first bell-2.0

Social Science - II

Chapter-4

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Col. William Lambton

George Everest

The British realized that they could ascertain power and collect the taxes in their colonies only if they clearly understood the special geographical features of each of them. This made them decide to conduct various surveys and prepare maps on their basis. Accordingly three surveys namely the Tax Survey, the Topographic Survey, and the Trigonometric survey were carried out by the East India Company in the Indian subcontinent. These surveys that were began with the stewardship of Col.william Lambton in 1802 which took more than 50 years to be completed, were very accurate.

Several Indians were part of these surveys conducted through difficult terrains and hostile climate, carrying the heavy metallic survey instrument called theodolite which weighed half a ton. The surveys incurred immense expenditure and took a toll on many. Col. George Everest joined as an assistant to Lambton in 1818. This was the first survey that recorded the correct measurements of the Himalayan mountain ranges.

As a tribute to George Everest who took up the survey as Lambton's successor the highest peak in the Himalayan mountain ranges was named as Mount Everest. The first topographic maps of the Indian subcontinent were prepared after the completion of the survey in 1854.

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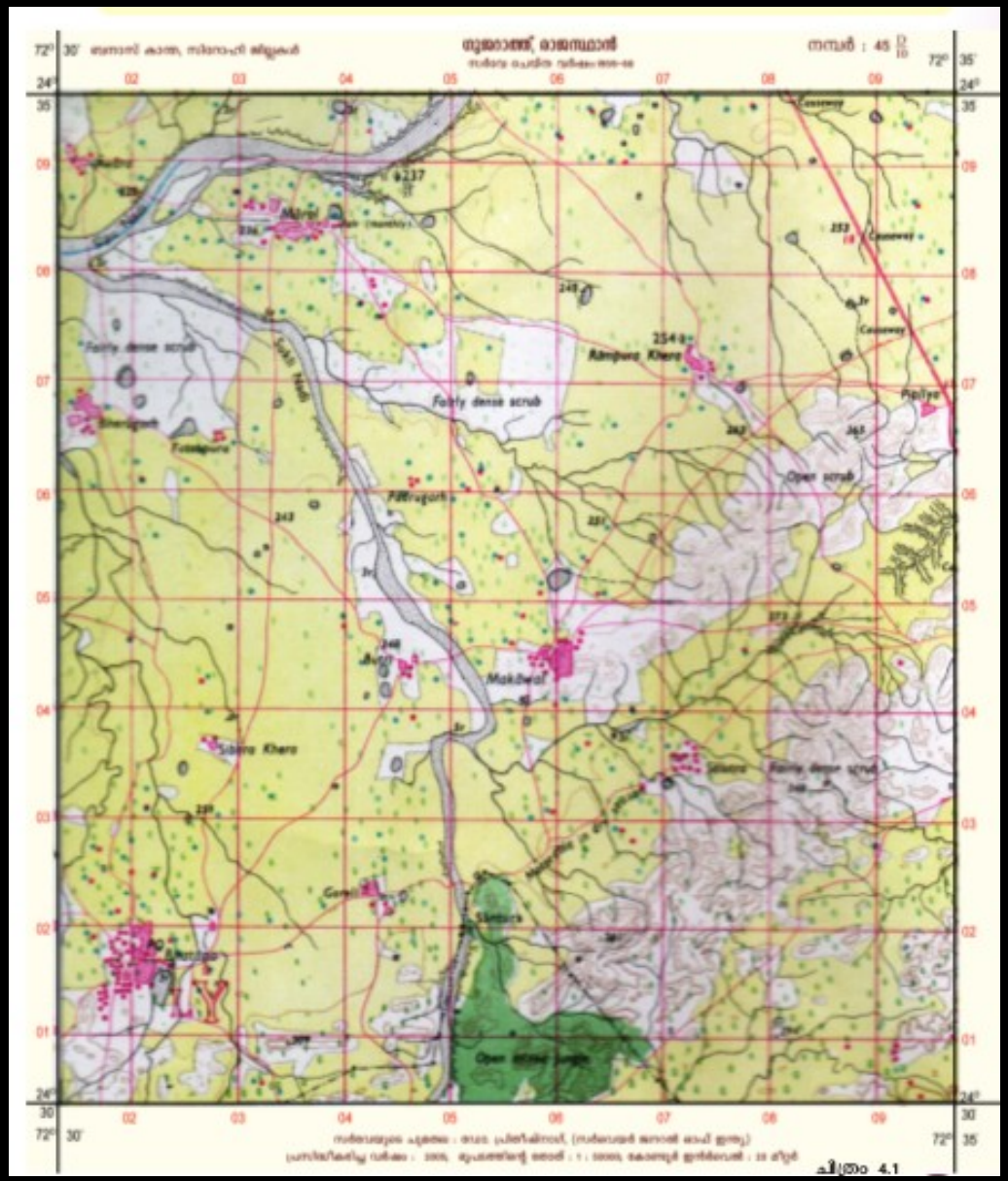

Topographical Map

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Toposheets

The English term 'topography' is derived from the Greek terms 'topo' and 'graphie' which mean 'place' and 'to write or draw' respectively. Topographic maps are also known as toposheets.

What is Topographical maps?

-Topographical maps depict in minute detail all the natural and man made features on the earth's surface.

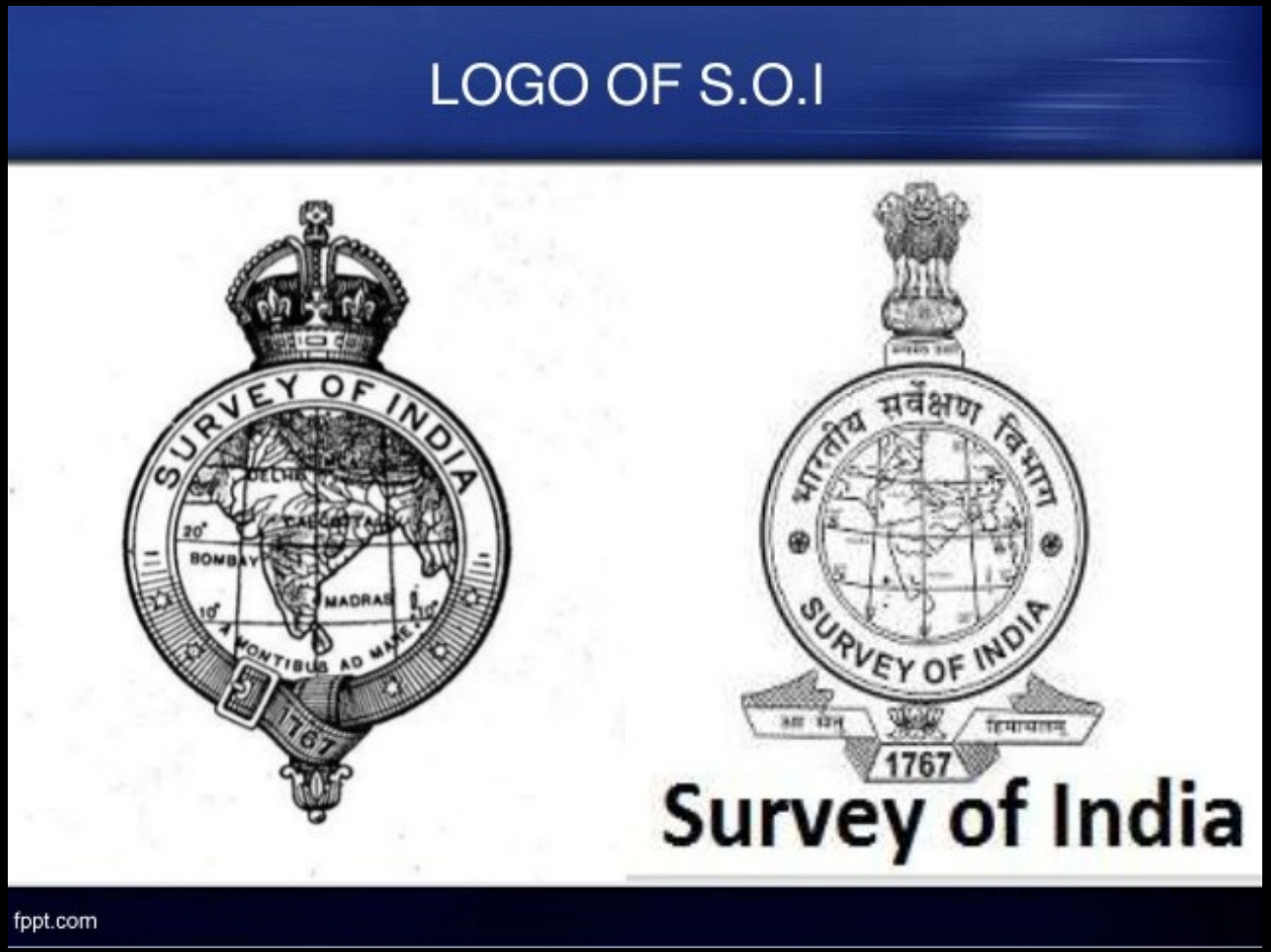
-These maps contain the important surface features such as the undulations of the terrain, rivers, other water bodies, forests, agricultural land, barren land, villages, towns, and transport and telecommunication systems.

-These maps show both natural and man-made features in details.

-Topographic maps are large-scale maps.

-Large-scale maps are maps depicting detailed information of relatively small areas.

Who is responsible for making the Topographic map in India? Why?



Survey of India

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-Certain restrictions have been imposed on the use of topographic maps of strategic regions owing to the national security concerns.

Uses of topographical maps?

-Analysis of the physical and the cultural features of the earth surface.

-For military operations and the preparation of military maps.

-Identification and studying of the natural and the cultural resources of a region as part of economic planning.

-For urban planning.

-To understand land use.

-To understand the topography.

-For resource conservation and allocation.

-For computerized form of maps - GIS

What are the essential elements for a topographic maps reading?

-Knowledge of the numbering scheme,

-Locational aspects,

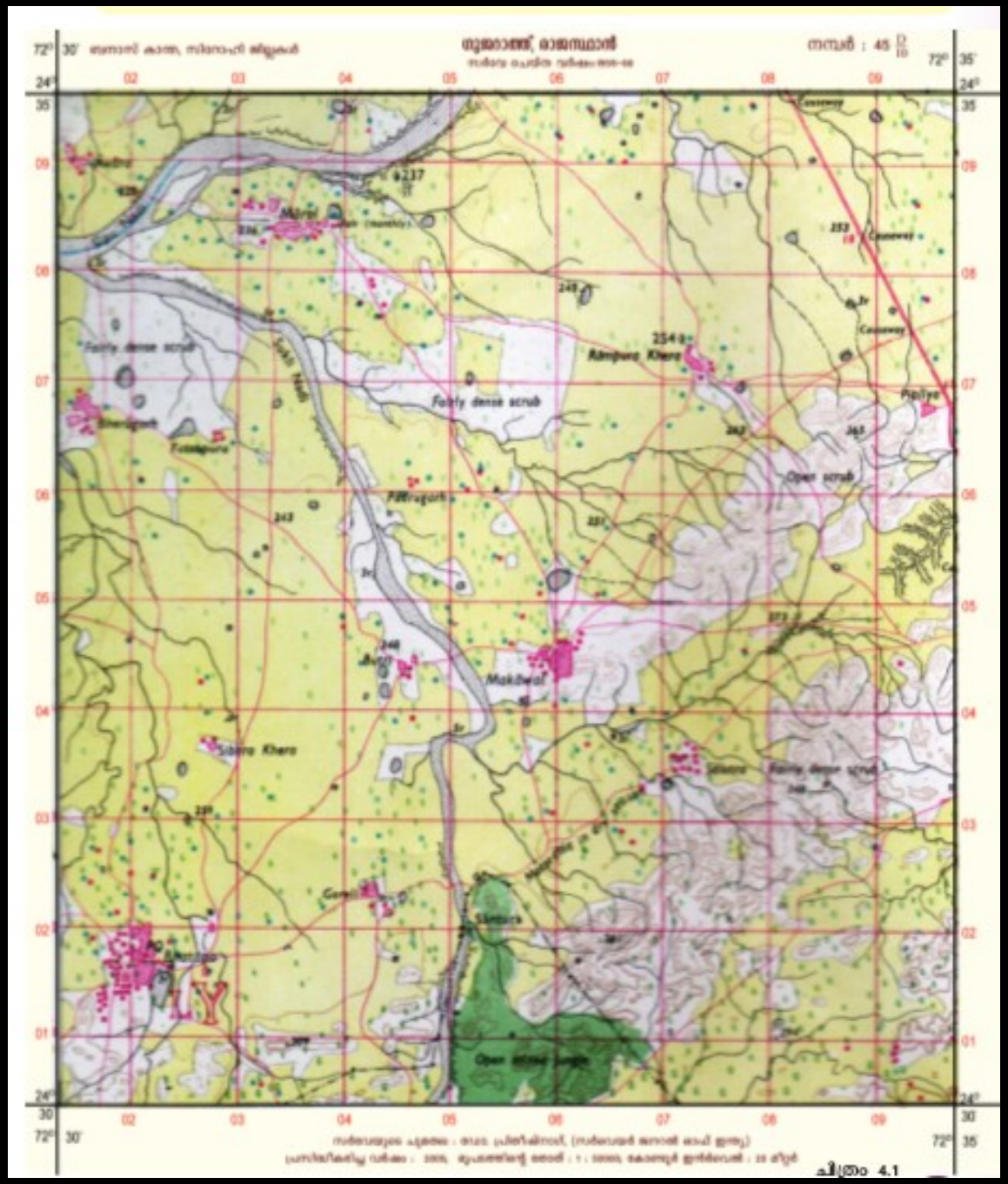
-The conventional signs and symbols,

-The elevation and slope of the terrain,

-The methods of their representation are very essential for comprehending topographic maps.

Survey of India

The official agency responsible for the preparation of topographic maps in our country is the Survey of India with its headquarters at Dehradun. In India, the topographic maps are prepared in scales 1 : 1000000, 1 : 250000, 1 : 50000 and 1 : 25000 for various purposes. Survey of India made topographical maps for all the places in India. The topographic maps prepared in India are generally known as the 'Survey of India Maps' (SOI maps).



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Layout and numbering of toposheets

-Toposheets for the whole world have been prepared in several sheets of same size and shape.

-The whole world is picturised in 2222 sheets as follows.

