

Mr. Whinery. is more than a grain of truth in the chaff. The earlier locating engineer who attained eminence in his calling had, undoubtedly, a peculiar natural aptitude for his work. His "organ" of locality was large. He was a born woodsman, and never got "lost." His natural faculties were highly trained, because he depended upon them and not on any such auxiliary devices as are now used. His "off-hand" judgment of topography, and the grades and curves that would fit it, was more acute and accurate than that of his degenerate successor, because the latter is not compelled to rely so largely upon his unaided faculties.

All this may be admitted, and yet it can be maintained successfully that, upon the whole, the new method is better than the old. It reduces the work to a system, and the results, if less brilliant, are more certain and reliable, and at least equally expeditious.

While details may differ, the paper describes well the approved modern method of railroad location, and the fullness of details makes it a very valuable contribution to the literature of the subject. Conditions, of course, may modify the procedure. The lines, the location of which is described in the paper, seem to have been, from the start, destined for construction; roads were to be built between certain points, and the only question was to find as quickly as possible the best route and location. If, as often occurs, preliminary lines were to have been run out for the purpose of determining the practicability of the route for a railroad, the building and even the final location of which, later, depended upon the success of the promoters in financing the enterprise, the methods and means would doubtless have been somewhat modified. The outfit would not have been so complete. The promoters would have wanted, to show, a reasonably good line and a profile that would at least fairly represent, if not minimize, the difficulties to be overcome, and their demand could not well be ignored.

But, assuming that the office of the preliminary line is mainly, as it should be, to determine distances and elevations, and to furnish a base from which to obtain correct topography, the appearance of the preliminary profile may well be disregarded.

In running such preliminary lines, the most important and responsible position in the party, next to the Chief, is that of topographer, and it is also the most difficult to fill. The work of the linemen and the draftsman, while, of course, it must be accurate, requires no special ability; but the topographer must be an expert at his work. He must possess, in a large degree, the peculiar gifts of the old locating engineer, must have a keen eye and a good judgment for locality, distance and elevation. If he depends too much on the tape-line and the hand-level, and lacks discrimination as to the relative importance of topographical features, he will neither

be able to keep up with the party nor do his work satisfactorily. Mr. Whinery. Particularly must he have the ability, natural or acquired from experience, to judge of the relative importance of the topography he sketches. He must know at a glance, from the general lay of the country, that the final location will hug this hillside closely, and its topography, therefore, must be taken accurately, while that other will not be touched, and, therefore, may be sketched with less care. A poor topographer is somewhat worse than useless, while a superior one is cheap at almost any salary.

There seems to be little to criticise in the conduct of the work described by the author. Not many engineers have been as fortunate, in having employers who appreciated the value and economy of complete equipment and liberal provision for the comfort of the men. The absence, from the equipment, of the medicine chest is noticeable. The writer has always considered it of importance to have along with the party a small supply of simple or standard remedies and surgical appliances, which every intelligent person knows how to use.

In running out the final location line, some modifications of the method described in the paper have been found advantageous in the writer's work. They are not new, and may not be novel, but he has not seen them described in print, and they may be of some interest to other engineers.

In the summer of 1880 the writer had charge of the preliminary and location surveys for the northern half of the New Orleans and North Eastern Railroad, his work extending from Meridian, Miss., southward about 100 miles. With some alternative routes, about 120 miles of located line was put on the ground. The preliminary surveys were made with care, especial attention being given to accuracy of instrument work and chaining, and to taking the topography. The lines crossed the drainage system of the country diagonally. The streams had flat and rather wide valleys, separated by dividing ridges from 80 to 150 ft. high, with rather abrupt and broken slopes. No special effort was made to get good preliminary profiles, the object being, while keeping the line reasonably near the probable located line, to run the preliminary where it could be gotten through easiest, or would best serve the purpose of the topographer. The preliminary lines were carefully platted by the "Latitude and Departure" method.

In running the final location line, the object sought was to do as much of the work as possible in the office tent, confining the work of the party largely to putting in the stakes on the ground, from notes furnished to the transitman (who had charge of the party).

The method of procedure was as follows: A tentative location line was put on the map as carefully as possible, and its profile was