AN IMPROVED PLANE-TABLE BOARD

(Extracted from an article by B. B. TALLEY, FIRST LIEUTENANT, CORPS OF ENGINEERS, published in *The Military Engineer*, Washington, November-December 1933, page 504).

About eighteen months ago an article was published in the *Bulletin* of the United States Coast and Geodetic Survey covering their experience with various types of plane-table boards.

It happened that I was in a position to experiment and to try to develop a better board. Technical Sergeant Christian V. MILLER, non-commissioned officer in charge of the drafting room of the Twenty-ninth Engineers at Fort Schuyler, lent his knowledge and experience and together we set out to devise a board that suited our needs.

We had experience with the use of vellum, ordinary drawing paper, double mounted drawing paper, metal mounted boards, both aluminium and zinc, and with pyralin. We had even investigated the use of celluloid, but it, too, had been found to be unsatisfactory.

Of the boards mentioned, the best, in our opinion, was the aluminium mounted board utilizing a hard semi-glazed paper, but this board had the disadvantage of being difficult to fasten to the plane table. However, it would hold its scale and would not warp due to moisture. If we could find a good way of fastening this board to the plane table our problem would be solved. Clips were tried but they would interfere with the alidade and would catch on underbush and branches of trees and become lost.

Drilling the mounted board for thumb tacks or for the screws of the plane table was not satisfactory as the tacks and the screw heads protruded above the plane of the paper and interfered with the alidade. Also the perforations allowed moisture to get between the paper and the plate causing it to deteriorate.

At this time we were using double mounted paper as a plane-table board, but this board was not durable, it would warp due to moisture, would not hold its scale, and would bend and tear if not carefully handled.

Our first experience with the metal mounted board was to use a plate only slightly larger than the area reserved for topography. This allowed a considerable margin for fastening the board to the plane table and for the use of the topographer in keeping notes. The results of this experiment were pitiful. The coefficient of expansion of the aluminium plate being different from the paper, the board would warp in one direction on warm and moist days and in the other on cold dry ones. In short, this board would not lie flat on the plane table, nor could it be held fast by any means short of drilling and screwing it down with screws, and this we did in one instance.

Our next experiment, and the one that gave the desired result, was to make the aluminium plate into a template slightly smaller than the plane table. Holes one inch in diameter were drilled through the metal plate concentric with the screw holes in the plane table. The paper was firmly cemented to the template and crimped to a bevelled edge one quarter of an inch wide around the border. The large diameter of the holes in the template allowed the paper to "bellows" sufficiently to fit snugly into the countersunk recesses around the screws in the plane table and allow the screw heads to sink below the surface of the board. Moistening with a damp sponge assisted in the fitting, although this was seldom necessary.

The aluminium plate is 17 1/4 in. × 23 1/4 in. with holes drilled and spaced to fit the thumb screws in the plane table. Two sheets of Bristol board 18 in. × 24 in. are cemented to and inclosing the aluminium plate in an air and moisture proof seal. The edges of the Bristol board are bevelled.

This board is exactly the size of the plane table and fits it so snugly that it seems to be a part of it. It retains its scale and will not change its shape due to moisture. It is rugged and will last indefinitely; that is, it becomes a permanent record.

Its surface is hard and will take either pencil or ink. It can be sensitized for photographic reproduction and can be printed either lithographically or with the blue print apparatus. It can be bleached and washed, all without danger to its surface.

It possesses two working surfaces of equal quality, permitting corrections (or oversheet data) to be shown on one side and topography on the other. Its cost is only slightly higher than the ordinary metal mounted board and its many advantages more than compensate for this small increase in expense.

We use Bristol board for the working surfaces. When the sheet is put on the plane table, small holes are drilled through the Bristol board to receive the thumb screws which are screwed down below the surface of the board to form a perfectly plane working surface.

After a year of service, in winter and summer, this board has been found to be quite satisfactory. The topographers like to use it and their work on it becomes a permanent record.