-There are 1800 sheets for regions between 60° North and South latitudes.

-420 sheets for regions between 60° and 88° latitudes in both hemispheres and 2 sheets for both the poles.

-The numbering of India's toposheets are done on the basis of the India and Adjoining Countries Map Series.

-As each of the maps in this series is in 1:1000000 scale, these are known as million sheets.

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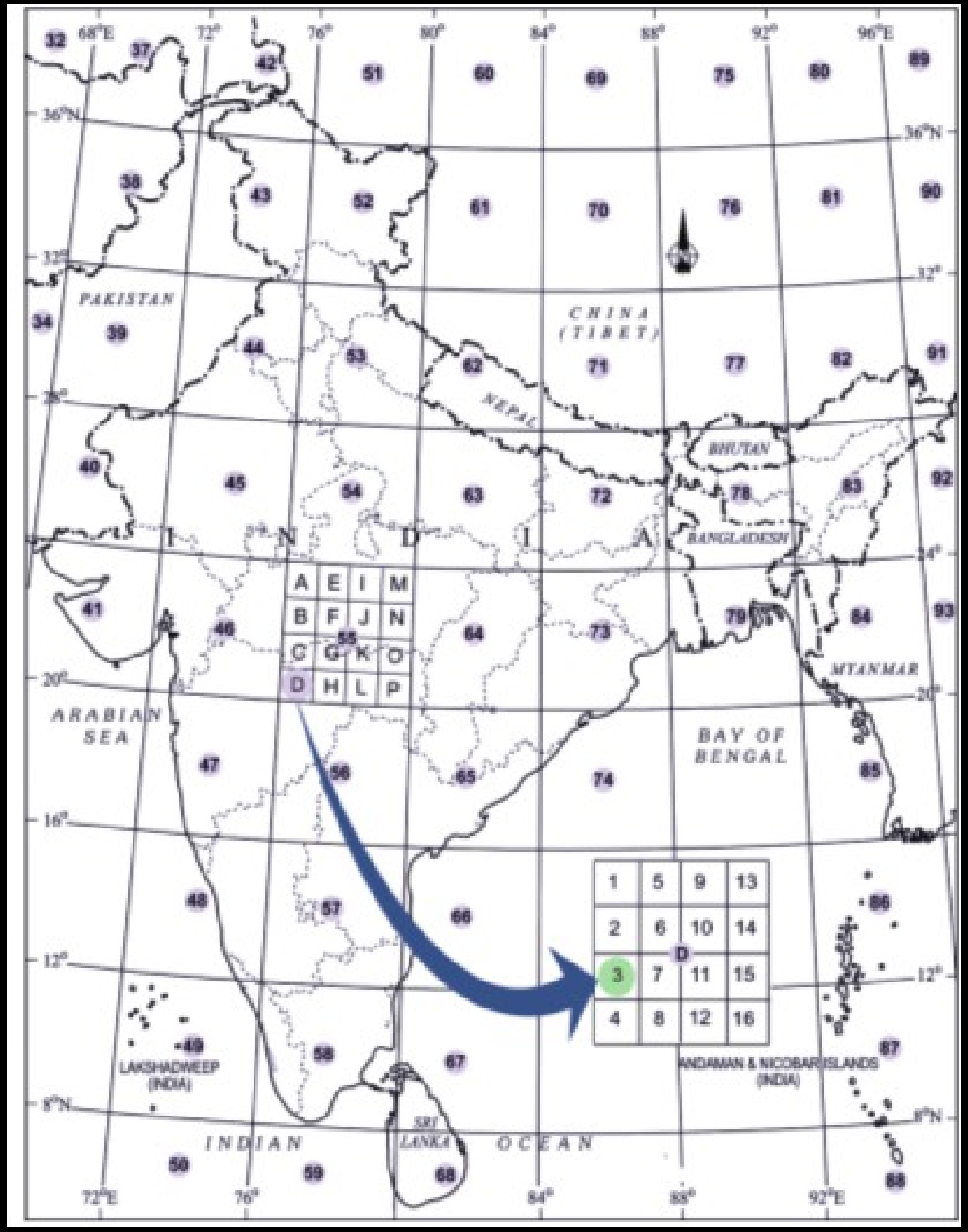

Million sheets

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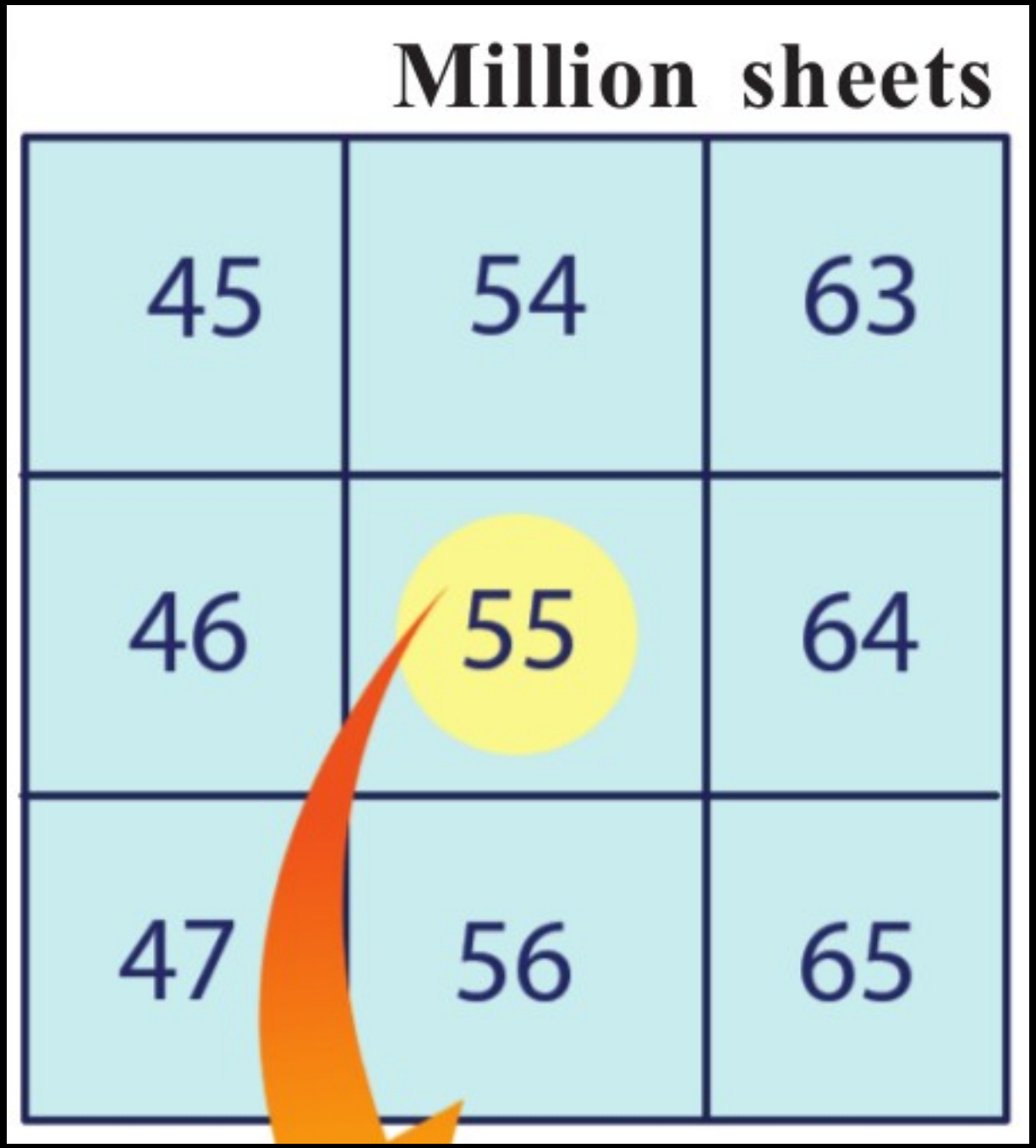

Million sheets
45
54
63
46
55
64
47
56
65

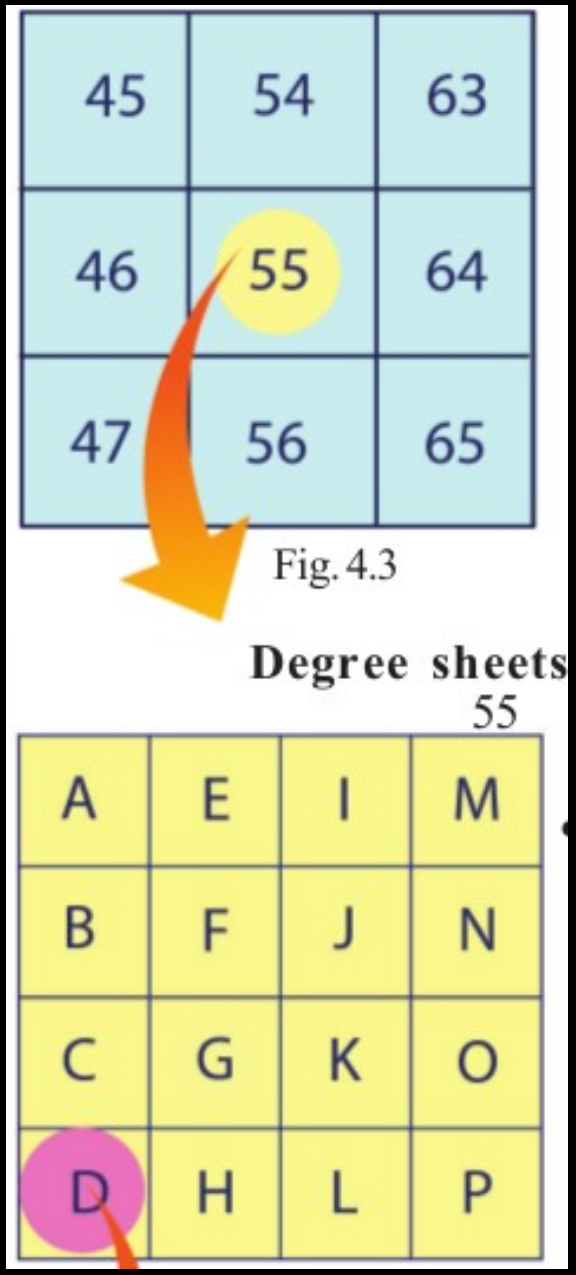
Million sheets

-Each of the maps in troposheets is in 1:1000000 scale.

-These are known as million sheets.

-The million sheets covering 4° latitudinal and 4° longitudinal extent are given numbers from 1 to 105.

-These numbers are known as index numbers(55).



Degree sheets

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Degree sheets

-Each million sheet is divided into 16 parts in the order A, B, C, D, ... up to P.

-For example, the million sheet numbered 55 is divided into 16 parts as 55A, 55B, 55C, ... etc.

-Each of these sheets with 1° latitudinal and longitudinal extent is prepared in 1:250000 scale.

-These sheets are prepared in 1:250000 scale.

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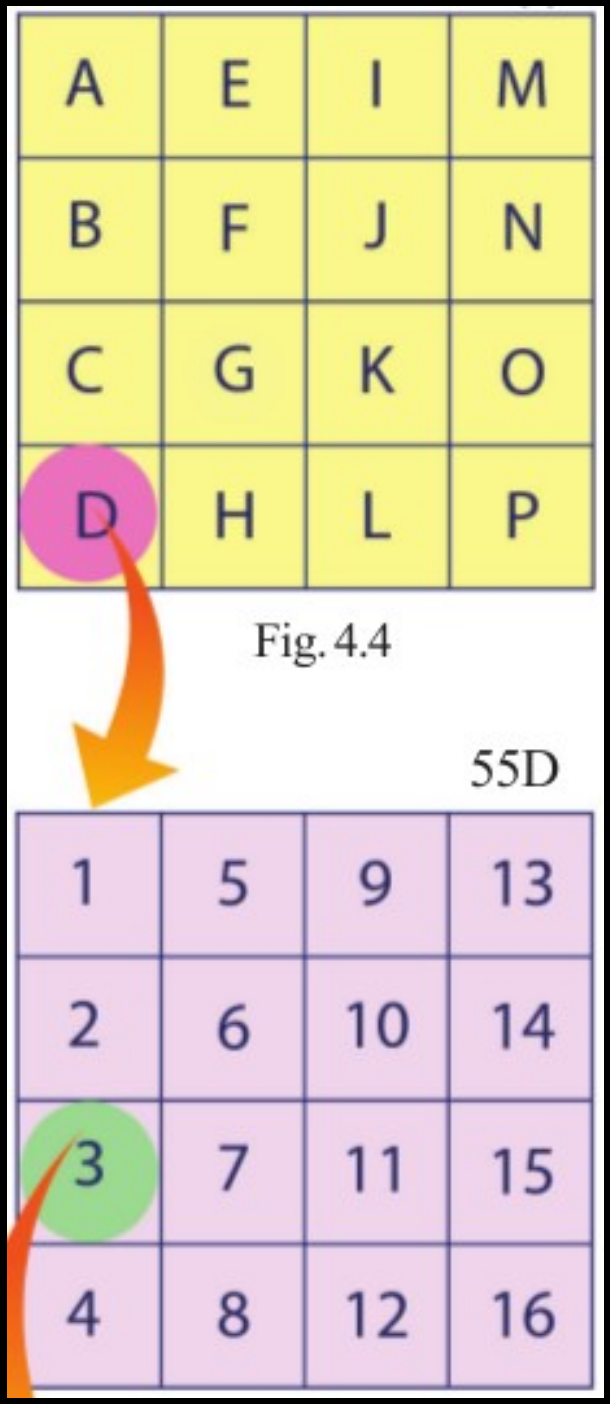

