Topic: 1

Ex.1. Map: Meaning, Definition and Types.

Cartography:

Cartography has been defined by the International Cartographic Association as……

"the art, science and technology of making maps, together with their study as scientific documents and works of art."

It has also been defined as…

"the production—including design, compilation, construction, projection, reproduction, use, and distribution—of maps" (Thrower, 2008, p. 250).

Meaning and Origin of Map:

- The origin of the word *"MAP"* may be traced to the *latin* term *"MAPPA" meaning "a sheet of cloth"* [size of s handkerchief].
- The word ***mappa*** or ***map mundi*** did not appeal to the ***Romans***, who, on the other hand employed such terms*: foram; tabula chorographia; orbispictus;sphaera, and occasionally picture.*
- Credit goes to the monk Micon of St.Riquier who applied the term ***Mappa Mundi***corrupted in to Map.

Definitions:

"A small scale conventional representation of the earth or part of earth as seen from above."

'In other words, it is a two-dimensional form of the three-dimensional earth.'

A map is, therefore, defined 'asselective, symbolised and generalised representation of whole or a part of the earth's surface on a plane surface at a reduced scale.'

Some Facts of Map:

- A map is drawn on a plane surface so that it represents only two dimensions [2D]-length and breadth.
- But the earth's surface pattern is actually curved and not flat, and has three dimensions.
- A map is,--a picture of a three dimensional [3D] curved surface on a two dimensional [2D] flat surface.
- The correct representation of the earth is a globe and not map.
- The problem of map construction is transferring spherical surface to a plane surface.
- This problem is solved by the use of map projection

- Maps are drawn at a scale and projection so that each point on the paper corresponds to the actual ground position.
- It may also be understood that a simple network of lines and polygons without a scale shall not be called a map. It is only referred to as "the sketch"

Process to Prepare Map:

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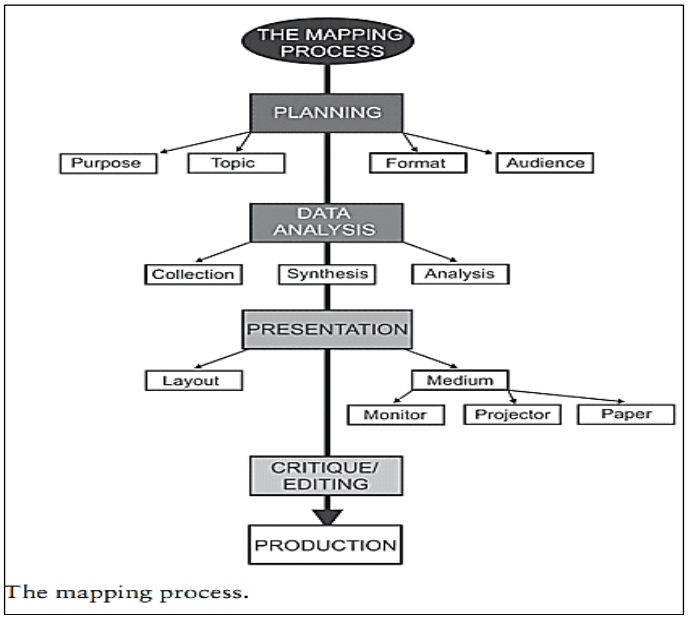
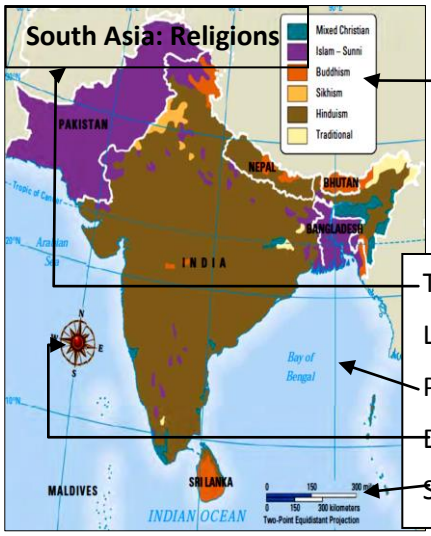


The mapping process.

Elements of Map:



Types of Maps Based on Scale:

It is difficult to give accurate and all-embracing classification. They may be …

According to scale, maps maybe classified into:**large-scale and small-scale**.

(i) Large-scale Maps:

- Large scale maps are drawn to show small areas at a relatively large-scale.
- Accommodate a larger amount of details with greater accuracy because their larger surface space.
- For example, the

  Topographical maps drawn at a scale of 1: 250,000, 1:50,000 or 1:25,000

  The village maps, the zonal plans of the cities and house plans prepared on a scale of 1:4,000, 1:2,000 and 1:500 are large scale maps.

(ii) Small-scale Maps:

- Small scale maps represent larger areas on a restricted surface space.
- So that the features shown are much reduced in size, moreover, only selected important details of the particular area are shown.
- On the other hand, small-scale maps are drawn to show large areas.

  For example, atlas maps, wall maps, etc.

Map classification of map based on aims and objectives….

