

liminary studies, and such sheets are obtainable for parts of the Eastern states. The writer has noted, however, that many published topographical maps are inaccurate in detail, and would always go over a paper route before commencing to make a survey of it. It is a consequence of the large area and sparse population of Canada that no such maps are as yet published here, but their value to the public at large and to the engineers in particular cannot be doubted. It seems therefore full time for a body such as the Can. Soc. C.E., the majority of whose members have need of satisfactory local maps, to commence to agitate for the establishment of a topographical survey. Much valuable work has already been done by the Geological Survey and by the Crown Lands Departments; but these are bureaus organized for special purposes, to the work of which accurate maps are merely an essential detail, and the task of making a general survey of the whole of Canada is one of such vast dimensions that it can appropriately be entrusted to an independent office only. The American policy of co-operation between the central government surveys and the several states might advantageously be copied.

When the exploration has been completed, railroad location becomes a problem of detail surveying, in which the necessity of reducing first cost to a minimum has to be constantly balanced against the demands of the operating departments for a straight and level track. Surveys with instruments of precision are necessary to adjust the alignment so nicely to the local contour that no stretches of track will be built over which rolling stock cannot be advantageously operated; and the area that can be covered by a precision survey is so limited that nothing but this local adjustment should be expected from it.

In making such an adjustment the fact that a railroad is simply a great machine for moving traffic must always be kept in mind. It is a machine which has the unique distinction of having two great and often apparently independent parts, the track and the rolling stock; and these are designed by two distinct bodies of men, who have been trained along entirely different lines, and whose views as to the best schemes for future improvement are often antagonistic. The work of the locating engineer will, in most cases, remain unaltered in service for a much longer time than that of his mechanical confrere, and should therefore be designed so that the operating department will always be able to take full advantage of the improvements in rolling stock that are constantly being made.