Fig. 4.4

Minutes sheets

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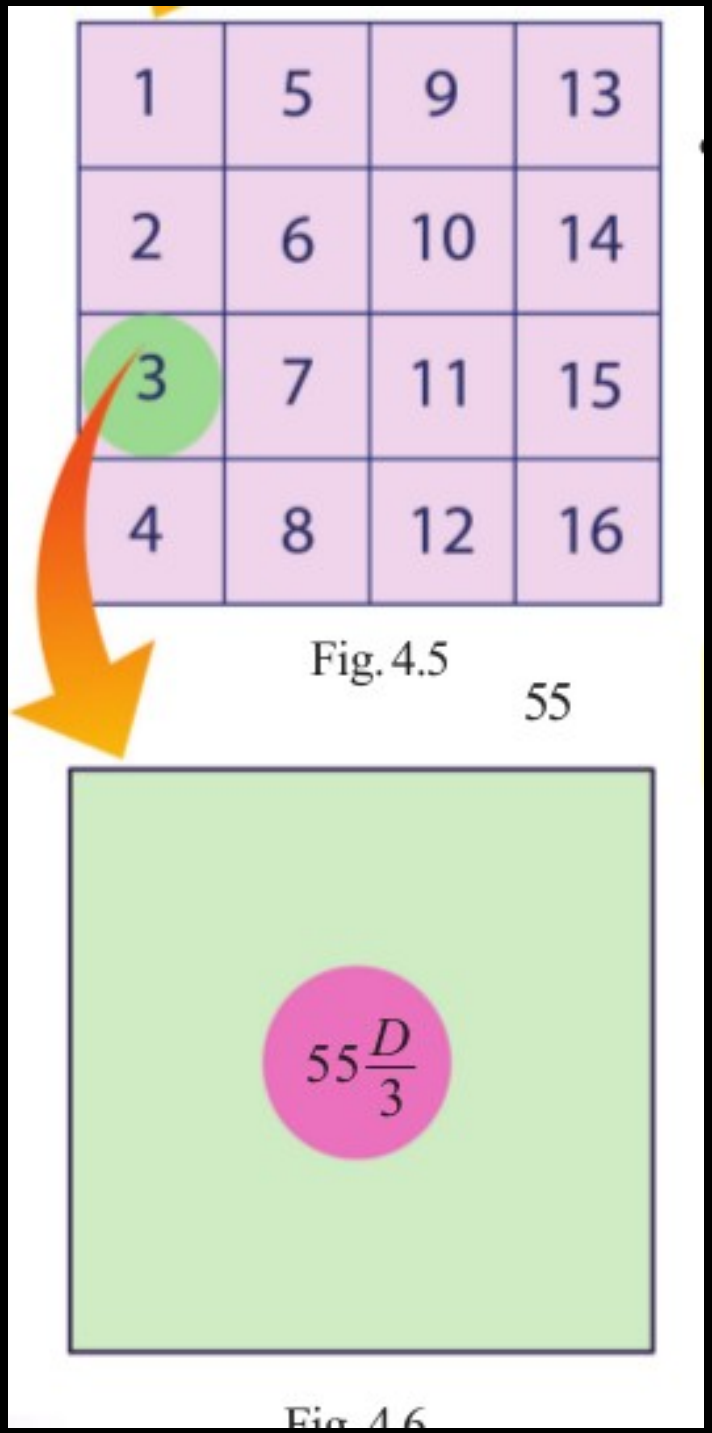

Fig. 4.5

Fig. 4.6

Minutes sheets

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Minutes sheets

-Degree sheets are divided into 16 parts and each has 15 minutes longitude and longitude.

-These are Minutes sheets.

-Minutes sheets are numbered as 1, 2, 3, ... 16 (55D/1, 55D/2,.....55D/16).

-These sheets are prepared in 1 : 50000 scale.

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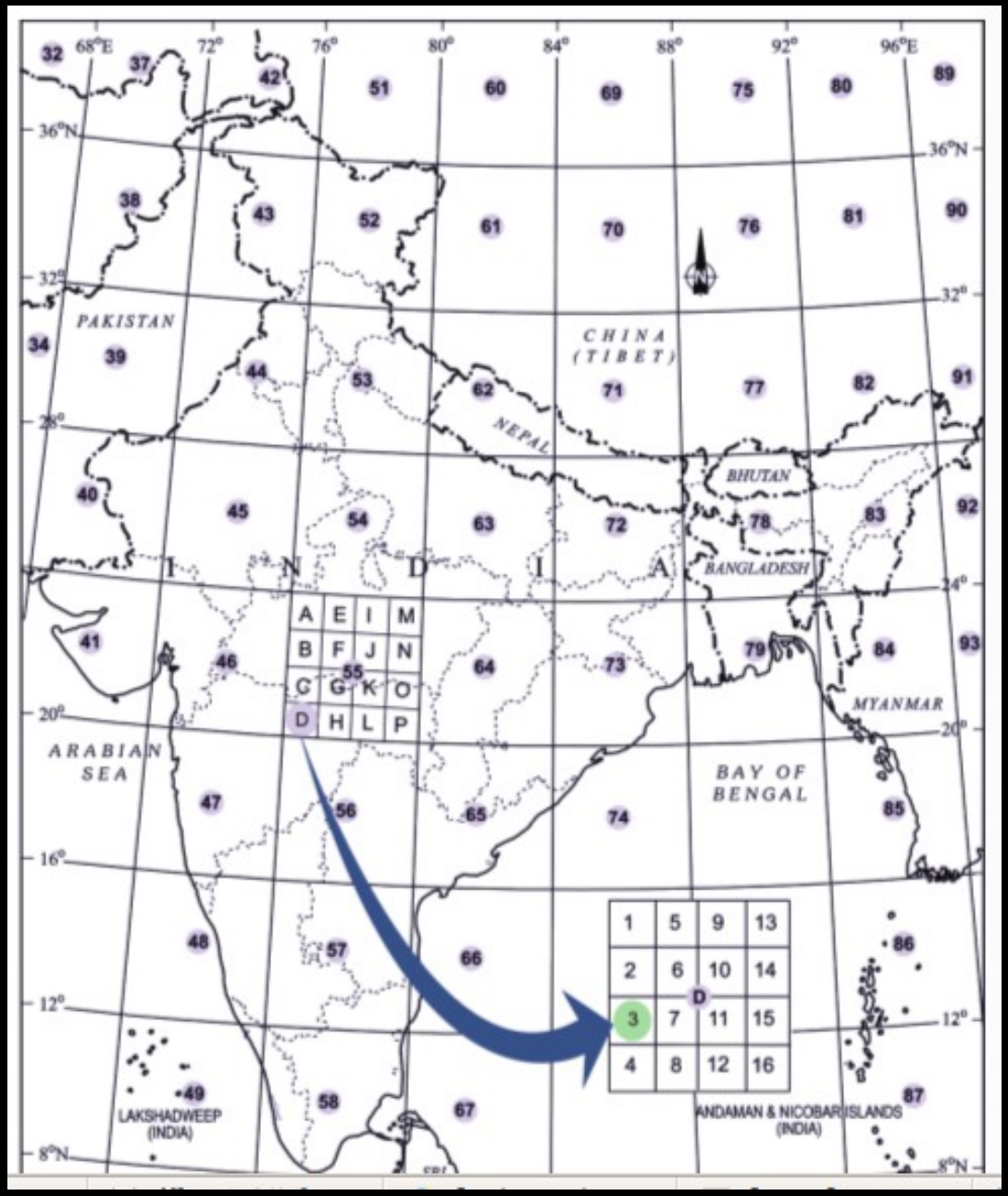

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- The parts of states that are included in toposheet number 45. **Rajasthan, Madhyapradesh, Gujarath**
- The index numbers of toposheets which cover the state of Odisha. **64, 65, 73**
- The states that are included in toposheet number 73. **Chattisgarh, Jharkhand, Odisha, Paschin Benga**
- The index numbers of toposheets which cover the state of Karnataka. **47, 48, 56, 57, 58**
- The index numbers of toposheets which cover kerala. **48 49, 56, 58**

Conventional signs and symbols in Troposphere

-various features on the Earth's surface are represented in topographic maps using different colours and symbols.

-The colours and symbols used in the toposheets are internationally accepted.

-So the maps prepared in one country can be easily understood and analysed by the people of another.

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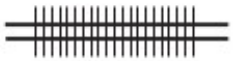
Conventional signs and symbols used in toposheets

Signs and symbols	Geographic features	Signs and symbols	Geographic features
	Road		**Boundary**
	Metalled road		International boundary
	Unmetalled road		State boundary
	Footpath		District boundary
	Cart track		Taluk boundary
	Bridge with road		
	Railway		**Waterbodies**
	Railway-broad gauge		Stream River
	Railway with station		
	Railway- meter gauge		Tidal river
	Level crossing		Spring
			Well
	Railway with bridge		Tube well

Vegetation

Grass

Palms

Coniferous trees

Bamboo

Dense forest

Reserve forest

Settlements

Permanent house

Temporary house

Clustered settlements

Dispersed settlements

Linear settlements

Lighthouse

Health centre

Airport

PO	Post office
TO	Telegraph office
PTO	Post and telegraph office
PS	Police station
IB	Inspection bunglow
RH	Rest house

Monuments and buildings		Elevation	
	Fort		Contour lines
	Temple		Form line
	Church	• 240	Spot height
	Mosque	 200	Triangulated height
	Tomb	• BM215	Benchmark
	Grave		

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Find out the conventional colours used to represent different geographic features

Feature	Colour
• Latitudes and longitudes • Non perennial waterbodies • Railway lines, telephone and telegraph lines • Boundary lines	BLACK
• Oceans, rivers, wells, tube wells…… (perennial waterbodies)	• BLUE
• Forests • Grasslands • Trees and shrubs • Orchards	• GREEN
• Cultivable land	• YELLOW
• Barren land	• WHITE
• Settlements, roads, paths	• RED
• Grid lines (eastings, northings and their numbers)	• RED
• Contour lines and their values	• BROWN
• Sand dunes and sand hills	• BROWN

Representing elevation

Elevation or height is represented in toposheets using contour lines, form lines, spot height, triangulated height, and benchmarks.

Contour lines

Contour lines are imaginary lines joining places having the same elevation above the sea level.

Form lines

When it is difficult to measure the elevation of places through land surveys due to rugged terrain, the elevation is represented with the help of broken lines. These are form lines.

Spot height

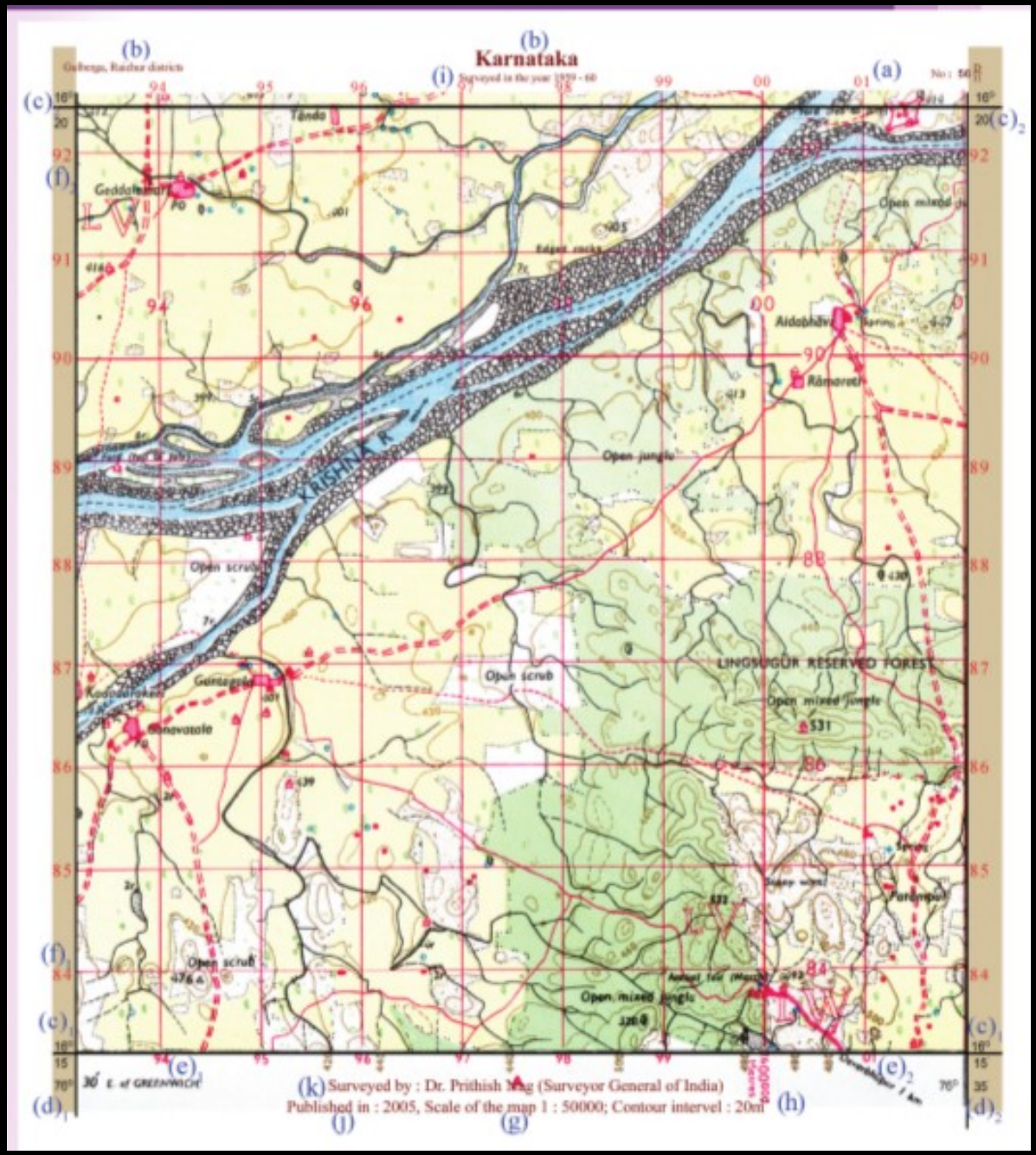
Spot height represents the actual height of a place by recording the height in digits beside a black dot. Sometimes the height alone is recorded without the black dot.

Triangulated height

Height of places estimated through trigonometric surveys are recorded in maps using 'Δ'symbol.

Benchmark

The height of reservoirs and prominent buildings are recorded along with the letters BM.



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Grid reference

-In Toposheets include red lines in the north-south and east-west directions.

-The north-south lines are called eastings.

-And east-west lines are called northings.

-The grids formed jointly by the eastings and the northings are called reference grids.

-Grid reference is the determination of the position of the terrestrial objects using this grid.

-In 1:50000 toposheets each grid with 2 cm width & 2 cm breadth covers an area with 1 kilometre length & 1 kilometre breadth on the earth's surface.

-Eastings and Northings lines are used to solve the difficulty of accurately determining the location of small geographical features on toposheets.

