

# CE 103: Surveying

## Lecture 8: Plane table surveying

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# Outline

- ❑ Equipment of plane table survey
- ❑ Trough compass
- ❑ Intersection, radiation and traverse
- ❑ Advantages and disadvantages of plane table survey

# Plane Table Surveying

- **Plane Table Surveying is a graphical method of survey in which the field observations and plotting are done simultaneously.**
- **It is simple and cheaper than theodolite survey. It is most suitable for small scale maps.**

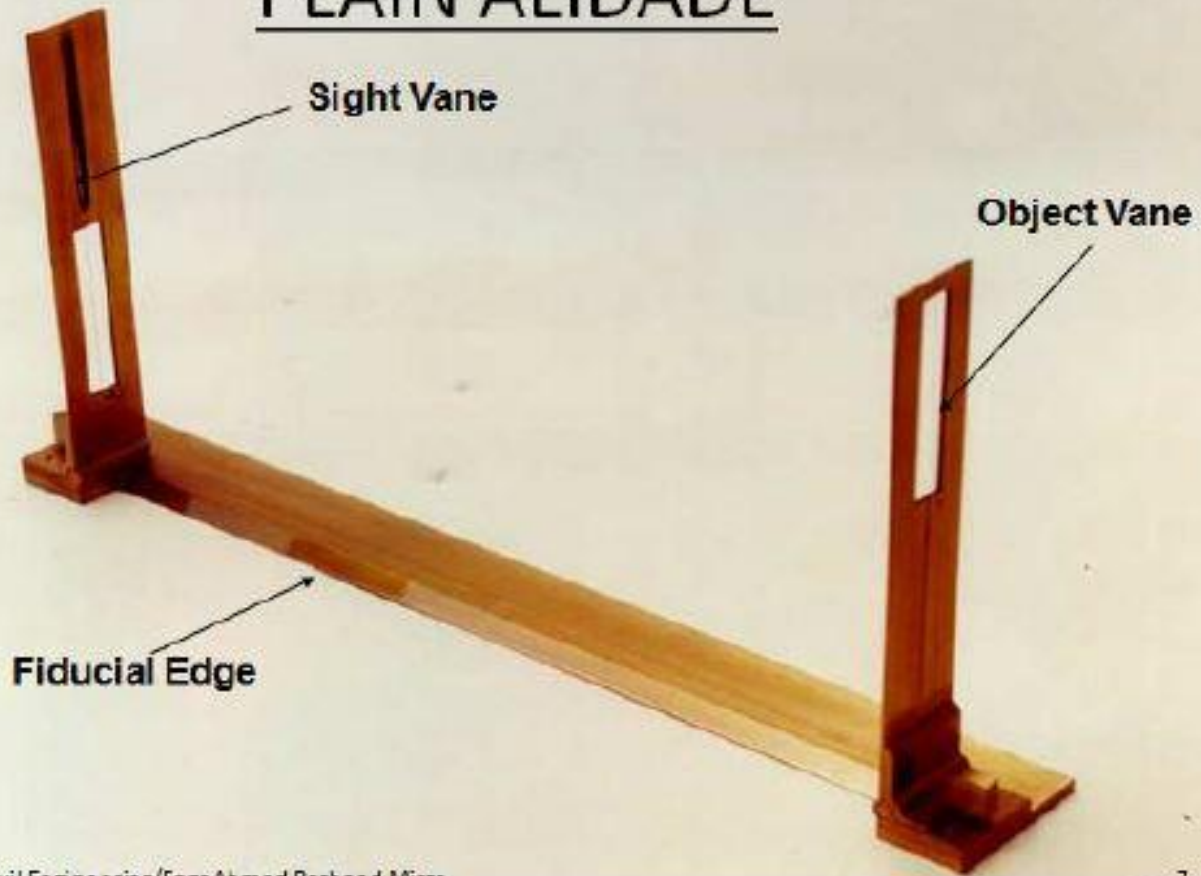
# Equipments and Accessories for Plane Tabling

- Plane Table
- Tripod
- Alidade
- Trough Compass
- Spirit level
- Plumbing Fork
- Plumb Bob

