

Mr. Oakley. slightly different manner from that ordinarily given in textbooks. He uses the first column for stations, in which are recorded also the initials for turning points, bench-marks, and height of instrument. In the second column is placed, first, the elevation of the bench-mark, and, immediately under this, not necessarily upon a line, the back-sight with its proper minus sign. Under this, drawing a line and performing the subtraction, the height of instrument is obtained. The third column contains only the rod readings, and the fourth column the elevations to be entered in the profile. When a turning point is desired, the rod reading upon this point is placed in the second column, the proper plus sign for this reading should not be omitted, the process of adding then is performed, obtaining the elevation of the turning point. The object of doing the work in this manner is to perform the arithmetical operations, upon which the elevations depend, so that there is the least chance for error, and it seems to the writer that the ordinary method of doing such work, placing one set of figures immediately under the other, is the easiest and most conducive to accuracy. This method has the advantage of leaving more columns upon the page for other notes, and keeping only elevations for profile work in one column. It also keeps the figures of the rod readings contiguous to the height of instrument, so that the operation of subtraction is easy and can be performed much more quickly than where these figures are placed across the page. As the author states, the rodman should keep and check the heights of instrument and turning points.

The writer notes that the author says nothing about the use of easement curves. The engineers probably did not find it necessary or desirable to use easement curves where the maximum curvature was so very light. This is not the case, however, on all railway lines, and it seems that such a paper, not being confined to the methods used upon one railway system, should not omit the question of the use of easement curves. Table 2* was used by the writer some sixteen years ago, when the use of easement curves was not as common as now, and only a few were published. He has found that this table has the advantage of being very concise; at the same time, it is very easy to use in the field with the transit. Blue prints may be pasted in the back of field books and always be accessible, so that little calculation is required.

Experience with drafting done in the field inclines the writer to favor the use of narrow rolls of paper. He has used paper not more than 18 in. wide, but would prefer 21 or even 30 in., 21 in. being the half of a 42-in. roll, is a convenient size to carry in a camp chest. Unless the lines are very sinuous, it is not difficult to keep

* Published in *The Railroad and Engineering Journal* in 1890, by Franklin Riffle, M. Am. Soc. C. E.

them on narrow paper for long distances, if care is used in starting the map. Mr. Oakley.

It is also found to be advantageous to use contours for all topography taken near the line, which is done with considerable care, for distances ranging from 200 to 500 ft. on each side of the line; beyond this limit, sketches should be made of prominent and important features. For instance, the location of a hill or a divide in the neighborhood of the line, when not given by accurate topography, may be shown by hatch lines, or some method may be used to indicate approximate elevations, or, where no elevations are attempted, the presence of abrupt changes in contour may be simply indicated.

Too great care can hardly be exercised in selecting the topographer. He should be an untiring worker, and have an eye for country, otherwise many important features will not receive the care they should, and time will be wasted on unimportant ones. The writer remembers when the topographer was a boy who could take slopes, and was chosen because he was nimble enough to keep up with the party. Such a policy will surely result in inaccuracy of topography, and may make a poor location of a line which otherwise should be a good one.

Experience has thoroughly demonstrated that it is false economy to put upon the locating engineer the burden of locating; also, sometimes directing the instrumentmen, and frequently looking after the draftsmen and estimators; and it is noted with some satisfaction that there is a tendency toward greater liberality in the assistance given the locating engineer, allowing him more freedom of movement and consequently greater opportunity to study more thoroughly the problems of location. This indicates a better appreciation of the value of well located lines by those in authority.

The writer recalls an instance of considerable difference in the cost of maintaining a locating party on account of the long distance it was necessary to transport supplies. In one instance, the cost of maintaining the party, per man per week, was \$5.61 for board, and, when the cost of transporting supplies to camp was deducted, this amount became \$4.73. In this particular instance, the supplies were hauled about 125 miles, and it was necessary to maintain two teams almost constantly for this work. The same party in a different locality cost about \$2.30 per week per man. These figures include the wages of the cook, but not of the teamsters.

O. H. TRIPP, Assoc. M. Am. Soc. C. E. (by letter).—Perhaps a Mr. Tripp. word on camp equipage and the management of a party in a region different from that described by Mr. Lavis may be of interest to the younger members of the Society.

In the older portions of Maine it has not been customary for