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ഈസ്റ്റിങ്ങ്സ്

15	16	17	18
15	16	17	18

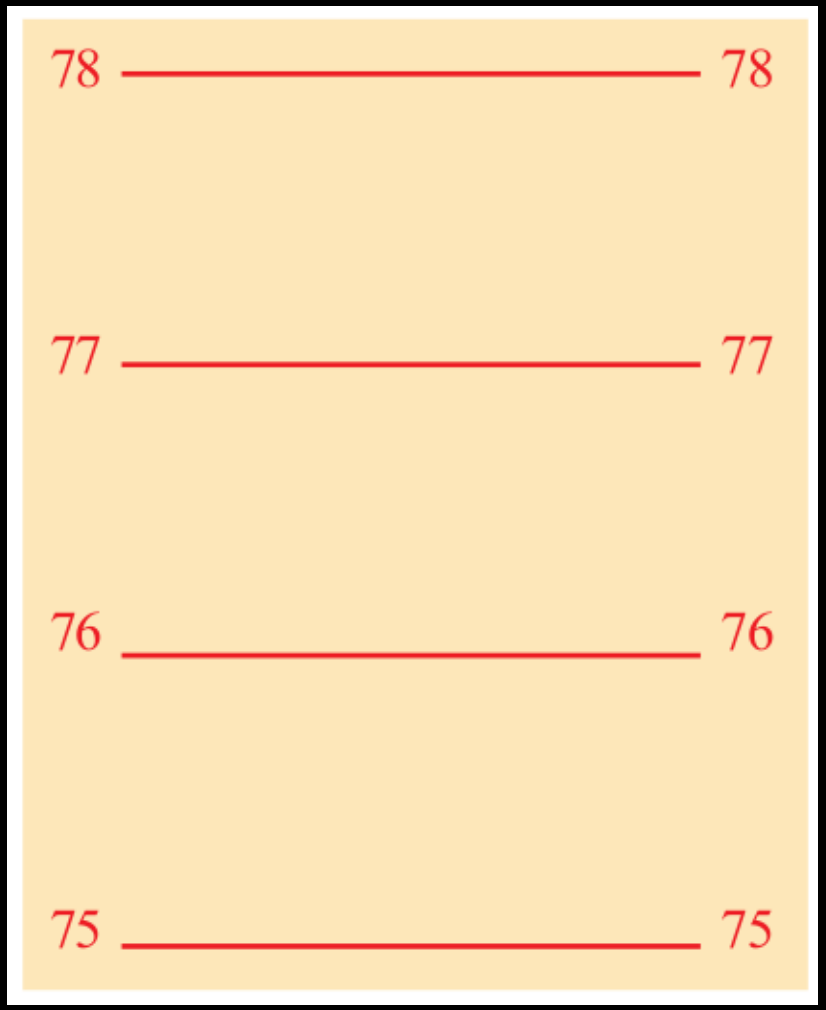
Eastings

-These are north-south lines.

-Their value increases towards the East.

-The value of the easting immediately left to the geographic features is considered for identifying a location.

നോർത്തിങ്ങ്സ്

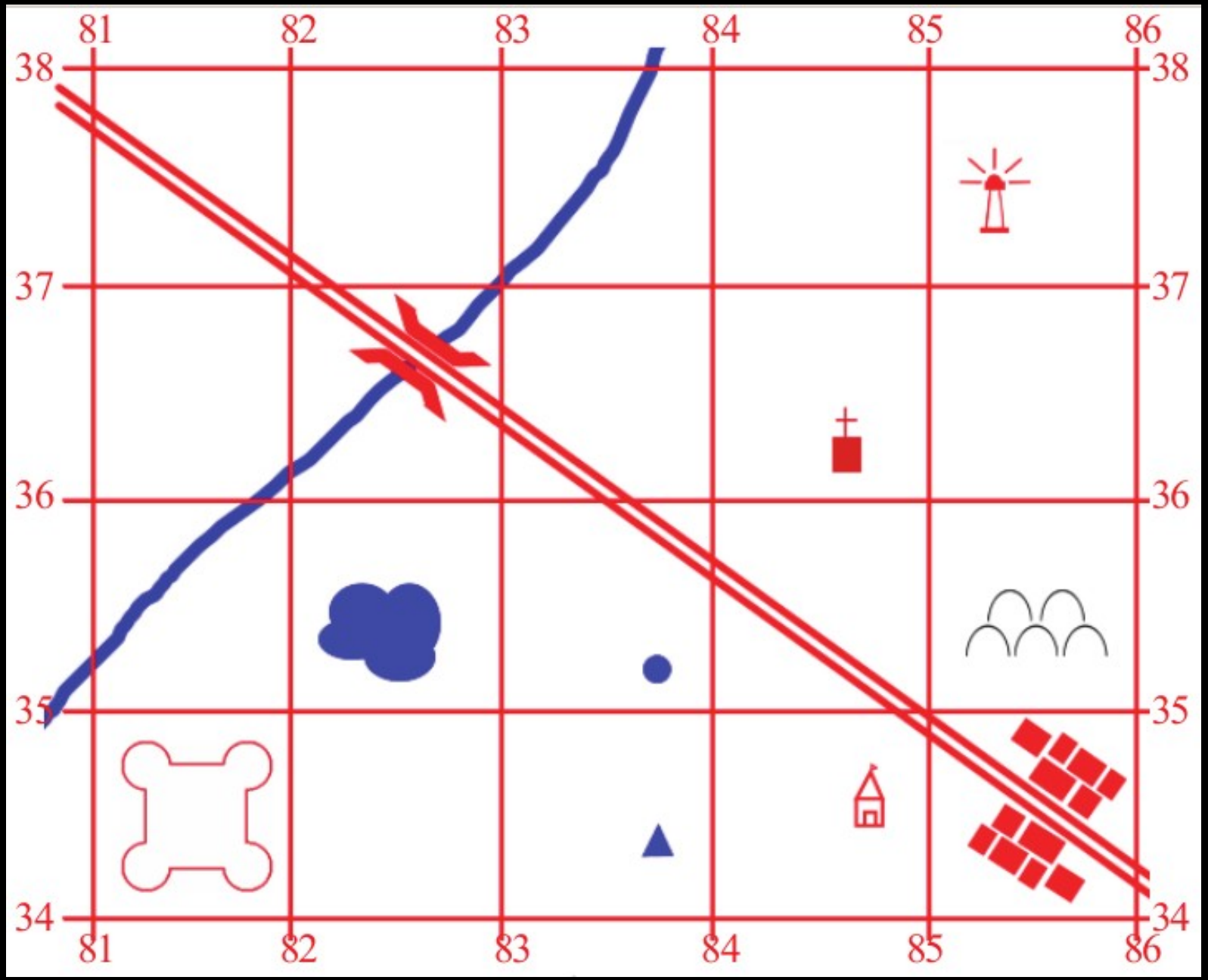


Northings

-These are lines drawn in the east-west direction.

-Their value increases towards the north.

-The value of the northings immediately to the south of the feature in the map is considered for identifying a location.



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4 - figure grid reference

-In the 4 - figure grid reference method, the value of the easting to the immediate left of the feature is to be written first.

-Then the value of the northing just south of the feature is to be written.

-This positioning method is known as four-figure grid reference.

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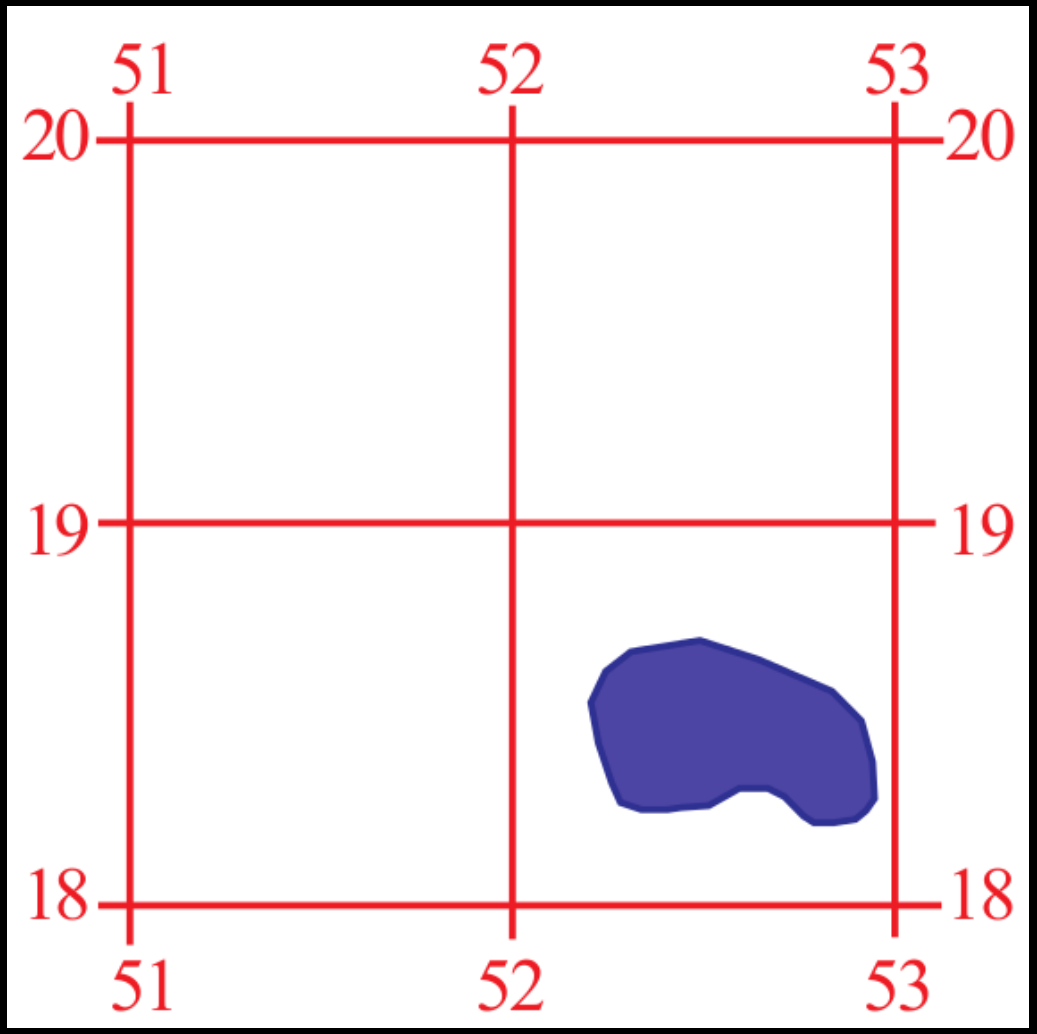

What is the position of the pool in the four figure grid reference?

5218 (Fifty two eighteen)

6-figure grid reference

-Relatively smaller geographic features are generally located through the 6-figure grid reference method.

-While determining the location of the geographical features the value of the easting to the left of it is to be written first.

-Then divide the area up to the next easting into 10 equal Parts.

-Then find the exact division on which the geographical feature is located and write it next to the value of easting already found.

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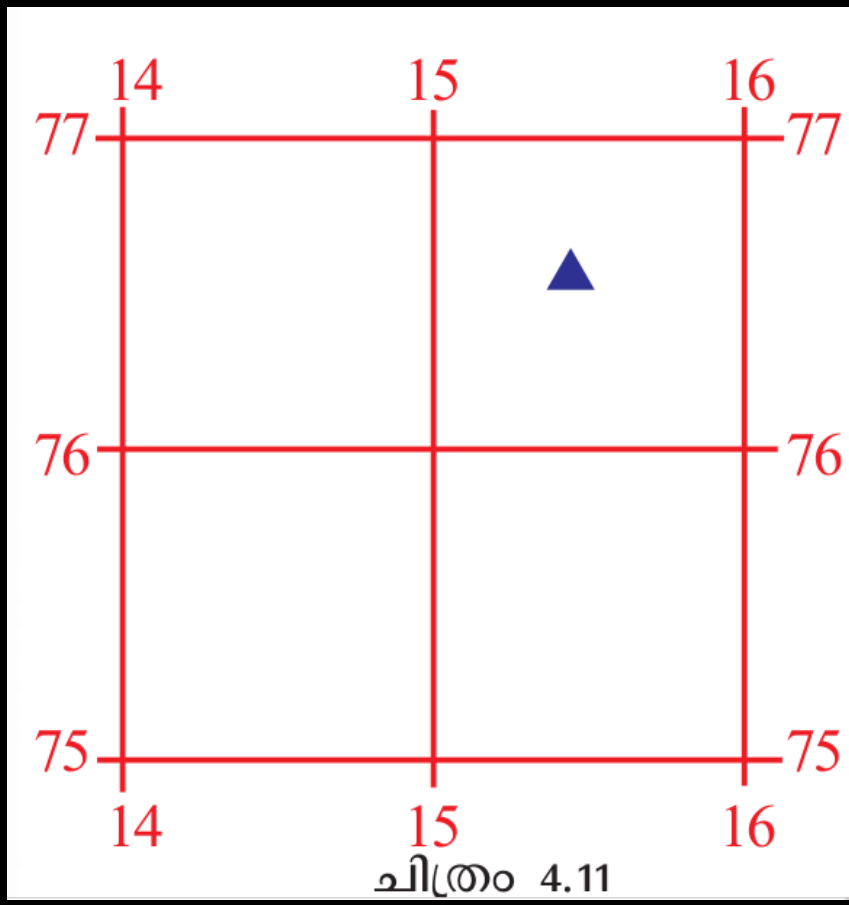
-Now write the value of the northing just below the feature along with the easting's value.

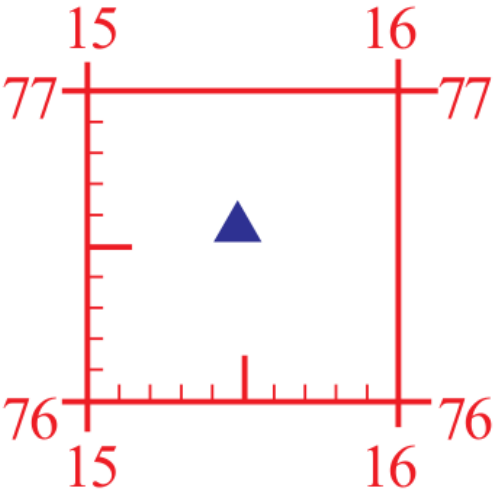
-Divide the area up to the next northing as being divided into 10 equal parts.

-Then find the exact division on which the feature is located and write it with the values already written.