1. **Physical Map:** They portray the relief features of the lands by hachures or columnar lines or by different shades or tints (green. yellow &brown) between the contour lines; and also show the drainage patterns thereon. Use as bases for super-imposing other relevant information like place names & boundaries etc.
2. **Political Maps**: main purpose is to provide a visual picture of the world or the continent or the country, either by bold boundary lines or by tints of colours and by boundaries. Physical and cultural background. good political map present a clear and pleasing effect.
3. **Statical Map or Distribution Map:**It is group of maps which deal with Statical data. They may depict quantitative behaviour of ..

   Physical elements like… relief, rainfall, temperature and air pressure etc.

   Socio-economic patterns of the lands- agriculture, industries, trade and transport, population and settlements etc.
4. **Special Map:** Those maps which require special handling and are used by scientific specialists.

   i. **Topographical Map:** Topographical map is the supreme achievement of modern cartography. It has been truly described as a "scenery map" because it presents a symbolic (conventionalised)

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picture of the landscape –its physical features [rivers, mountains, lakes], and its cultural features [buildings, roads, railways etc]. They require special training for their interpretation and are handled by geographer and military experts. They prepped by Govt. agencies [SOI]

ii. **Geological Maps:** quite like topo-sheets which tell of the geological structure of the region with the aid of colour-shades super-imposed upon their respective locations. Maps carry columnar sections and profiles of considerable complexity. They are the generally published in the *folio-forms, known as Geological Fo,lios.* They are of great value to the geographer , in the study of land forms.

iii. **Physiographic Maps:** Small scale hand drawn maps showing the salient features of the landscape. With block diagrams (devised by American physiographer), objective is to provide a geological understanding of the land forms to the layman.

iv. **Town Map:** Town plans form a type in themselves. They are large scale maps, says 3inch to a mile 6inch to mile, showing the urban landscape of important towns individually. Useful to the town planners for they provide the base for their master plans.

v. **Cadastral Maps:** Maps used for demarcating the boundaries of landed properties, fields, gardens, and buildings etc. They prepped by Govt. agencies and are used by them for revenue purpose. [16inches to 1mile ;32 inches to mile]

vi. **Weather Maps:** They are produced by meteorological officers. They show the conditions of the weather elements – barometric pressure ,winds, temperature, cloudiness, precipitation etc.at particular point of time say 08:30am or 17:30pm.

vii. **Navigational Chart:** Published by Gov. Agencies. *Their main emphasis is on coasts and coastal waters; as such they concentrate on those features which a sea sight commands.* They show the cliffs along the shores with their heights, depth of sea, bottom relief and tides and currents

viii. **Aeronautical Charts:** the Air Age has added these aeronautical charts, the popularity of which has increased by leaps and bounds. They are of great help to pilots.

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Ex.2. Map Scale: Definition and Types.

Aim: to understand the map scale, methods to express the map scale and unit of measurements.

Definition of Scale:

"The scale is the ratio between the distance of two points on the map and their corresponding distance on the ground."

Map scale as a ratio of distances between two points on the map and the corresponding distance between the same two points on the ground.

The scale of map depends upon the area which is to be mapped, the purpose for which it is entended, and the amount and character of detail which it is to show.

Units of Measurements:

Systems of Measurements

Metric System of Measurement

1 km = 1000 Metres
1 Metre = 100 Centimetres
1 Centimetre = 10 Millimetres

English System of Measurement

1 Mile = 8 Furlongs

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1 Mile= 5280 feet
1 Mile= 63360 inches
1 Furlong = 220 Yards (7920 inches)
1 Yard = 3 feet (36 inches)
1 Foot = 12 Inches

12 inches = 1 foot = 0.3048 meters

- ***Denominator:*** The number below the line in a fraction. For example, in a fraction of 1 : 50,000, **50,000 is the denominator.**
- ***Numerator:*** The number above the line in a fraction. For example, in a fraction of 1 : 50,000, **1 is the numerator**.
- ***Representative Fraction:*** A method of scale of a map or plan expressed as a fraction showing the ratio between a unit distance on the map or plan, and the distance measured in the same units on the ground

1 : 50000
Numerator : Denominator

Methods to express the map scale:

1. Statement of Scale
2. Representative Fraction (R. F.)
3. Graphical Scale

Each of these methods of scale has advantages and limitations.

The scale of the map may be expressed using one or a combination of more than one methods of scale.

1. Statement of Scale:

The scale of a map may be indicated in the form of a written statement.

For example:

- In metric System:1 cm =10 km/1cm is to 10km/One cm to ten km., it means that on that map a distance of 1 cm is representing 10 km of the corresponding ground distance.
- British/English system of measurement, i.e. 1 inch =10 miles/ 1 inch to 10mile/One inch to ten mile.

It is the simplest of the three methods.

Limitations:

1. it may be noted that the people who are familiar with one system may not understand the statement of scale given in another system of measurement.
2. Another limitation of this method is that if the map is reduced or enlarged, the scale will become redundant and a new scale is to be worked out.

2.Representative Fraction (R. F.):

The second type of scale is R.F. It shows the relationship between the map distance and the corresponding ground distance in units of length. The use of units to express the scale makes it the most versatile method. R. F. is generally shown in fraction because it shows how much the real world is reduced to fit on the map.

