

A SIMPLE SLIDE DEVICE FOR THE USE OF VERTICAL PROFILE STUDIES IN OCEANOGRAPHY *

By A. V. S. MURTY **

Central Marine Fisheries Research Institute, Mandapam Camp

MUCH time has to be spent for studying the vertical profiles if one adopts the conventional means of plotting the data on graph sheets. Moreover, a good number of graph sheets are required in case the data are voluminous. A slide device would be quite useful for such studies. Such a device designed and fabricated by the author for particular use in oceanography, is described here.

THE SLIDE DEVICE

The slide device is shown in Plate-I. A calibrated grid (graph sheet) is fixed to the board of the slide device. The vertical axis is calibrated in metres of depth and the horizontal axis in concerned units of any required parameter such as the temperature in °C. The index-slides (I) which are made of steel are carried along thin nylon strings held parallel to the horizontal axis in tension. There is a pinhole at the tip of each index-slide. Each index slide can be moved along its axis (the nylon string) and be fixed in position. Two sets of wedge-shaped wooden slides (W) one on each side, are fixed in grooves running along the vertical sides of the board. Each nylon string passes through two wedge-slides facing each other in their respective grooves. The nylon strings are held in tension by means of these wedge-slides which in turn are kept intact in their respective grooves due to the tension of the strings. The positions of the horizontally held nylon strings across the depth axis can be varied at will by moving the corresponding pair of the wedge-slides in their grooves. A hair-thin nylon thread passes through the pinholes of the index-slides.

It is easy to represent a vertical profile of a given parameter by means of this nylon thread. This is achieved by moving the wedge-slides vertically and the index-slides horizontally to their required positions. In the final set-up, the pinholes stand for a number of points in a graph of the given parameter versus depth. The hair-thin nylon thread, passing through the pinholes, serves the purpose of a line joining these points. In case the recorded observations are confined to the International standard depths or any other fixed depths, the wedge-slides once set in their proper depth positions need not be altered from station to station. Only the index-slides in such a case, are to be moved horizontally in order to set the profile on the slide board. Vertical profiles can thus be set in no time and their nature (gradients, etc.) can be studied rapidly, using the device.

* Published with the kind permission of the Director, Central Marine Fisheries Research Institute, Mandapam Camp.

** Present Address : Central Marine Fisheries Research Sub-Station, Ernakulam.

A profile can be set on this device without involvement of an exaggeration of the vertical scale at any portion of it. Here lies the technical advantage of the device. This continuous linearship of scales renders it convenient to study the gradient at any point along the profile.

The gradient at a required depth along the profile can be rapidly recorded by adopting angular measurement. For this purpose, a sector of one-quarter of a circle of suitable diameter printed on a transparent sheet is to be chosen. The arc of the sector is to be divided into segments one degree each and the degrees are to be marked along the arc. The sector sheet is to be introduced below the hair-thin nylon thread after the latter is set for the profile. It is to be oriented in such a way that the reference line (radius) of the sector which is marked "Zero" degree would be tangential to the curve (the hair-thin nylon thread) at the point at which the gradient is required. The horizontal line on the grid passing through the centre of the arc (centre of circle) is followed up to the point of intersection of this line and the arc. The gradient of the parameter at the point where the reference line is made tangential is proportional to the cotangent of the angle thus obtained. In order to get the absolute value of the gradient, the cotangent of the angle has to be multiplied by the proper ratio of the scales of the respective axes of the grid.

A graph or a table can be prepared to convert readily the angles into their corresponding absolute gradient values. Such a graph for temperature gradients is shown in the text Fig. 1. The temperature gradient is shown in $^{\circ}\text{C}/10$ meter depth on the ordinate and the angle in degrees on the abscissa.