-What is obtained is the exact 6 figure grid reference of the geographical feature.



ചിത്രം 4.11



ചിത്രം 4.12

What is the position of the Tube well in the 6 figure grid reference?

155766(Fifteen five seventy six six)

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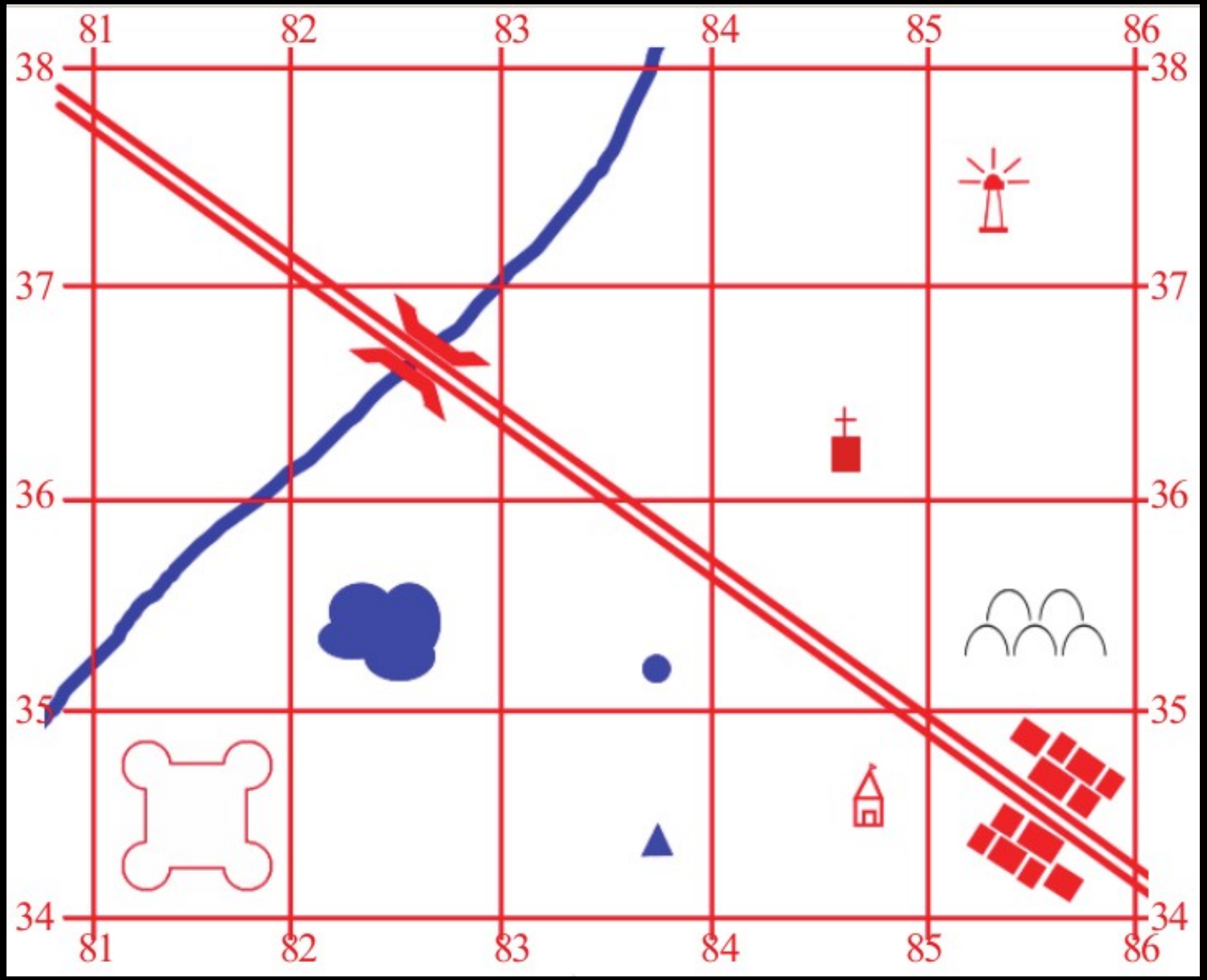

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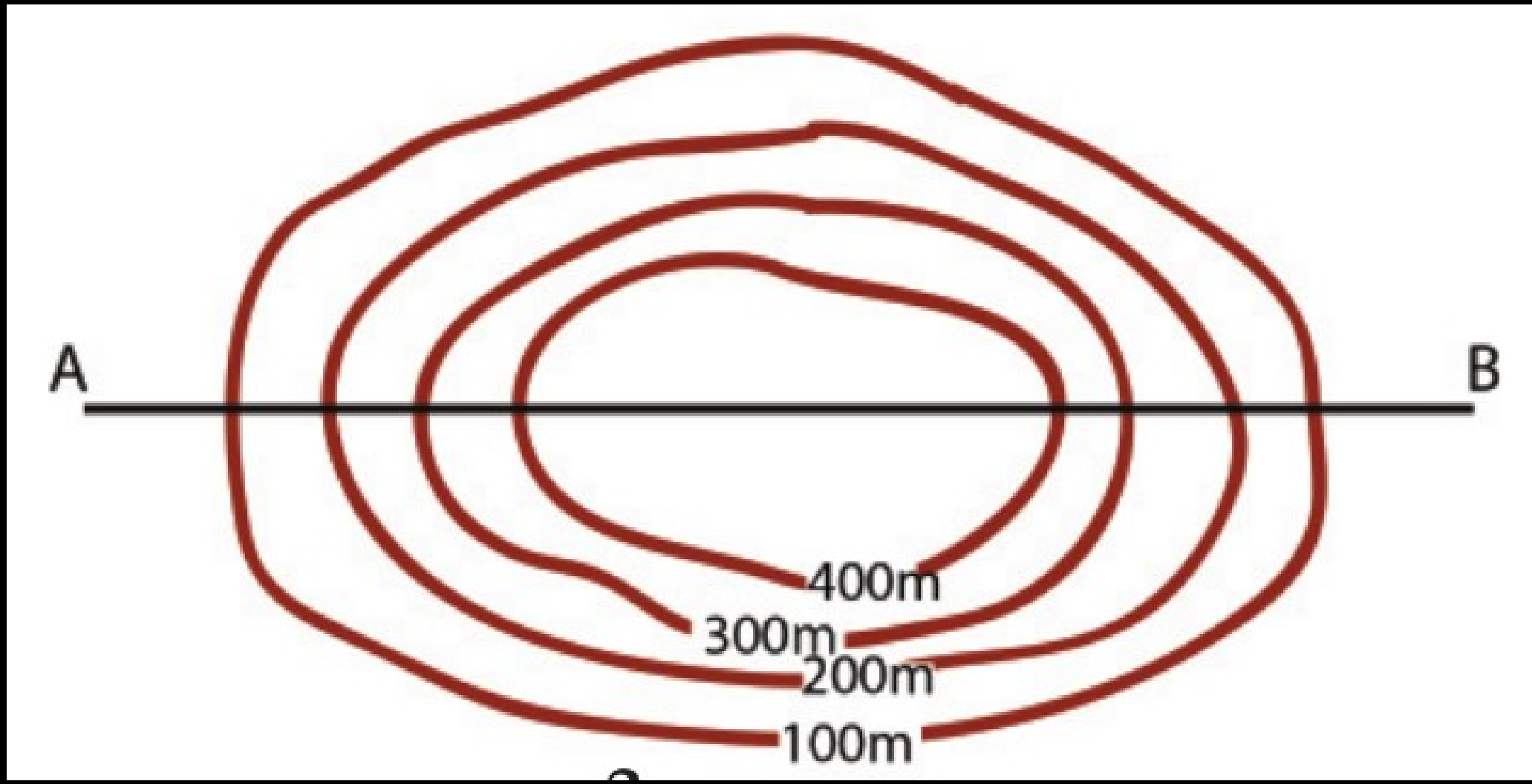
A
B
400m
300m
200m
100m

Contour Lines

-Contours are imaginary lines drawn on maps connecting those places having equal elevation from the sea level.

-The respective altitude will be marked with each contour line.

-These are called contour values.

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-The closely spaced contours represent steep slopes and the widely spaced contours represent gentle slopes.

-The following three things can be assessed from the contour lines in topographic maps.

-Altitude of the place
-Nature of the slope
-Shape of the land form

Contour interval

The contour interval of toposheets in the 1:50000 scale is generally 20 metres. By analysing the values of the contours, the altitude of places represented in the maps can be found out. To understand the relief of elevated landforms, contours with 100 metre interval are used.