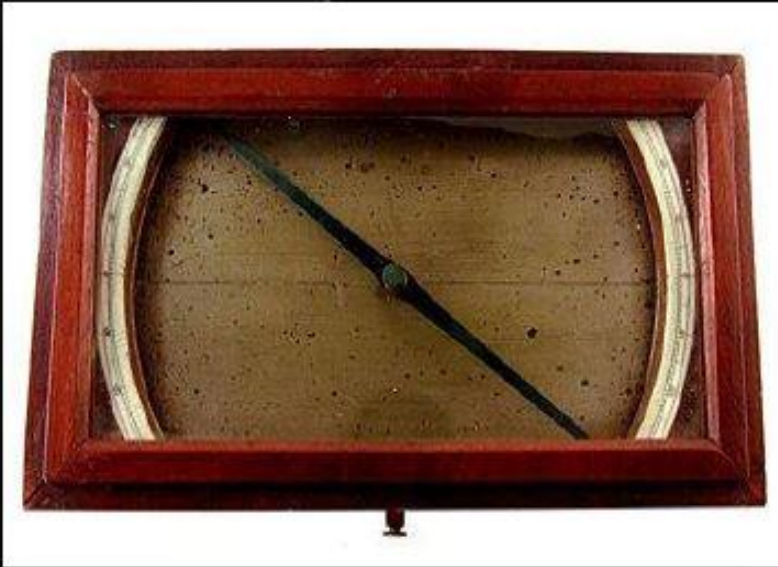
# Plane Table



# PLAIN ALIDADE



# Trough Compass



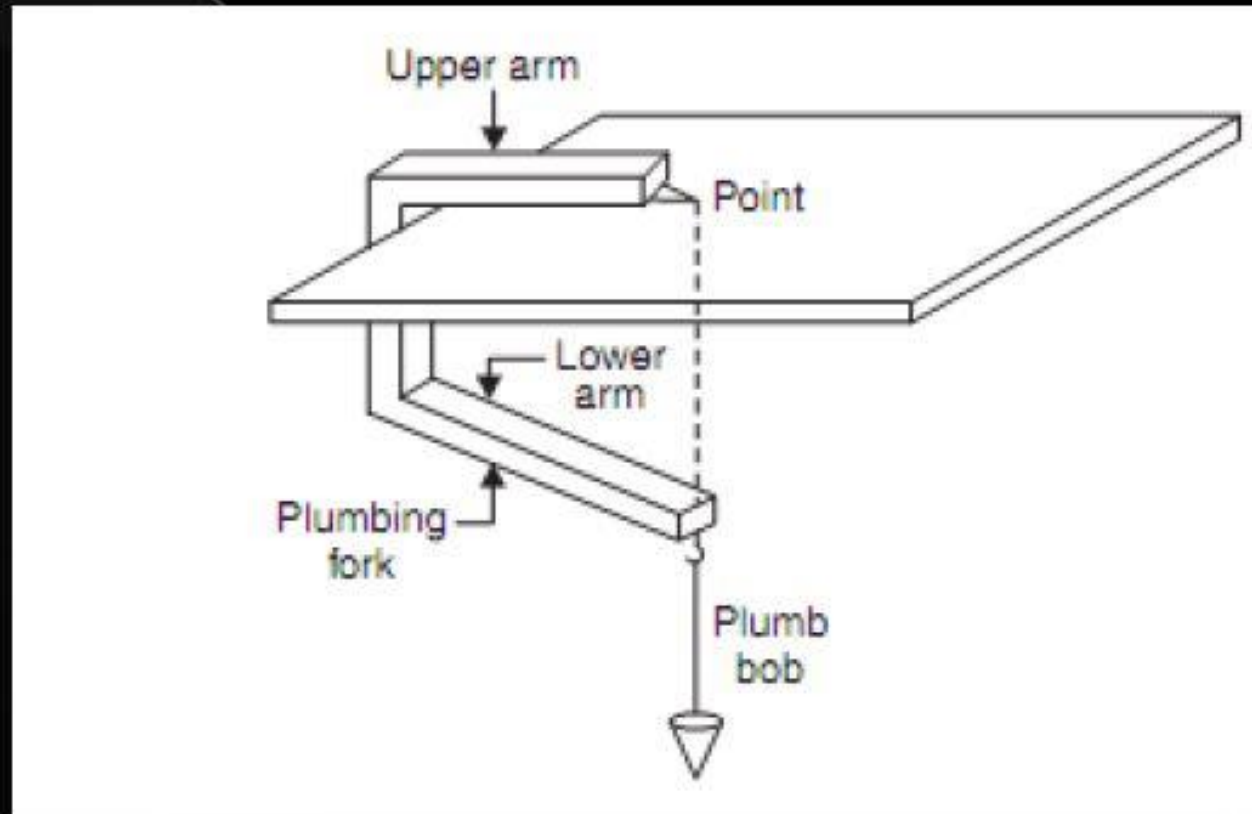


# SPIRIT LEVEL





# Plumbing Fork and Plumbing Bob



# Working Operations

- **Fixing** : Fixing the table to the tripod.
- **Setting**:
  - i) Levelling the table
  - ii) Centering
  - iii) Orientation
- **Sighting** the points.

## Orientation by trough compass

For orientation, the compass is so placed on the plane table that the needle floats centrally, and a fine pencil line is ruled against the long side of the box. At any other station, where the table is to be oriented, the compass is placed against this line and the table is oriented by turning it until the needle floats centrally. The table is then clamped in position.



## Orientation by backsighting

To orient table at the next station, say **B**, represented on the paper by a point **b** plotted by means of line **ab** drawn from a previous station **A**, the alidade is kept on the line **ba** and the table is turned about its vertical axis in such a way that the line of sight passes through the ground station **A**. When this is achieved, the plotted **ab** will be coinciding with the ground line **AB** (provided the centering is perfect) and the table will be oriented. The table is then clamped in position.

