of atlases, there are special subject atlases such as *population atlas, agricultural atlas, irrigation atlas,* etc.

3. Topographical maps— See below.

4. Cadastral maps— See below.

5. Plans— See p. 4.

Both the small-scale map and the large-scale map can be used to serve the same purpose, as for example, both of these two types of maps are used to show the distribution of population, area under a crop, etc. Thus different types of maps according to this classification are not independent of each other.

On the basis of usefulness, the maps are classified into the following types :

1. Topographical maps, 2. Cadastral maps, 3. Ocean and navigational charts, 4. Commercial maps, 5. Weather maps, 6. Geological maps, 7. Political maps, 8. Relief maps, 9. Climatic maps, 10. Agricultural maps.

According to this classification, the different types of maps are independent of each other and the very title of the type of a map suggests the use to which it is put.

1. Topographical maps. Topographical maps are official maps. They are prepared by government agencies after surveying land. They are drawn on the scales varying from 1 cm. to 250 metres to 1 cm. to 2.5 km.

They are multi-purpose maps and represent the natural features such as relief, rivers, vegetation, etc., and man-made features such as villages, towns, roads, railways, canals, etc., in sufficient detail. They are generally coloured. Blue is used to show lakes, rivers, etc., red to show roads, cart-tracks, villages, towns, etc., yellow to show cultivated areas and green to show trees, forested areas, etc. Topographical maps are of immense value for the armed forces in planning defence and attack and for geographers for a detailed geographical study of some areas. They are also used for planning hydro-electric projects, laying roads, railways, etc. Other categories of maps are based on these maps.

2. Cadastral maps. These maps are drawn for showing individual landed property and land registration. In fact these maps show the record of ownership of land. They are not printed and published for sale. They are official maps and are drawn on the scales varying from 1 inch to 110 yards or 1 cm. to 40 metres to 1 inch to 55 yards or 1 cm to 20 metres and are kept by the village Patwari. They are also used for determining the revenue due from the owners of land.

3. Ocean and air navigational charts. Each of these two charts is single-purpose but of special use.

Ocean navigational charts give details of the positions of reefs, cliffs, sub-marine ridges, etc., which can be hazardous to navigation. Relief of the ocean floors, depth of water and information regarding tides and ocean currents are given on these charts. The lines of latitude and those of longitude are drawn on these charts in a special way and they are drawn close to each other. These lines help in determining the courses of the ships. There are also charts which show detailed plans of harbours.

Air navigational charts are prepared on maps showing relief features elaborately. They show flight lanes, landing grounds, restricted areas, etc.

4. Commercial maps. They are based on official topographical maps and are produced by the official and non-official agencies. They are generally single-purpose maps. They include maps showing the network of roads, railways and air routes, tourist maps, town maps, production maps and the distribution maps.

Distribution maps. These maps show various distributions by symbols, lines or shadings. A map showing the distribution of a commodity without indicating its quantity is called a non-quantitative distribution map. A map of India showing areas under cotton, jute and tea by different shades or colours, is an example of such a map. If, however, a map shows not only the distribution of a commodity or a weather element but also its quantity, it is called a quantitative distribution map. Maps showing rainfall by isohyets,

temperature by isotherms, density of population by different shades of a colour are examples of these maps. For details see the chapter on distribution maps.

5. ***Weather maps.*** These maps are produced by government agencies and published daily showing the weather conditions of the day at a particular time. Atmospheric pressure, wind velocity, wind direction, cloudiness, rainfall, drizzle, snowfall and sea condition are shown on it.

6. ***Geological maps.*** They are also produced by government agencies and they show geological structure of the area they represent.

7. ***Political maps.*** They are based on topographical maps. They, however, show political boundaries. The countries or the states of a country are shown in bright contrasting colours. Capital towns, other important towns, railways and highways are given on these maps.

8. ***Relief maps.*** They are based on topographical maps but they show boldly relief features and drainage system. They are included in atlas as well as in wall maps and are used mainly for class-room teaching.

9. ***Climatic maps.*** These maps are used as wall as well as atlas maps. They show seasonal atmospheric pressure, temperature and rainfall. Annual rainfall maps are also produced.

10. ***Agricultural maps.*** They include maps pertaining to soil condition, land utilization, agricultural land classification maps, etc.

Uses of maps. A map is a great source of information. It displays vividly the pattern of natural and man-made features. Analysis of these patterns reveals inter-relationships among the various facts presented on the maps. Therefore, the maps particularly the topographical ones are very useful in framing plans for a country. We can also carry out a detailed study of one or more than one of the numerous categories of information given on maps. For example, we can study and interpret the future possibilities of soil erosion, settlement patterns, drainage patterns, land utilization, etc. Thus a map is a very useful tool in research.

Maps enable us to know details of the landforms and other ground features without actually seeing the area. Moreover, details of a large area of the ground can be visualised at a glance from the map. Hence maps are of immense importance to the military personnel for planning campaigns against the enemy, for locating enemy positions and then destroying them with artillery fire or by aerial bombardment. In fact, the topographical maps are produced specially for military use.

Without maps, it is impossible for the aeroplanes to reach their destinations and the ocean-going ships to cruize safely in the oceans and call on various harbours. They are used by tourists for hiking, for pleasure or for gaining knowledge of a certain area.

Recently maps have entered the realm of advertisement. They are drawn especially for showing the location of industries, production, marketing centres, etc. Land lay-out maps are prepared for showing the housing colonies of townships.

Since boundaries of countries, states, districts and even individual landed properties are marked on maps, they evidently form important documents for settling disputes regarding encroachments on lands. These maps are, therefore, of great assistance in settling the land disputes.

Weather forecasting, so important for aviation and agricultural operations, has been made possible by comparing weather conditions depicted on daily weather maps.

A host of other purposes are served by maps. It is no exaggeration to say that a map is an integrated part of our present civilization and a tool of promoting future civilization.

QUESTIONS

1. Describe a terrestrial globe and give its merits and demerits.
2. What is a map? Give its uses.
3. Write short notes on (a) ecliptic, (b) analemma, (c) topographical maps, (d) cadastral map, (e) sea and air navigation charts, (f) a small-sale map, and (g) a large-sale map.
4. Classify maps and give a brief account of each classification.