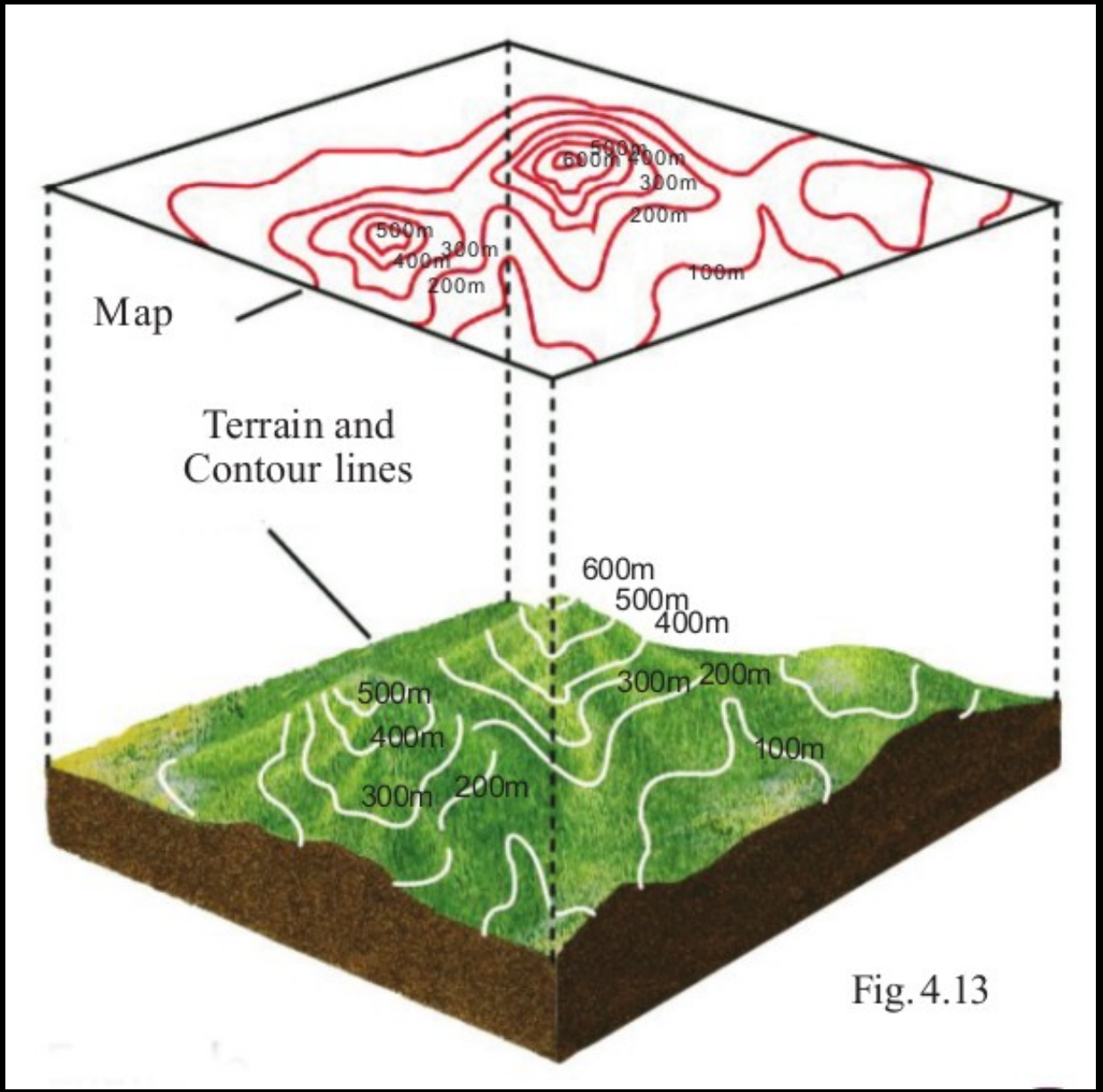


Fig. 4.13

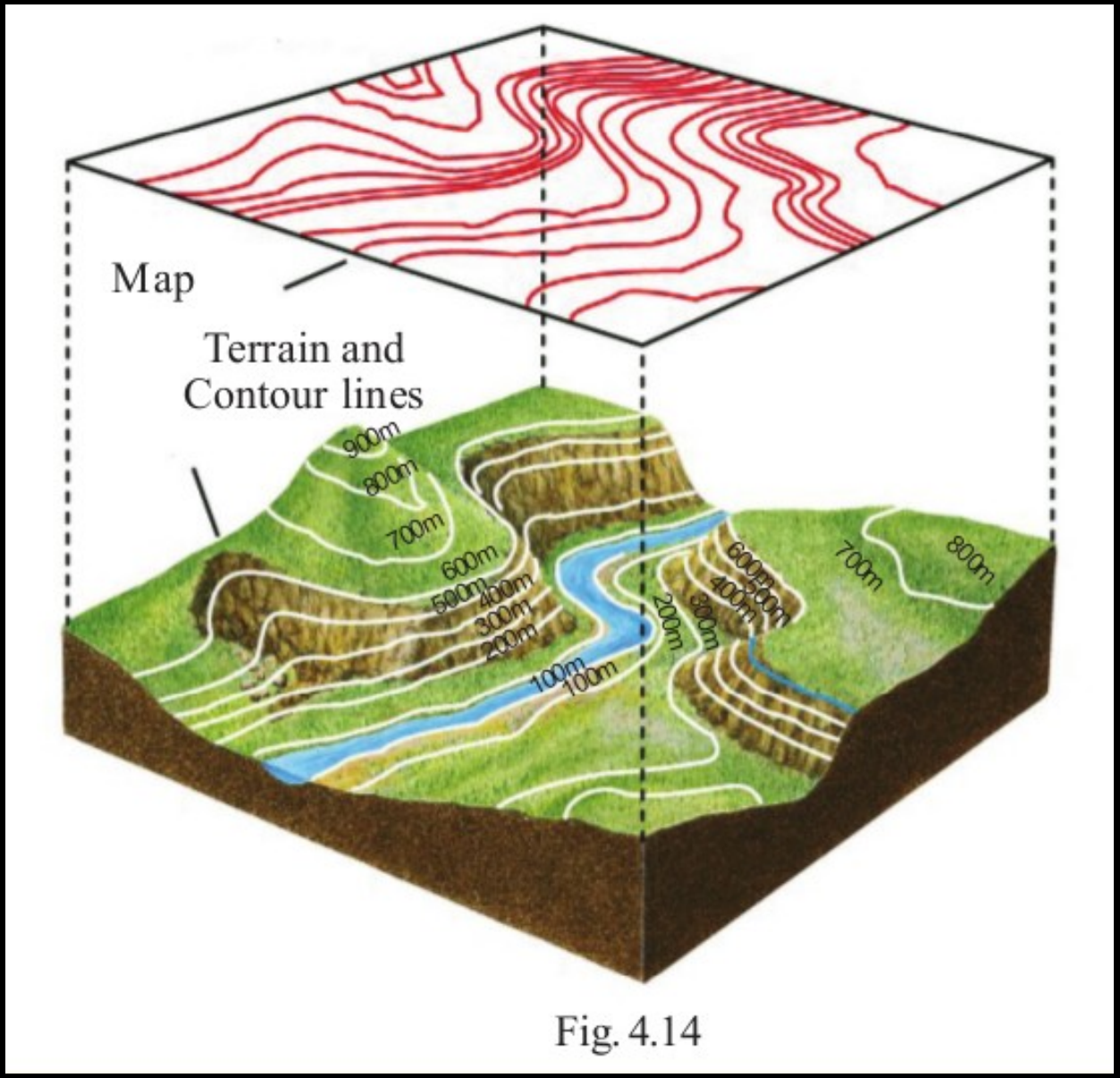
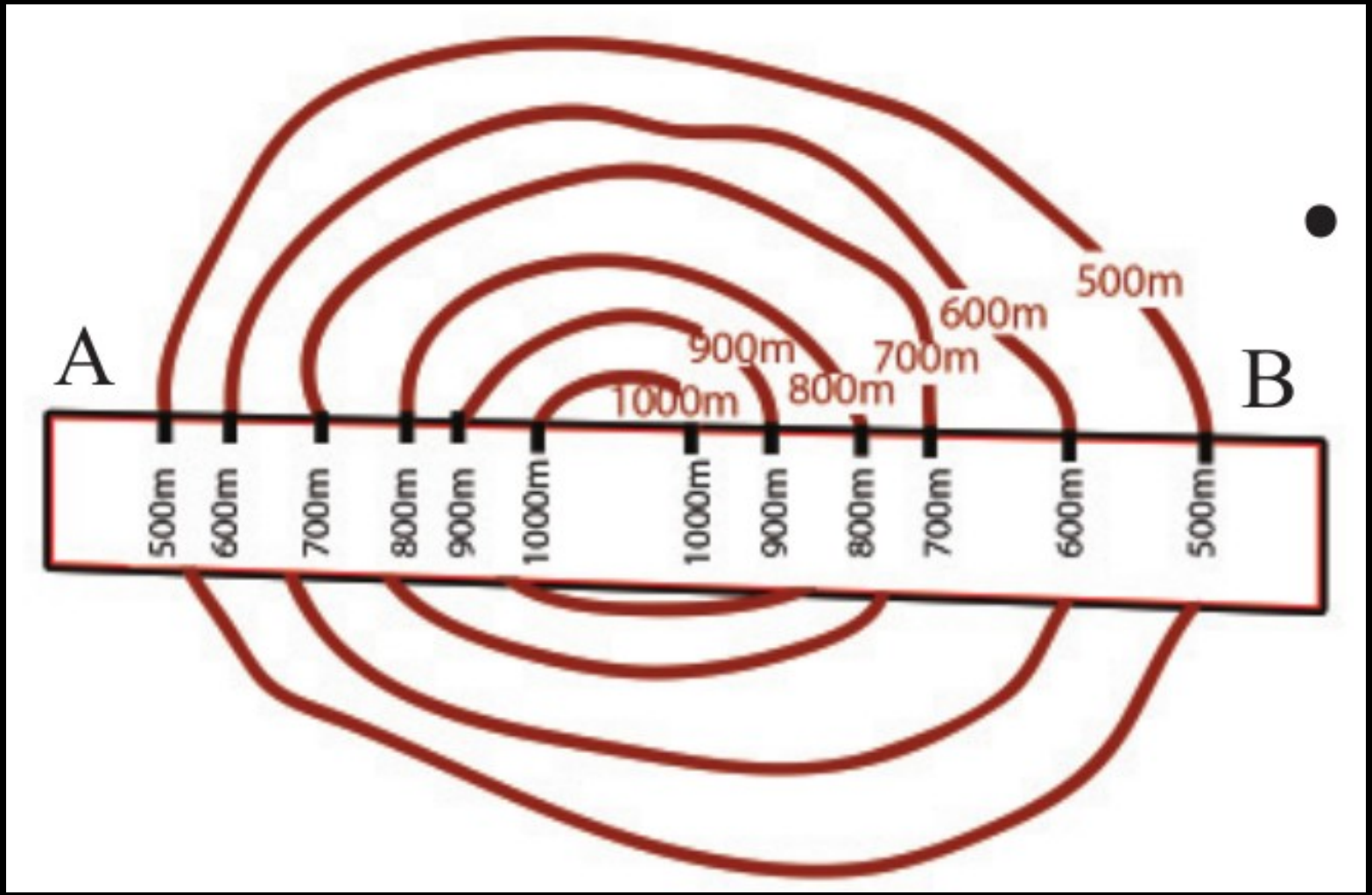
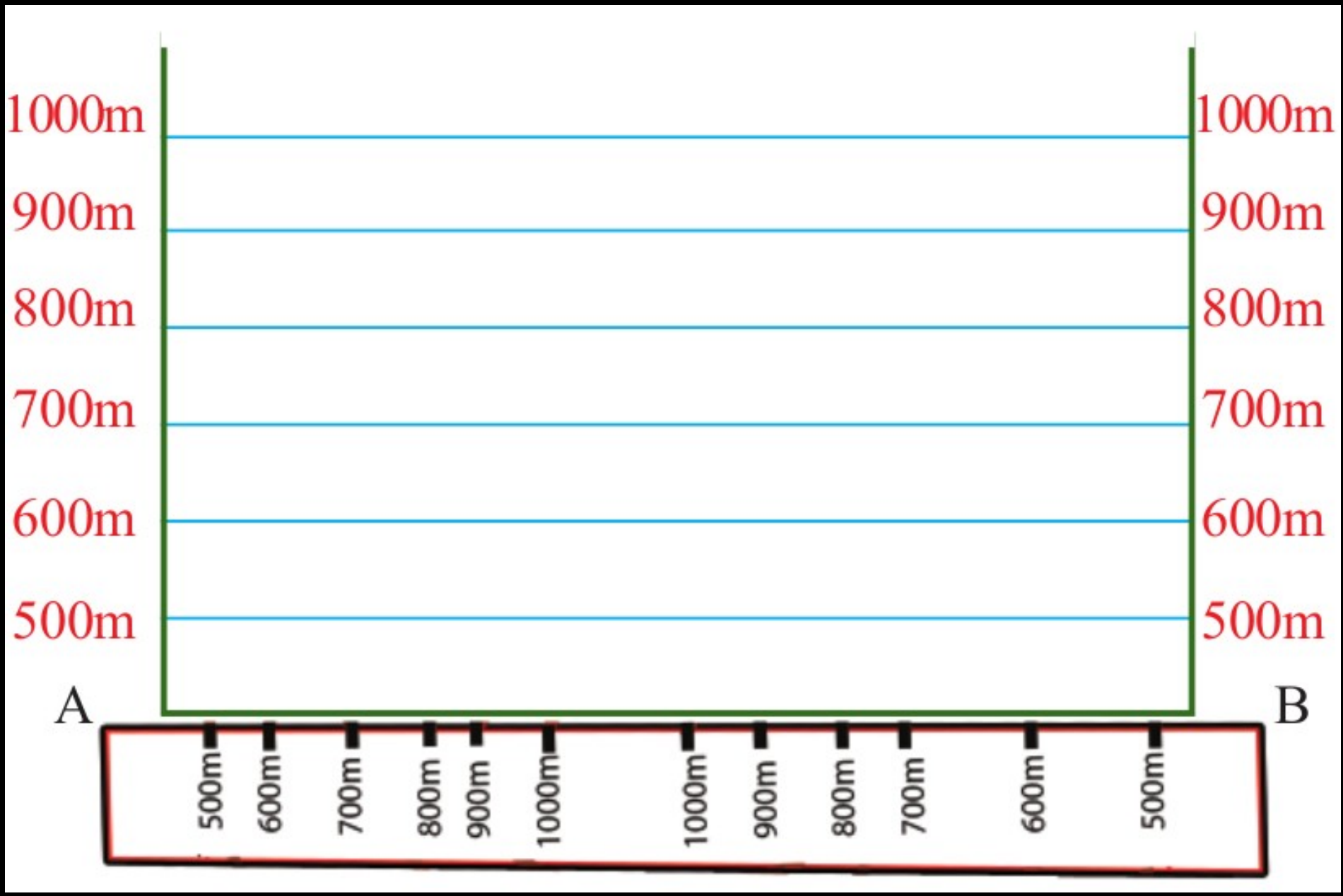

Map
Terrain and
Contour lines
900m
800m
700m
600m
500m
400m
300m
200m
100m
100m
200m
300m
400m
500m
600m
700m
800m

Fig. 4.14

The method of finding the shape of places directly from contour lines





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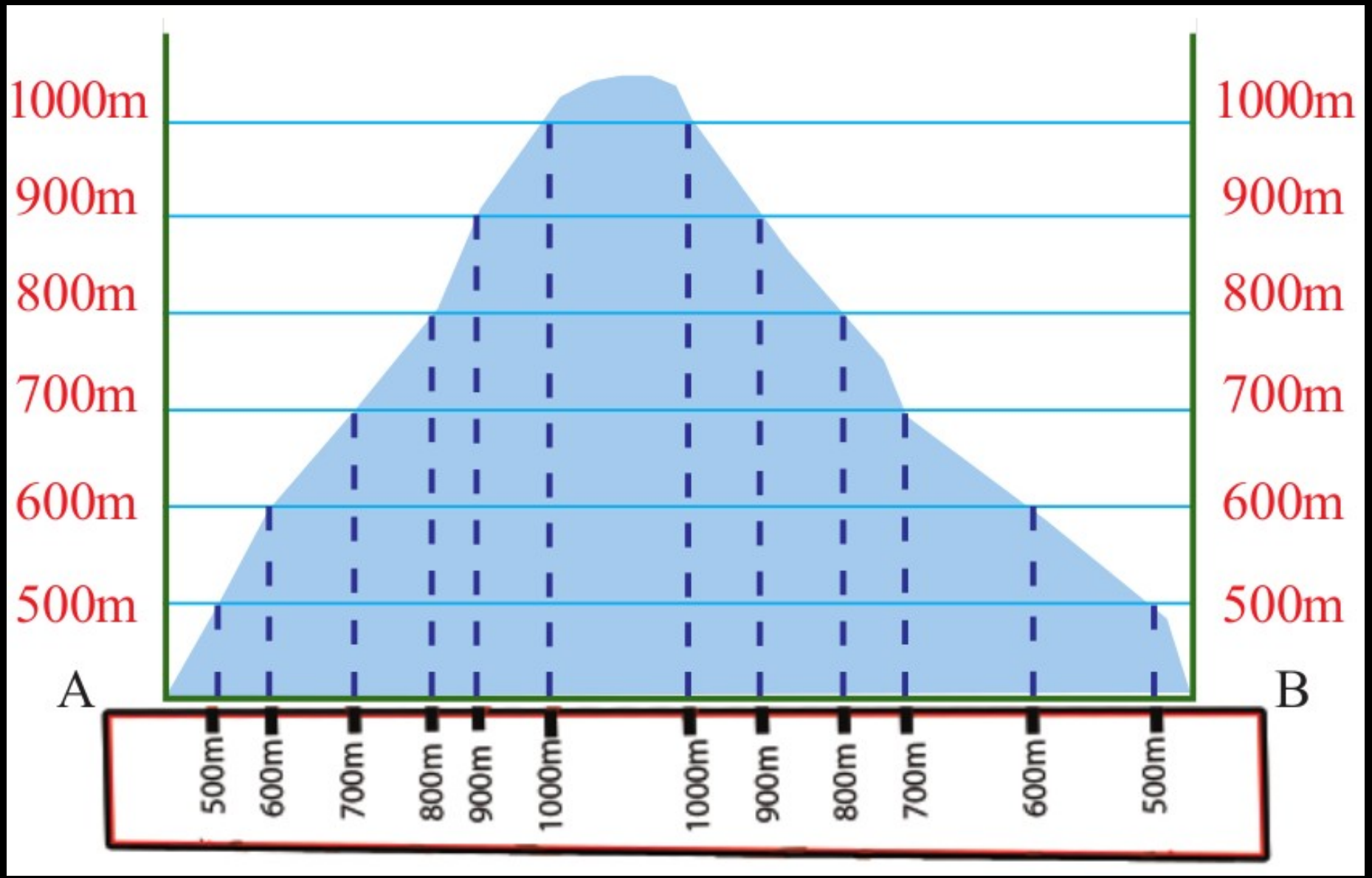