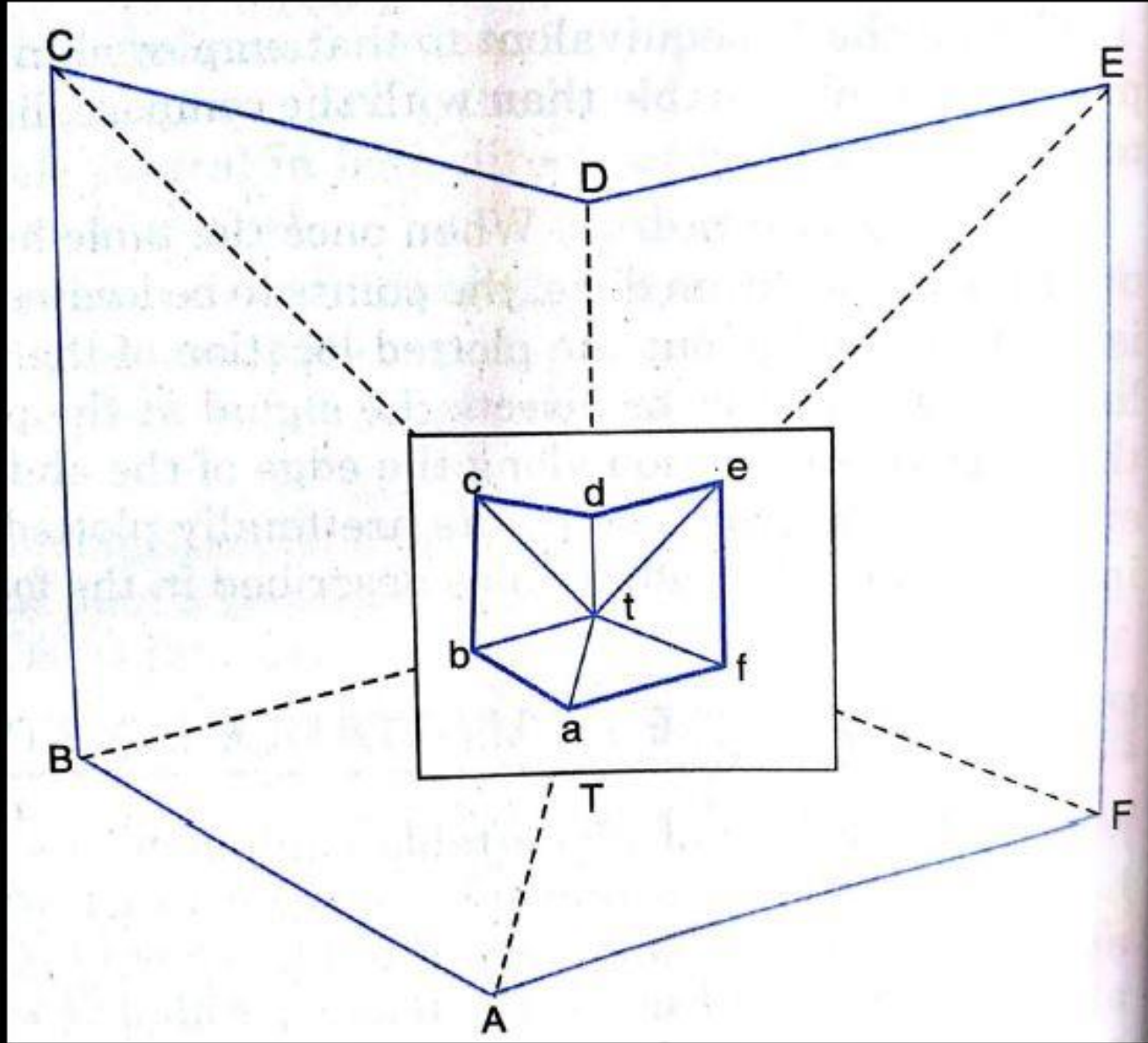
# Methods of Plane Tabling

- Radiation
- Intersection
- Traversing

# Radiation

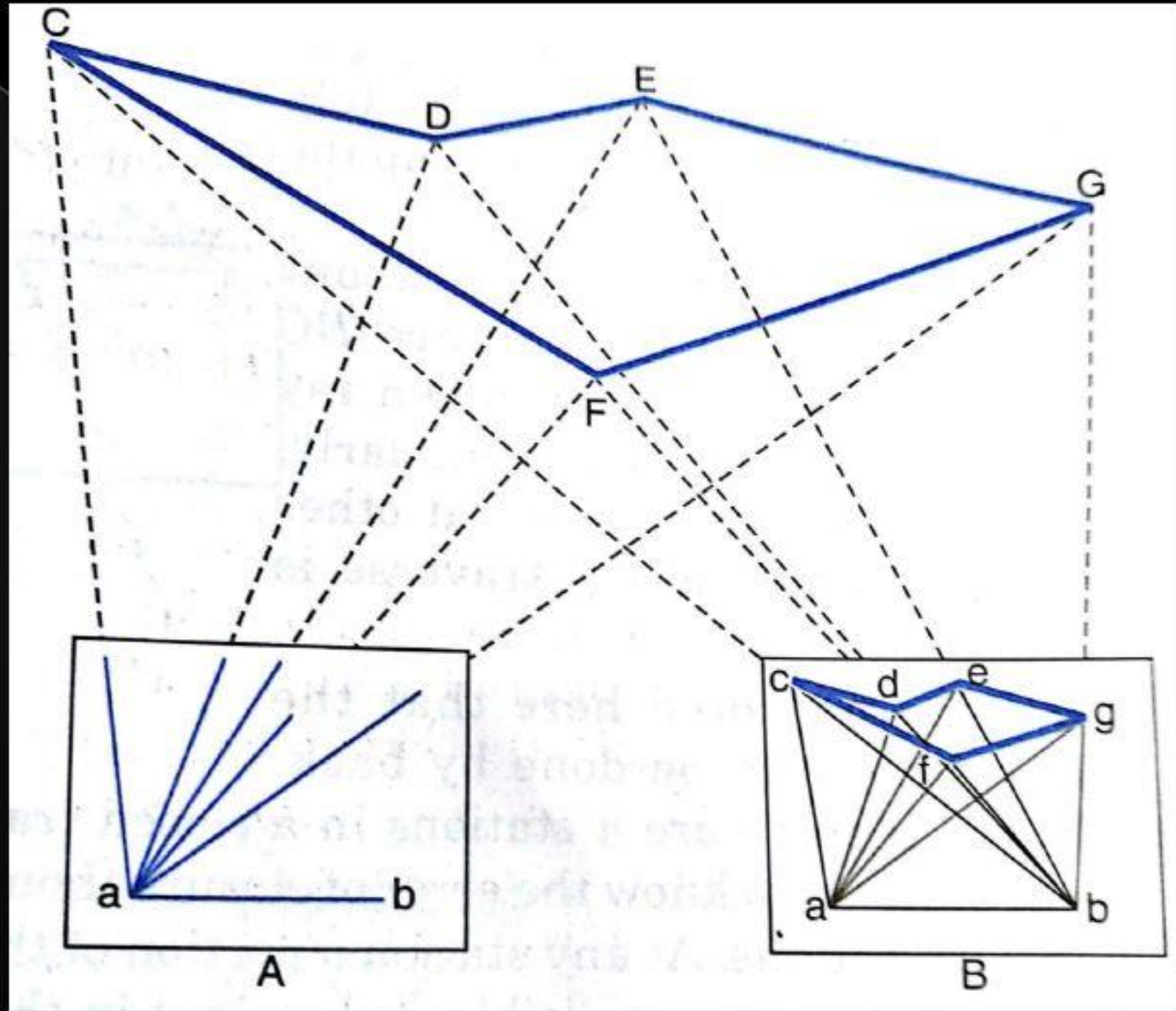
1. Set the table at ***T***, level it and transfer the point on to the sheet by means of plumbing fork, thus getting point ***t*** representing T. Clamp the table.
2. Keep the alidade touching ***t*** and sight to A. Draw the ray along the fiducial edge of the alidade. Similarly, sight different points B, C, D, E etc., and draw the corresponding rays. A pin may be inserted at ***t***, and the alidade may be kept touching the pin while sighting the points.
3. Measure ***TA, TB, TC, TD, TE*** etc., in the field and plot their distances to some scale along the corresponding rays, thus getting ***a, b, c, d, e*** etc. Join these if needed.





