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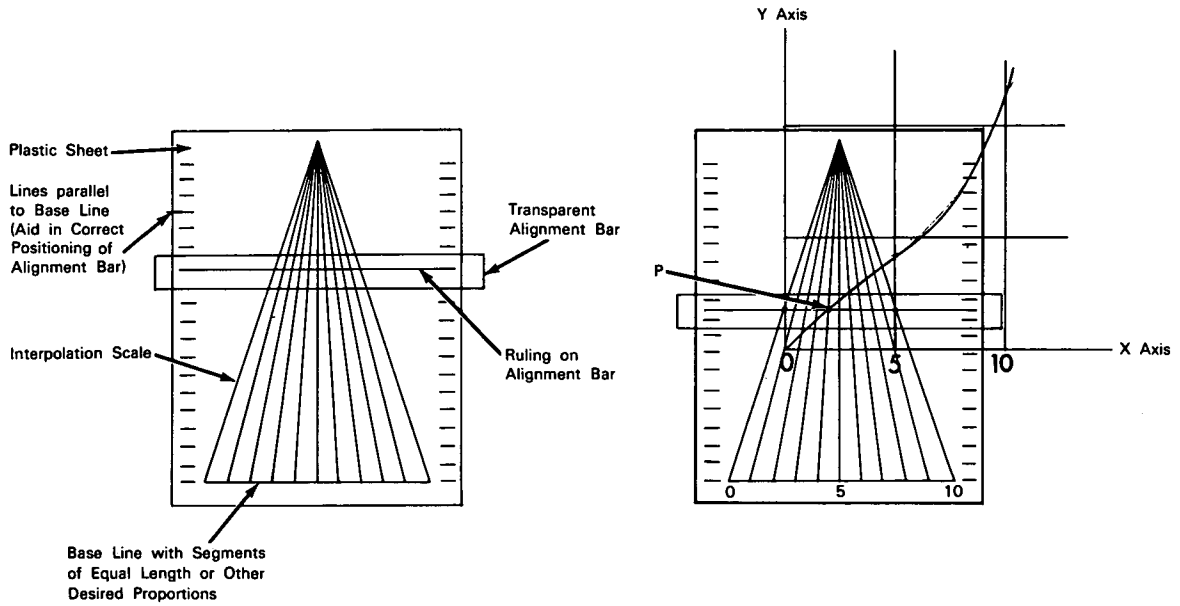
NASA TECH BRIEF

Simple Scale Interpolator Facilitates Reading of Graphs



The problem: Providing a simple device to facilitate accurate and rapid reading of the coordinates of points on graphs plotted on relatively coarse rectangular grids.

The solution: A device employing a transparent overlay with an interpolation scale that can easily be positioned over a graph to permit accurate reading of the coordinates of any selected point.

How it's done: The interpolation scale consists of a set of convergent straight lines inscribed on the underside of a transparent plastic or glass sheet. The segments at the base of the triangular interpolation scale must be of equal length for use with graphs plotted in Cartesian coordinates. For such use, the base line would generally be divided into ten equal segments. For graphs plotted in other rectangular coordinate systems (e.g., logarithmic or exponential plots), different proportioning of the segments on the base line would be required. The transparent sheet is mounted on a frame with a pair of parallel sides that form a track for a transparent alignment bar. A line parallel to the base line of the interpolation scale is inscribed on the underside of this bar.

The use of the device for reading a coordinate of a point on a curve plotted on a coarse Cartesian grid is illustrated in the second figure. To read the abscissa of the point P, for example, the graph is placed underneath the interpolation scale which is positioned so that the ruling on the alignment bar can be made to coincide with the X axis or a line parallel to this axis on the graph. The alignment bar is then slid along until the ruling intersects point P. Then while the

(continued overleaf)

alignment bar and graph are held steady, the interpolation scale is slid along the graph paper until the sides of the triangle (passing through 0 to 10 on the base line) respectively intersect the Y axis and one of the grid lines perpendicular to the X axis, at division 5, for example, as shown in the illustration. In this position, the line segment (on the alignment bar) has an abscissa length of 5 units and is divided into 10 equal segments by the interpolation scale. Therefore each division has the value of 0.5 unit on the X axis, and the abscissa of P is read as 2 units. The ordinate of the point can be read by turning the graph at right angles to its original position and repeating the operation.

Notes:

1. The device can be simplified by eliminating the alignment bar and frame and using only the triangular interpolation scale inscribed with a series of lines parallel to the base of the triangle. The device can also be modified to permit reading X and Y coordinates without rearranging the graph paper or for positioning near the corners of a book or journal.
2. The device can also be adapted to facilitate enlargement of sketches and drawings and location of points on perspective drawings.
3. Inquiries concerning this innovation may be directed to:

   Technology Utilization Officer
   Langley Research Center
   Langley Station
   Hampton, Virginia, 23365
   Reference: B65-10070

Patent status: NASA encourages commercial use of this innovation. No patent action is contemplated.

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