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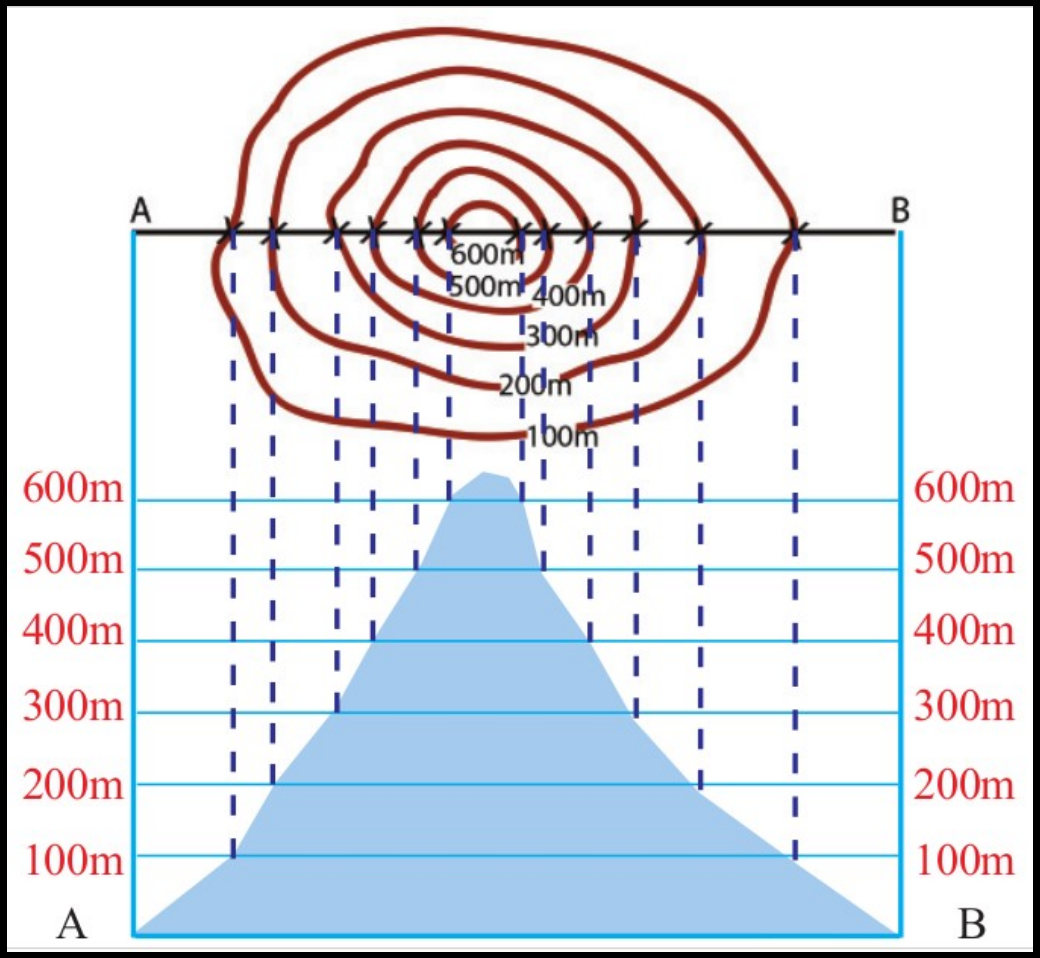
The method of finding the shapes by tracing out the contour lines



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Determine the shape of the place using both methods.

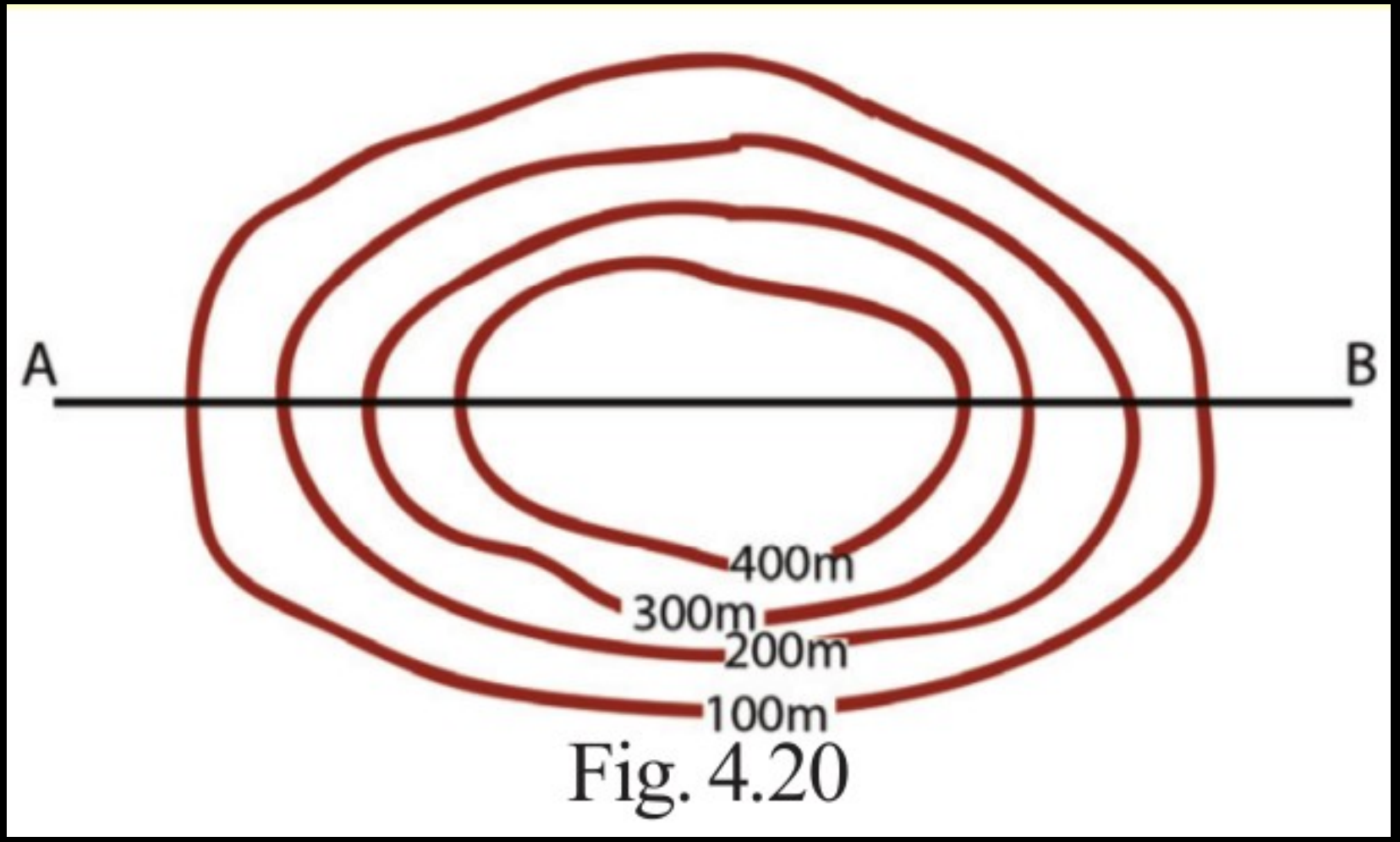

Fig. 4.20

Determine the shape of the place using both methods.

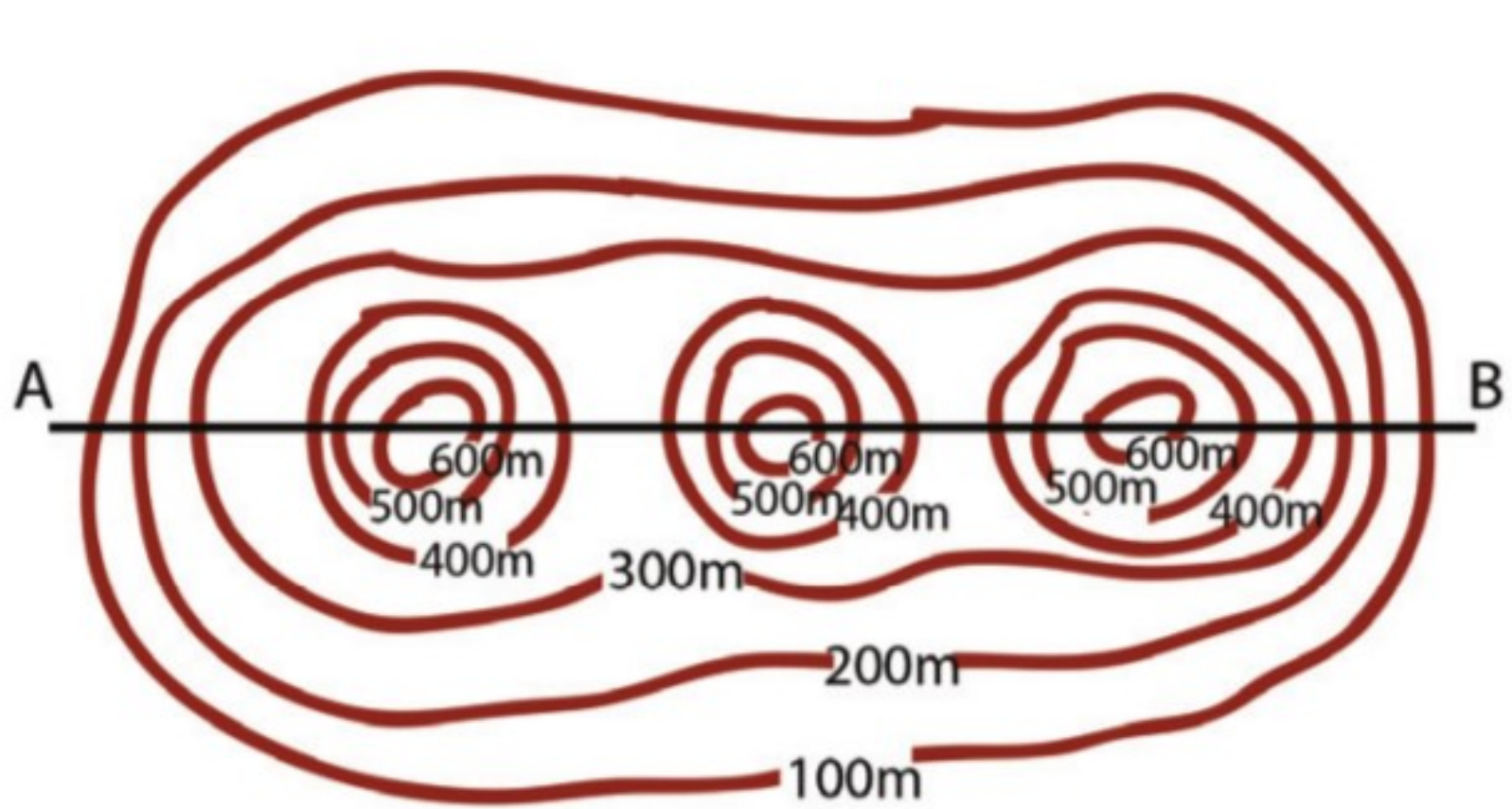

Fig. 4.21

Intervisibility

- If any two places are mutually visible, then we can establish that these places are intervisible.

- Intervisibility assessment is being applied for erecting electric posts, mobile towers and wireless transmission towers.

- To find out the intervisibility between two place we must draw the shape of geographical feature by using contour lines.

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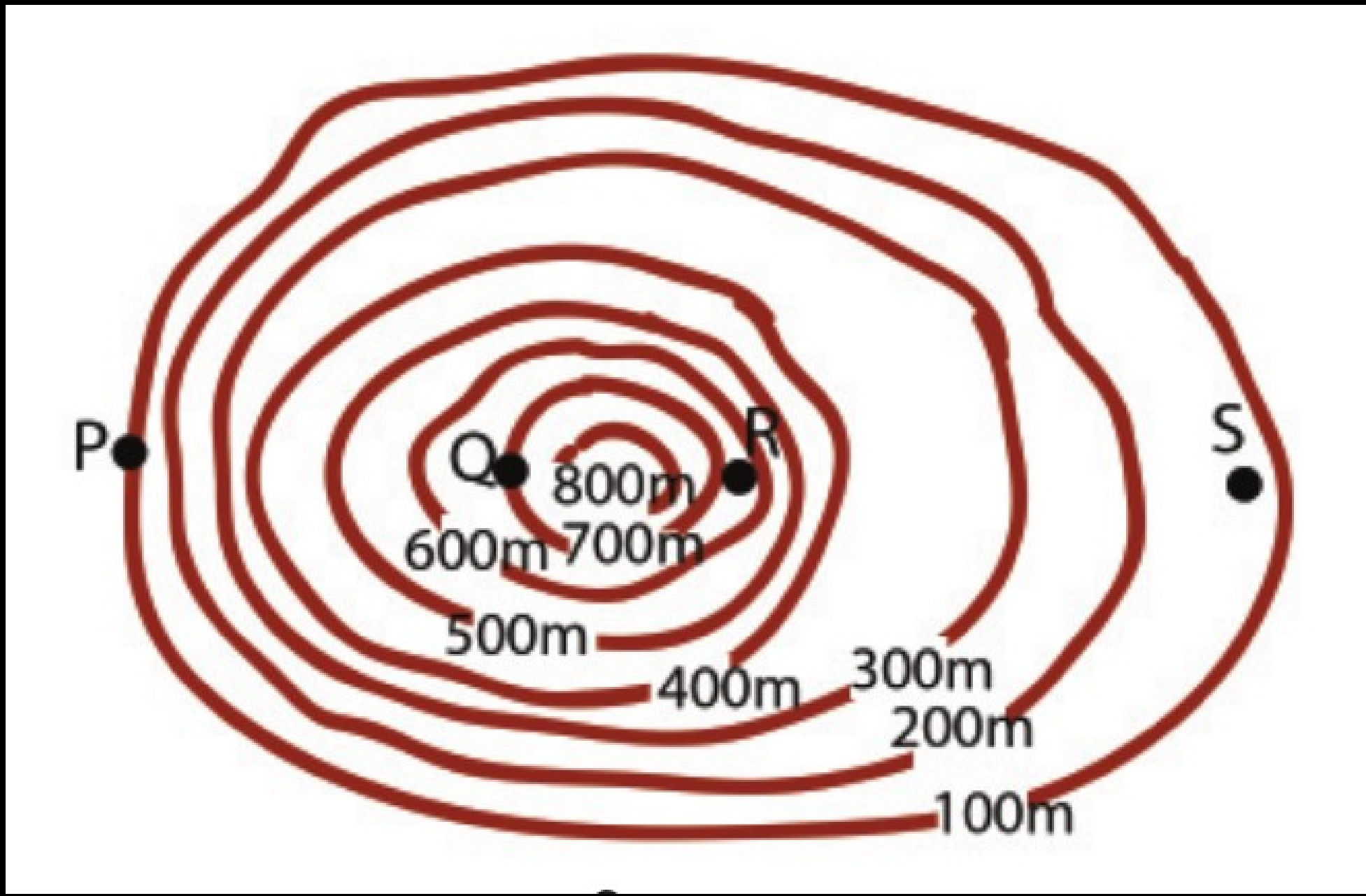

