Mr. Tripp. not most) cases, for preliminary work, one of the smaller instruments, with a 4-in. limb, might well be used. Whatever its size, it should be furnished with a level attachment as well as with stadia hairs and vertical arc. This is essential for the taking of side slopes and the location of such buildings, lot corners, etc., as may be within range in open ground.

It will be understood, of course, that in Maine there is no uniform system of land division, as in the West, hence the opportunity of locating one's self by lot corners is to a great extent lacking. The northern townships were laid out with sides on the true meridian (±) while the older settled parts were laid out to suit the occasion, and when the lines were called north and south it meant by needle at the time of their location. The plans of the townships are usually procured before making surveys, and are of more or less value, in proportion to their accuracy.

Among the minor but important things that tend to expedite the work the writer would suggest that at least one of the axemen should be furnished with a bush-hook, in addition to the axe, and that a supply of machetes should be provided for use in swamps and wherever small stuff in any quantity is to be encountered. More than double the rate of progress will be made in small growth if the party is thus provided. Nothing is more disheartening to axemen than to work for days at a time where there is nothing big enough to stand up to meet a blow of the axe.

The plans for locating purposes are usually made on a 400-ft. scale, but, in places where that scale does not show sufficient detail, the work is plotted on a 200-ft. scale or a 100-ft. scale, as the case may demand. The record plans are almost invariably made on the 400-ft. scale, in fact, it is a sort of unwritten law that they shall be on that scale. Sometimes (but rarely), for some special purpose, as for a general view of a project for use at a hearing, a map may be made on a smaller scale.

It would seem that there could be no controversy as to the advisability of setting hubs at property lines on location (or on preliminary, if the location is not to follow at once). On location, the writer is a firm believer in the practice of running all tangents to intersection whenever the extra work involved does not utterly prohibit such a course, as will often be the case in rough country.

The writer has made a practice of running all curves of 3° or more with 50-ft. chords, and all sharper than 10° with 25-ft. chords; the intermediate points are always needed when work is cross-sectioned, and time is saved by setting them on location.

In taking level notes all foresights on turning points are kept by themselves, so that there is no chance of confusion when sights are added for checking elevations; and the two things wanted when

platting a profile—namely, elevations and stations—are in adjoin- Mr. Tripp.
ing columns, giving no chance for the rodman to lose his way in getting from one to the other in "calling off." The profile is usually plotted on Plate B paper, but sometimes Plate A is used when the work is light and the grades are not too steep.

The remarks of Mr. Lavis as to the importance of the forechainman are very much to the point; his importance can hardly be over-estimated. It is difficult to get a good man for that position, as it requires a good deal of physical strength and lots of "push," and the combination is hard to find. He should be continually on his feet to keep the axemen on line and cutting to advantage, but should not (as too many are) be continually moving his pole ahead and singing out "line" to the transitman; that over-worked person has troubles enough without adding any needless ones to the list.

As regards the speed of work, of course what is only moderate speed in one place is a rate of progress not to be even thought of in another. The writer was once assistant in a party which, with five axemen, was a long day in getting ahead forty-nine stations on a preliminary line, and the best time that any man in the party made over that distance at night when going to camp was one hour. On other portions of the same survey as many as 4 miles were made during the shortest days.

The writer fully agrees with Mr. Gould in the idea that, after the utmost care has been taken with the projected line, it remains to a considerable extent a cut-and-try process to get the best practicable line on the ground. Usually, when the most carefully projected line has been put on the ground, there will be seen places where a trifling difference in the position of the line will make a difference of many dollars in the cost of construction, and it should always be kept in mind that it takes but a trifling difference in the quantities to pay for a day or two of the time of the locating party. The chief of party should never let pride, on the one hand, or remarks from others (members of the board of directors, for example), on the other, prevent his taking the time for making desirable changes in the line after the location profile has shown them to be advisable. Some men, otherwise thoroughly good locators, cannot grasp the whole of a section and make the best of it, but spend too much time in fitting each separate side hill as closely as possible (apparently) and end by getting far too much curvature in the line, that is, they have curvature beyond the point where it saves enough work to be justifiable. The writer was once Principal Assistant under Frederic Danforth, M. Am. Soc. C. E., and on one portion of the line had the plans of a previous line (if he remembers aright only the preliminary had actually been run—the location being projected). It was on a river bank with a steep side hill, and a very