# Intersection

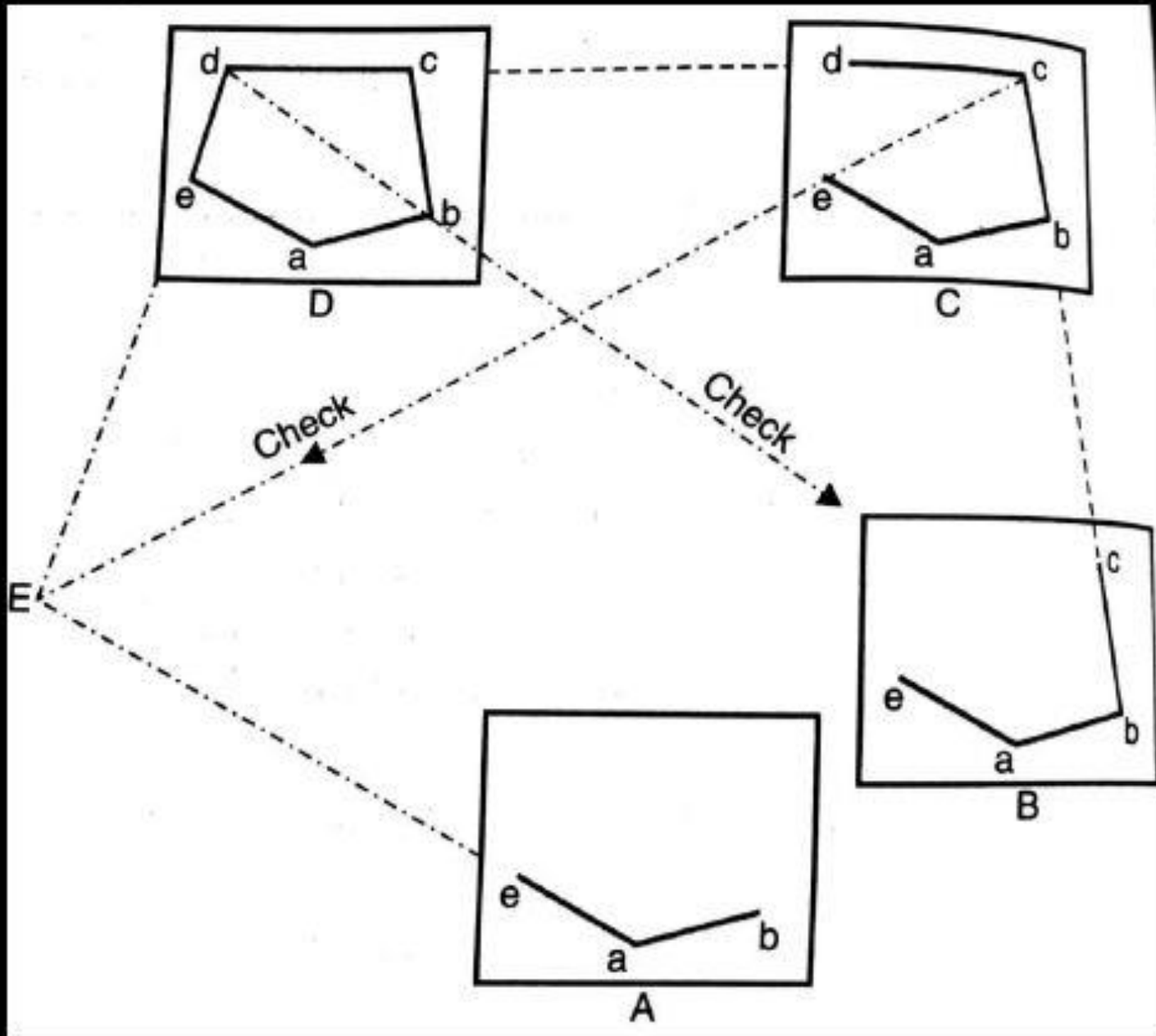
1. Set the table at **A**, level it and transfer the point **A** on to the sheet by way of plumbing fork. Clamp the table.
2. With the help of the trough compass, mark the north direction on the sheet.
3. Pivoting the alidade about **a**, sight it to **B**. Measure **AB** and plot it along the ray to get **b**. The base line **ab** is thus drawn.
4. Pivoting the alidade about **a**, sight the details **C, D, E** etc., and draw corresponding rays.
5. Shift the table at **B** and set it there. Orient the table roughly by compass and finally by backsighting **A**.
6. Pivoting the alidade about **b**, sight the details **C, D, E** etc. and draw the corresponding rays along the edge of the alidade to intersect with the previously drawn rays in **c, d, e** etc. The positions of the points are thus mapped by way of intersection.





# Traversing

- Set the table at **A**. Use plumbing fork for transferring **A** on to the sheet. Draw the direction of magnetic meridian with the help of trough compass.
- With the alidade pivoted about **a**, sight it to **B** and draw the ray. Measure **AB** and scale off **ab** to some scale. Similarly, draw a ray towards **E**, measure **AE** and plot **e**.
- Shift the table to **B** and set it. Orient the table accurately by backsighting **A**. Clamp the table.
- Pivoting the alidade about **b**, sight to **C**. Measure **BC** and plot it on the drawn ray to the same scale. Similarly, the table can be set at other stations and the traverse is completed.



# Advantages of Plane Table Surveying

- i) It is most suitable for preparing small-scale maps.
- ii) It is most rapid.
- iii) The field book is not necessary as plotting is done in the field concurrently with the field work, and hence the mistakes in booking the field notes are avoided.
- iv) The surveyor can compare the plotted work with the actual features of the area surveyed and thus can ascertain if it represents them properly.
- v) It is particularly advantageous in magnetic areas where compass survey is not reliable.
- vi) It is less costly than a theodolite survey.
- vii) No great skill is required



## Disadvantages of Plane Table Surveying

- i) It is not suitable for work in a wet climate.
- ii) It is heavy, cumbersome and awkward to carry.
- iii) There are several accessories to be carried, and, therefore, they are likely to be lost.
- iv) It is not intended for accurate work.
- v) If the survey is to be re-plotted to a different scale or quantities are to be computed, it is a great inconvenience in absence of the field notes.