P
Q
R
S
800m
700m
600m
500m
400m
300m
200m
100m

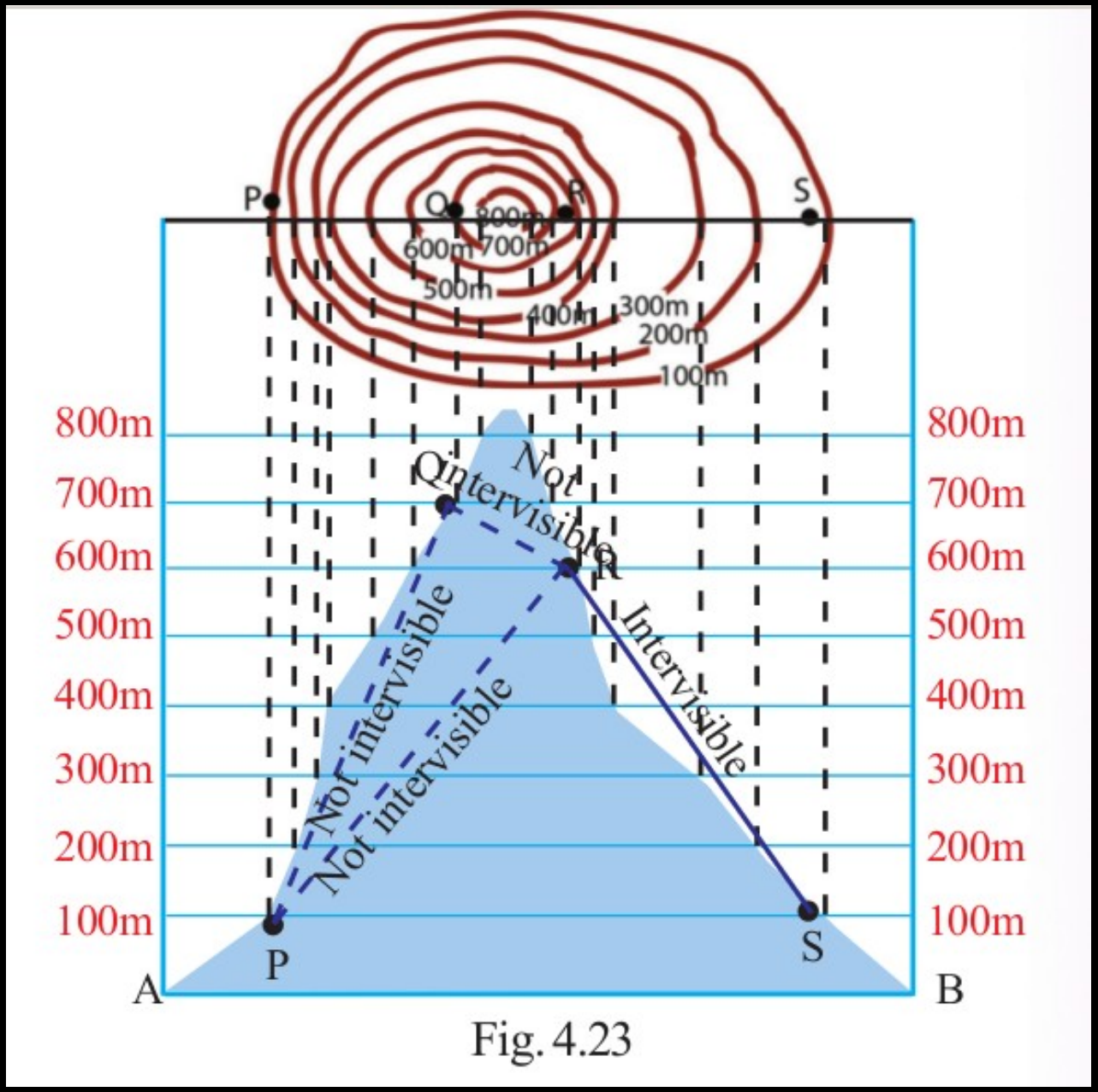
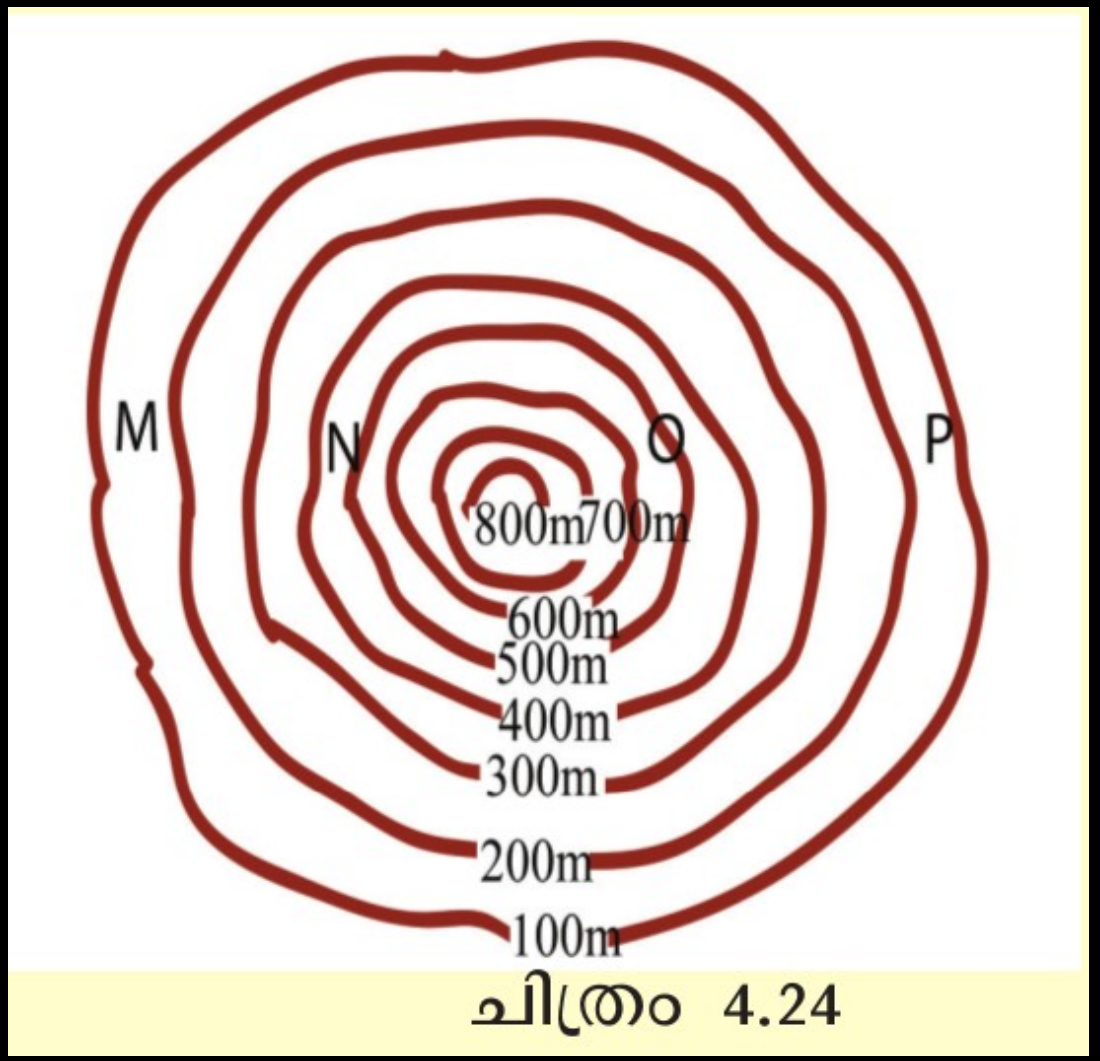

P
Q
R
S
800m
700m
600m
500m
400m
300m
200m
100m
Not intervisible
Not intervisible
Not intervisible
Intervisible
A
B

Fig. 4.23

Find out the Intervisibility



ചിത്രം 4.24

Places	Intervisible/ Not intervisible
• Between M and N	• **Yes**
• Between N and O	• **No**
• Between O and P	• **Yes**
• Between M and O	• **No**
• Between M and P	• **No**
• Between N and P	• **No**

Toposheet interpretation

- Marginal Information/Primary information,

- Physical/Natural features,

- Cultural/Man-made features.

These are the different stages of study and interpretation of toposheet.

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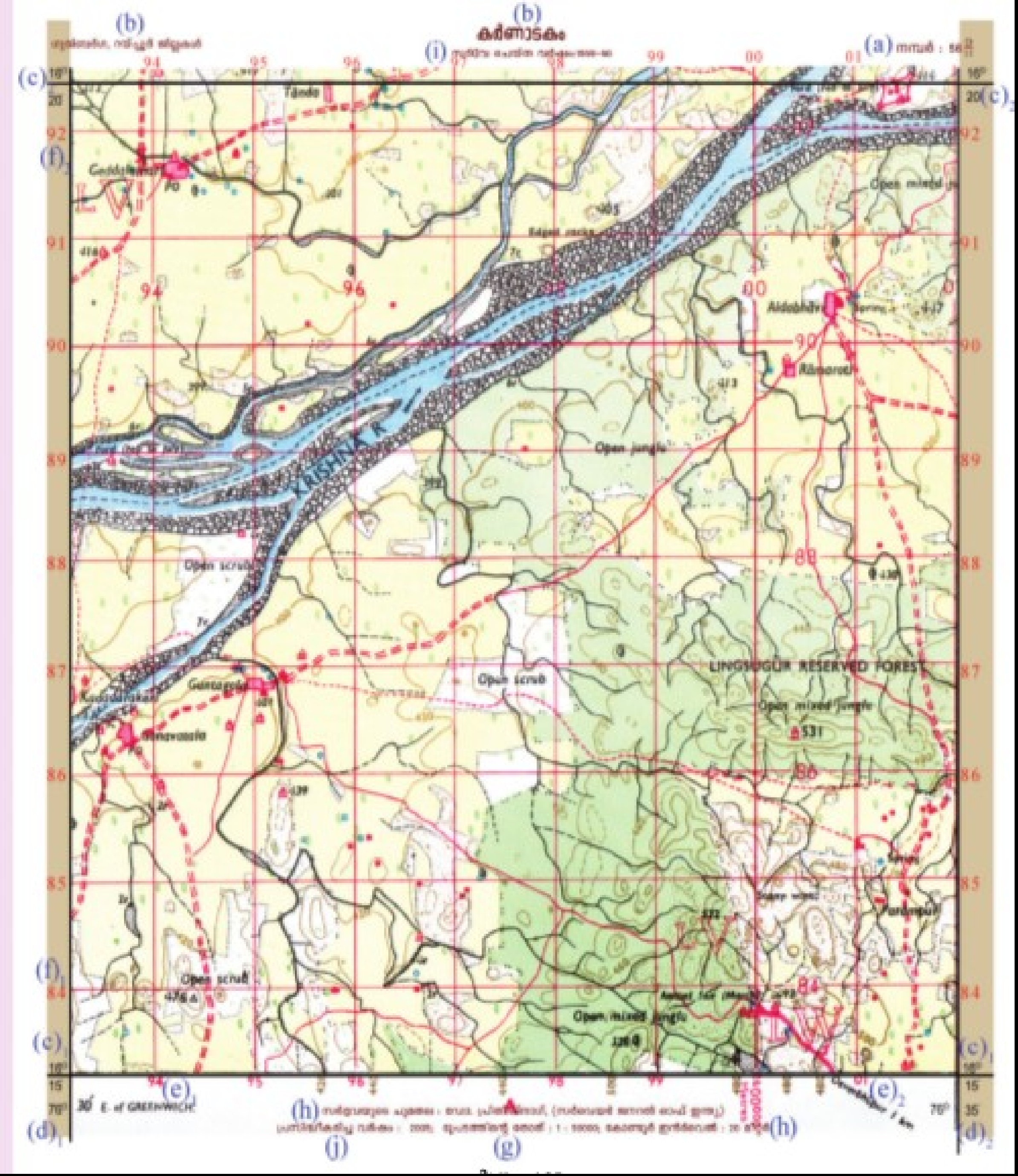

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Marginal Information or Primary information.

-The general information given outside the margins in topographic maps is known as marginal/primary information.

Marginal Information
or Primary information & indicators.

- Topo sheet number - (a)
- Name of the place represented - (b)
- Latitudinal location - (c) 1 , (c) 2
- Longitudinal location - (d) 1 , (d) 2
- Easting - (e) 1 , (e) 2
- Northing - (f) 1 , (f) 2
- Scale of the map – (g)
- Contour interval - (h)
- Year of survey - (i)
- Year of publication - (j)
- Agency in charge of survey - (k)

Physical features of toposheets

Water bodies such as

- **-rivers,**
- **-streams,**
- **-springs, etc. and**
- **-different landforms**

are the physical features in topographic maps.

Find answers to the following questions by reading the given toposheets (Fig 4.25).

- *Which is the major river flowing through this area?* **Krishna**
- *In which direction does it flow?* **North - East**
- *On which bank of the river are the forests seen?* **South**
- *What is the name of the reserve forest in this area?* **Lingusur**
- *How many springs are seen in this region? Locate them based on direction.* **Two, South east & Noth east**
- *Locate the open scrubs in this area* **West and middle**
- *Find out the location of the following using the 6-figure grid reference method.*

• *476A* • *447* • *the spring north of Parampur village*

476A - 944839 **447- 017903** **013852**

Cultural features

Cultural features are man-made objects on toposheet.
-Settlements,
-different types of roads,
-boundaries,
-places of worship,
-agricultural lands,
-post office,
-police station,
-bridges,
-wells and tube wells are a few cultural features shown in toposheets.

Find answers to the following questions by reading the given toposheets (Fig 4.25).

- *Identify the districts in Karnataka to which the area belongs.*
  Gulberga, Raichur
- *Based on which natural feature is the district boundary determined?* **River-Krishna**
- *Where is the metalled road seen?* **South-East**

- *In which direction is the Gadalamari village situated?*
  North-West
- *Which are the villages where post offices can be found?*
  Geddalamari, Ganavatala

- *Find the location using the 4-figure grid reference method.*
  - *Aldobhavi village* **0090**
  - *Ganavathala village* **9386**
  - *Fort to the north-eastern corner* **0192**
- *Using the 6-figure grid reference method, find the locations of:*
  - *Temple near Gadalamari village* **942917**
  - *Temple within the Lingusugar Reserve Forest* **004863**
  - *Post office in Ganavathala village* **937863**

ALL THE BEST

GHSS TUVVUR

MALAPPURAM – 9778300200