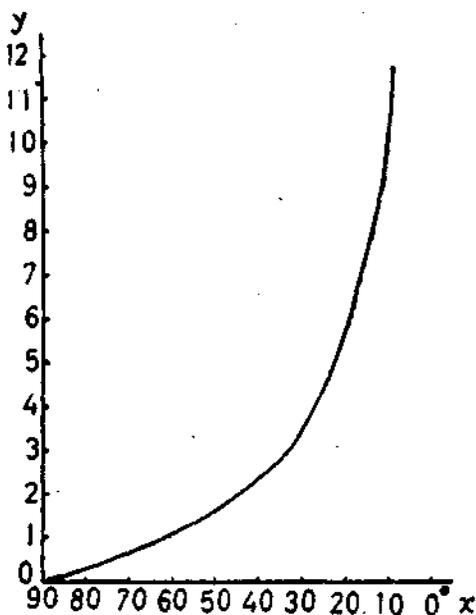
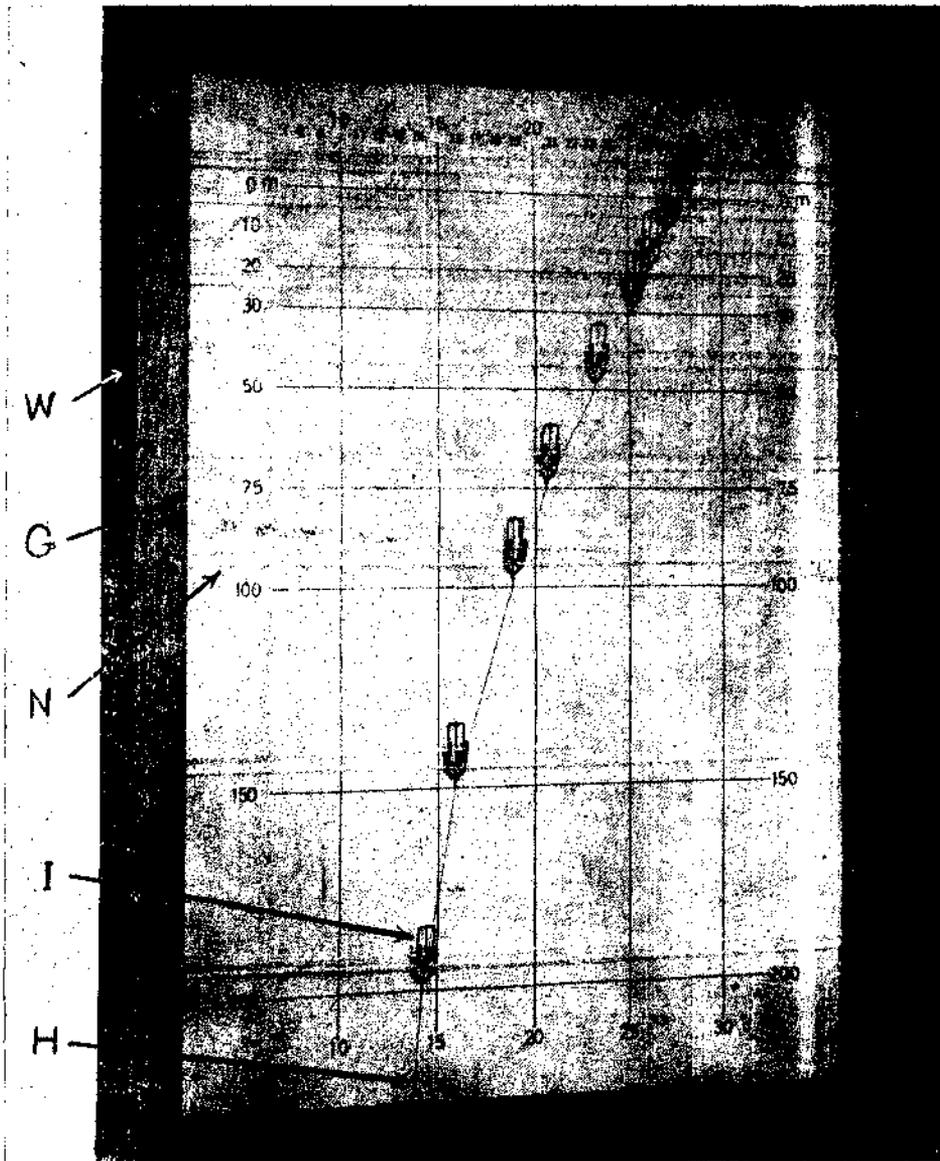


FIG. 1. Conversion graph.

x —Angle (ϕ) in degrees made by the profile with the horizontal.
 y —The corresponding gradient (in $^{\circ}\text{C}$ units /10 m.)

The profile study of each parameter such as temperature, salinity, density (Sigma-T) dissolved oxygen etc., requires a suitably calibrated grid to be inserted



The Slide Device.

- W - Wedge-shaped wooden slide.
- G - Calibrated grid.
- N - Nylon string.
- I - Metallic index-slide.
- H - Hair-thin nylon thread.

in the slide-device. Apart from the limitation imposed on the accuracy by the field apparatus by means of which the data are originally obtained, the accuracy of the device is only limited to the accuracy to which the calibrated grid can be read.

The use of the device is not limited to profile studies in oceanography alone. It can be used for similar studies in other fields also.

SUMMARY

A slide device is described for vertical profile studies of oceanographic parameters such as temperature, salinity, dissolved oxygen etc., from registered data.

The device offers a more economic and quick method of profile studies without in any way impairing the accuracy of the results. Provision is made in the device to set the profile even under changed depth intervals of observations. The continuous linearship of scales along the axes of the grid of the device renders it convenient for studying the gradients along a set profile. The device is very simple, portable and handy and is quite inexpensive. It is useful for profile studies not only in the oceanography but also in the allied fields.