

so truly represented, as when the topographer has the ground under his eyes. This is a mistaken idea; there is no difficulty whatever in identifying any number of points on moderately good photographs, and, moreover, the topographer does not need, as with the plane table, to trust to his memory in order to recognize them. The undulations of the ground are, it is true, less distinct on the photographs, but this is more than compensated by the advantage of having, side by side, views of the same place from several stations."

Surveying Cameras.—The number of instruments devised or proposed for photographic surveying is considerable. They are divided into three classes:—

- (1) Ordinary cameras.
- (2) Surveying cameras or "photogrammeters."
- (3) Photo-theodolites.

Ordinary cameras must be provided with a level; the relative positions of the plate and lens must be invariable, and when adjusted, the plate must be exactly vertical.

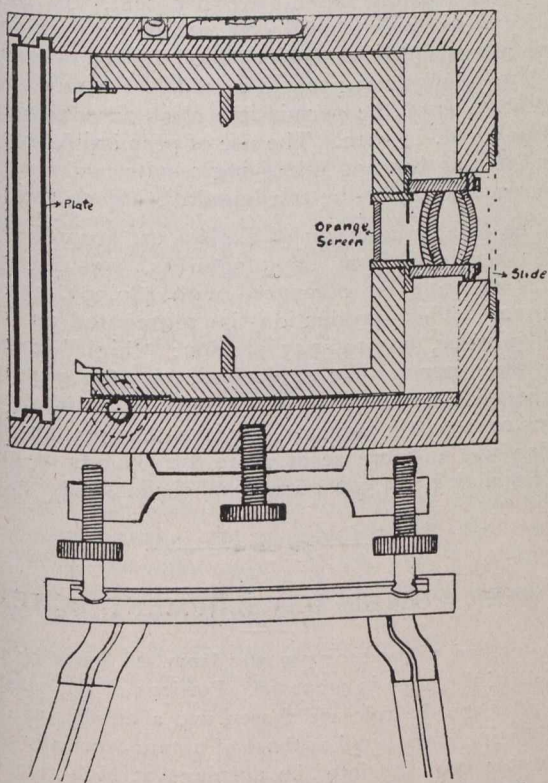


Fig. 1.—Sectional View of the Deville Surveying Camera.

The horizon is determined by two zenith distances of well-defined objects as far apart as possible. The principal points are ascertained from the azimuths of at least three points. It is expedient to make these determinations for every photograph. See specimens of plotting Figs. 2 and 3 (Wheeler).

The employment of ordinary cameras for surveying is not recommended. The present Surveyor-General, Dr. Deville, has invented a camera suitable for this work. A section of this camera is shown in Fig. 1. There are, however, many patterns of surveying cameras, one of the earliest is Meydenbauer's. It is a camera with tapering bellows set on a horizontal circle; it moves on a vertical axis.

Canadian Equipment.—The equipment of a party on the Canadian Surveys consists of a transit theodolite and two cameras. The transit theodolite and its tripod are carried by the surveyor, and a camera without the tripod by one of the men who always accompanies the surveyor. The assistant has his own camera with a tripod.

The transit is one of the ordinary patterns used by surveyors. It has three inch circles and reads to minutes. The tripod is a short one, specially designed for mountain work. It is three feet four inches long and has sliding legs, the joint being perfectly stiff. The surveyor observes

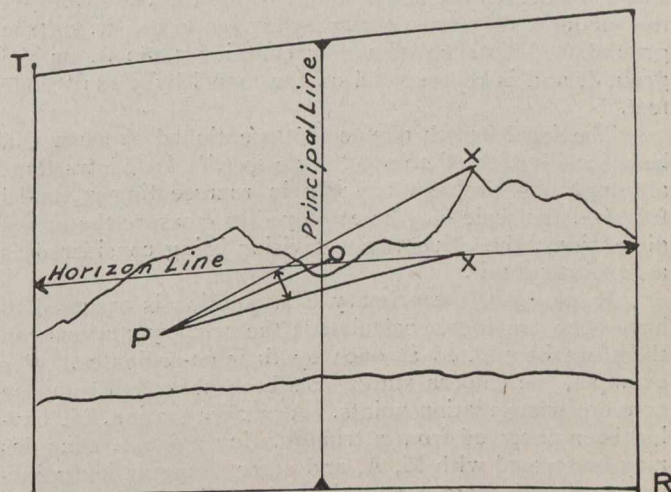


Fig. 2.

either in a sitting or kneeling position. For the purpose of packing, the head of the tripod is taken off and put in the transit box; when folded, the legs are twenty inches long and are placed under the box of the transit, as shown in frontispiece. The heavy parts of the instrument are made of aluminum; the whole, including tripod

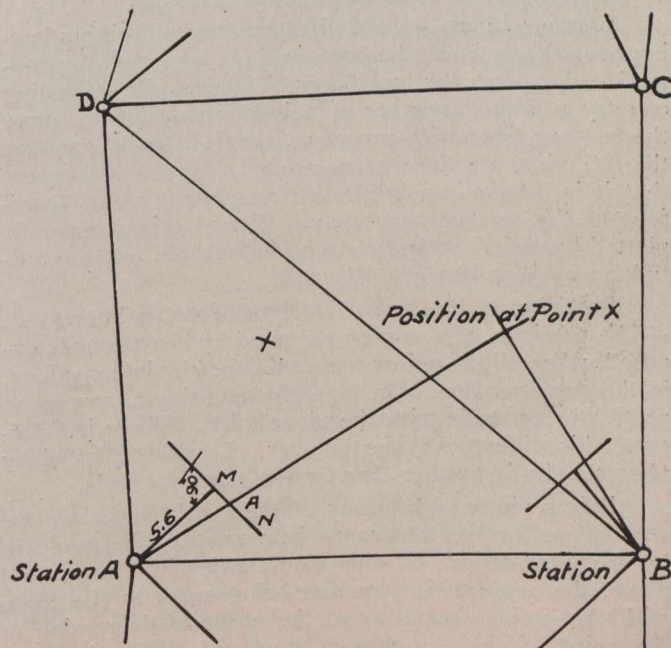


Fig. 3.—Specimens of Photographic Plotting (Wheeler).

and case, and also the camera base, weighs fourteen pounds and eight ounces.

Plotting the Survey.—The minutes of Canadian surveys are plotted on a scale of 1/20,000. They are afterwards reduced for publication to 1/10,000. The equidistance is 100 feet.

The angles measured are equal to those on the ground, for any triangle ABC of the ground is represented on the model by a similar triangle abc . The altazimuth set in a gives between b and c the same angle as it would between B and C, if set at A.