For example,

- a fraction of 1 : 24,000 shows that one unit of length on the map represents 24,000 ofthe same units on the ground
- i.e. one mm, one cm or one inch on the map representing 24,000 mm, 24,000 cm and 24,000 inches, respectively of the ground.

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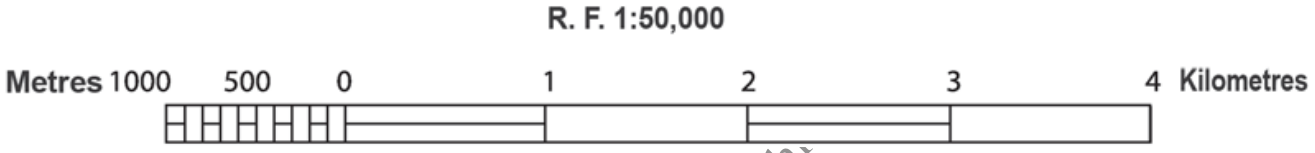
- While converting the fraction of units into Metric or English systems, units in centimetre or inch are normally used by convention.
- This quality of expressing scale in units in R. F. makes it a universally acceptable and usable method.
- Let us take R. F. of 1 : 36,000 to elaborate the universal nature of R. F.
- The Metric System will read the given units by converting them into cm, i.e. the distance of 1 unit on the map as 1 cm and the distance of 36,000 unitson the ground distance as 36,000 cm.
- These values may subsequently be converted into a statement of scale, i.e. 1 cm represents 360 metres. (by dividing values in denominator by the number of centimetres in a metre, i.e. 100).
- The English system of measurement will understand the map scale by converting it into a statement of scale convenient to read the map scale as 1 inch represents 1,000 yards.
- The said statement of scale will be obtained by dividing 36,000 units in the denominator by 36 (number of inches in a yard).

Graphical or Bar Scale:

❖ The third type of scale shows map distances and the corresponding ground distances using a line bar with primary and secondary divisions marked on it.



❖ This is referred to as the graphical scale or bar scale.
❖ Metric system: scale readings as shown on the bar scale in Figure 2.1 reads only in kilometres and metres.
❖ British system: bar scale the readings may be shown in miles and furlongs.
❖ This method finds restricted use for only those who can understand it.
❖ The graphical scale stands valid even when the map is reduced or enlarged.
❖ This is the unique advantage of the graphical method of the map scale.

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Ex.3. Conversion of Scale. Verbal scale to numeric and vice versa (in British and Metric Systems)

Aim: To understand conversion of scale from statement to representative fraction (RF) and RF to statement scale in Metric and British system.

❖ **Verbal scale to Numeric Scale:**

a. Verbal/Statement scale to Numeric (in British Systems)

Problem1: Convert the given Statement of Scale of One inch to four miles into R. F.

Solution: The given Statement of Scale may be converted into R. F.using the following steps.

In 1inch to four mile
1 inch represents 4 miles
or 1 inch represents 4 x 63,360 inches (1 mile = 63,360inches)
or 1 inch represents 253,440 inches
NOTE: We can now replace the character "inches" into "units "and read it as :
1 unit represents 253,440 Units

Answer: R. F. 1: 253, 440

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b. Verbal scale to numeric (in Metric Systems)

Problem1:

……

❖ **Numeric scale to Verbal scale:**

c. Numeric scale to Verbal scale (in British Systems)

Problem1:

d. Numeric/RF scale to Verbal scale (in Metric Systems)

Problem1: Convert R. F. 1: 253, 440 into Statement of Scale (In Metric System)

Solution the given R. F. of 1: 253, 440 may be converted into Statement of Scale using the following steps:

1: 253, 440 means that…

1 unit on the map represents 253, 440 units on the ground.

or 1 cm represents 253, 440/100,000 (1 km = 100,000cm)

or 1 cm represents 2.5344 km

After rounding of up to 2 decimals, the answer will be :

Answer: 1 cm represents 2.53 km

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Ex.4. Construction of Graphical Scale:

Graphic or plain scale can be constructed when statement of scale or RF is given. Precautions are necessary for drawing a graphical scale.

- Length of scale should vary from 12 to 20 cm or from 5 to 8 inches.
- Distances shown on the scale should be in round figures.
- Whole line showing scale is dividing in to primary and secondary division.
- Zero (0) is written not at the left end of the scale but to the right of the secondary division.
- Distances shown by primary and secondary divisions are marked on the right and left of the zero of the scale respectively.
- It is useful to write RF and Statement scale along the graphical scale.

a. Construction of simple Graphical Scale (2 examples each)
(British and Metric Systems)

- Any one example from both systems.

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Ex.5. Construction of Comparative graphical scale. (2 examples each) (British and Metric Systems)

A comparative scale is that scale which facilitates the reading of distance in two different units of measurement such as Metric and British system. Two plain or simple scales comprising the comparative scale are drawn on the same RF. Zero of one scale is just below the zero of other scale so that comparison of distances in different units is made easy.

- Any one example from both systems.

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