

## SUPERIMPOSED RELIEF MAPS.

(Extracted from an article by MAJOR D. H. GILLETTE, CORPS OF ENGINEERS, U.S.A., published in *The Military Engineer*, Washington, Sept.-Oct. 1933, page 436).

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The United States ENGINEER OFFICE at Juneau, Alaska, in 1929 was confronted with the problem of accurately comparing, point by point, two subaqueous contour maps of a very unstable sand bar, covering an area of several square miles and made about a year apart before and after dredging.

It is difficult to do this from two ordinary contour maps, because of the continual jumping from one sheet to the other. To draw both sets of contours on one sheet, even in different colors, is extremely confusing, if many small shapes have to be shown. To make relief models and superimpose them for comparison would be impracticable.

A glass relief map solved the problem in a most satisfying manner. The "relief effect" is surprising.

As considerable cut-and-try was required in the development of this map, the following notes might be of help to those making one:

1. Glass is heavy — make the U-frame thick and strong.
2. Use extra heavy clear window glass about 1/8 inch thick — it is cheaper than plate glass.
3. The V-1 of model shown was 1/8 inch = 1/2 fathom. Hence contours were inked on the top and bottom of each sheet of the glass, and narrow 1/8 inch strips of soft wood at sides kept glass sheets separated the right amount. Each fathom contour is on the top of a sheet of glass, while each 1/2 fathom is on the bottom.

Old conditions were shown in dotted lines. The new conditions were shown solid. The project-depth lines were accentuated by crosses. Piers, docks and all other surface data were drawn on the top sheet only. All land areas were shown in solid black.

4. Note adhesive tape tabs to handle glass in registering — also four wing nuts which clamped everything in place. These were on stove bolts through strap hinges at bottom. Strap hinges were fastened to 1-inch square wood strips under each long edge and running full length of glass. Tightening wing nuts pressed glass sheets and strips against brass plates screwed down from top.

5. Three lights gave proper illumination through a piece of tracing cloth tacked under the table. This tracing cloth is important to prevent the floor and other things from being seen through the map.

6. The inking gave the most difficulty. Every known kind of ink or pigment was tried in every available form of pen. The only successful result was obtained by having the glass surface clean and dry — tracing thereon from map below, using an ordinary fountain pen dipped in ordinary drawing ink. The black works best for solid lines. Colors are all right for broken lines.

I can strongly recommend the use of such maps for "before and after" studies of any ground forms, either under or out of water, particularly when such studies are to be shown to non-technical people. They are very impressive, easy to understand and to construct, and can be changed or altered *ad infinitum* with a minimum of expense — all you need is household cleaning powder and a wet rag.

