S.S. COLLEGE; Jehanabad
Department- Geography

Class- B.A. Part- I
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Topic- MERCATOR'S PROJECTION

(Paper- Geography Practical)

Introduction-

A Dutch cartographer Mercator Gerardus Karmer developed this projection in 1569. The projection is based on mathematical formulae. So, it is an orthomorphic projection in which the correct shape is maintained. The distance between parallels increases towards the pole. Like cylindrical projection, the parallels and meridians intersect each other at right angle. It has the characteristics of showing correct directions. A straight line joining any two points on this projection gives a constant bearing, which is called a *Laxodrome* or *Rhumb line*.

Example

Draw a Mercator's projection for the world map on the scale of 1:250,000,000at 15º interval.

CALCULATIONS

Radius of the reduced earth is $R = \dfrac{250{,}000{,}000}{250{,}000{,}000} = 1''\ inch$

Length of the equator 2ðR or $\dfrac{1x22x2}{7} = 6.28''$inches

Interval along the equator = $\dfrac{6.28x15^o}{360^o} = 0.26''\ inches$

Construction of Mercator’s Projection

(i) Draw a line of 6.28" inches representing the equator as EQ:

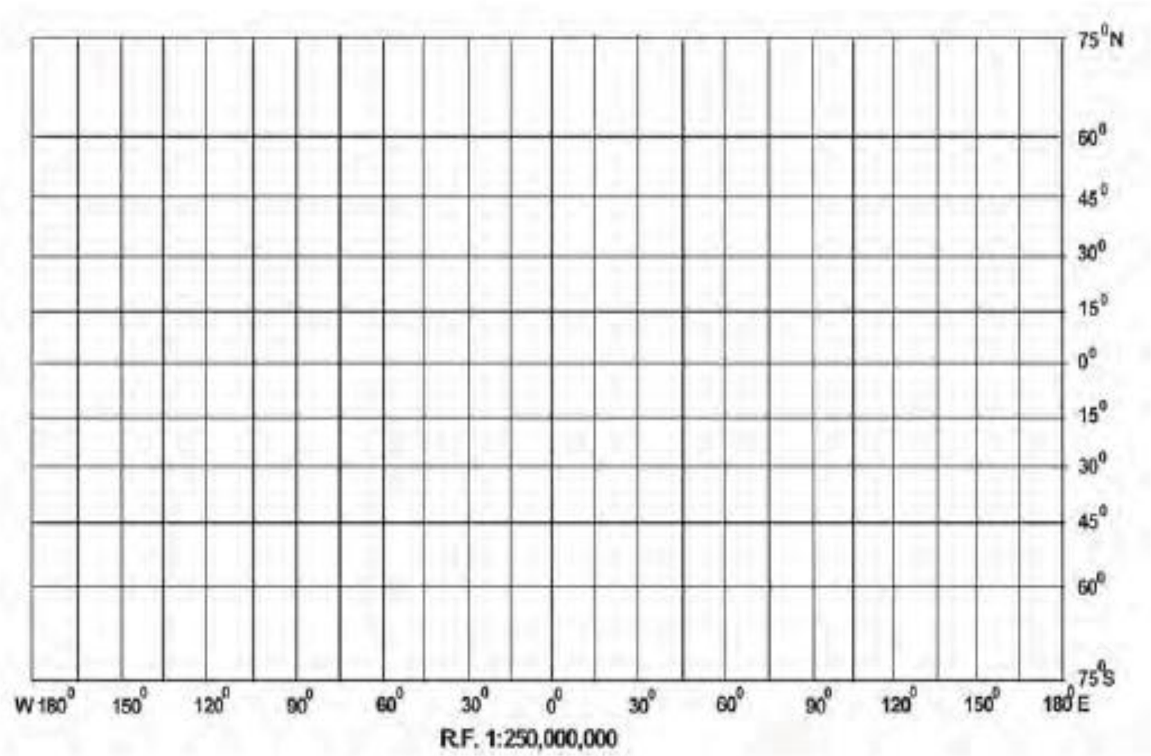
(ii) Divide it into 24 equal parts. Determine the length of each division using the following formula:

$$\frac{\text{Length of Equator X interval}}{360}$$

(iii) Calculate the distance for latitude with the help of the table given below:-

Latitude	Distance
15º	0.265 x 1 = 0.265" inch
30º	0.549 x 1 = 0.549" inch
45º	0.881 x 1 = 0.881" inch
60º	1.317 x 1 = 1.317" inches
75º	2.027 x 1 = 2.027" inches

(iv) Complete the projection as shown in Fig. below



PROPERTIES OF MERCATOR'S PROJECTIONS:

1. All parallels and meridians are straight lines and they intersect each other at right angles.

2. All parallels have the same length which is equal to the length of equator.

3. All meridians have the same length and equal spacing. But they are longer than the corresponding meridian on the globe.

4. Spacing between parallels increases towards the pole.

5. Scale along the equator is correct as it is equal to the length of the equator on the globe; but other parallels are longer than the corresponding parallel on the globe; hence the scale is not correct along them. For example, the 30o parallel is 1.154 times longer than the corresponding parallel on the globe.

6. Shape of the area is maintained, but at the higher latitudes distortion takes place.

7. The shape of small countries near the equator is truly preserved while it increases towards poles.

8. It is an azimuthal projection.

9. This is an orthomorphic projection as scale along the meridian is equal to the scale along the parallel.

Limitations

1. There is greater exaggeration of scale along the parallels and meridians in high latitudes. As a result, size of the countries near the pole is highly exaggerated. For example, the size of Greenland equals to the size of USA, whereas it is 1/10th of USA.

2. Poles in this projection cannot be shown as 90o parallel and meridian touching them are infinite.

Uses

1. More suitable for a world map and widely used in preparing atlas maps.

2. Very useful for navigation purposes showing sea routes and air routes.

3. Drainage pattern, ocean currents, temperature, winds and their directions, distribution of worldwide rainfall and other weather elements are appropriately shown on this map