A RAPID METHOD OF LAYING OUT CIRCULAR PLOTS

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ABSTRACT

The average saving in time achieved by using the Spiegel Relascope to lay out circular sample plots was 1.02 minutes for 0.1-acre plots, and 1.85 minutes for 0.2-acre plots. The more difficult the cruising conditions, the greater the saving in time.

The laying out of the boundaries is a time-consuming factor in the establishment of circular plots, which often constitutes an excessive proportion of the total time taken in plot measurement. In tests carried out at the Petawawa Forest Experiment Station in 1959, the Spiegel Relascope was employed for the laying out of conventional circular plots, and this method has resulted in the saving of time and effort. Lemmon (1) described such a method using the wedge prism for a similar purpose.

On level ground an observer viewing a specially constructed target placed at the plot center through any angle gauge can move around the target keeping the range constant by maintaining a constant angle subtended by the target at the observer; e.g. an observer when viewing a target 13.54" in diameter with an angle gauge of basal area factor 5 can mark out the boundary of a plot whose radius is 52.7 feet, equivalent to a 1/5 acre plot (Figure 1). Similarly, using the same target and a 10 basal area factor angle gauge he describes a circle whose area is 1/10 of an acre.

Preliminary tests made with a simple prism and cone-shaped target indicated that this method was slower than the conventional use of a tape because of the necessity for slope corrections and the need for much more careful operating procedures. However, when a Spiegel Relascope which automatically compensates for slope was used with a yellow and red plywood ring, 13.54 inches in diameter, as a target (Figure 2), plot boundaries could be defined accurately and more quickly and easily than with a tape. The field procedure is outlined below and the results of the test are shown in Table 1.

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FIGURE 1. Relationship of target and critical angle of relascope when laying out circular plot.

The plot center was located at random and marked by a staff. The target was then placed on the staff and the observer viewed the target with the instrument. He then found the point on the ground where the target subtended an angle exactly equal to the critical angle of the relascope. Keeping this relationship of target and critical angle constant he walked around the target, checking with the relascope whenever he was in doubt, whether a tree stood within or without the plot. Where borderline trees proved difficult to assess by relascope an accurate measurement of the distance to the tree was taken with a tape. The time taken to lay out the plot was recorded by stop watch. The same plot was then laid out again, using only the tape and time was again recorded.

The saving in time became significant on the steeper slopes and in areas where there was much underbrush and windfall, because in such locations it is more difficult and time-consuming to measure with a tape. Because the Spiegel Relascope automatically corrects for slope it is as easy to measure distances on slopes as on level ground, and it is of course quicker to sight

FIGURE 2. Target used with Spiegel Relascope.

TABLE 1
COMPARISON OF TWO METHODS OF LAYING OUT CIRCULAR PLOTS

Plot Number	Slope	Visibility	Approximate density (trees per acre)	Time Required		Difference	Number of borderline trees checked	
				Relascope	Tape (min : sec)		Relascope	Tape
1/10 - ACRE PLOTS								
1	nil	good	380	4:50	5:50	1:00	0	9
2	nil	fair	550	4:20	5:40	1:20	0	10
3	medium	good	400	4:50	5:00	0:10	1	7
4	medium	good	270	4:40	5:20	0:40	0	12
5	medium	poor	500	4:00	5:00	1:00	1	8
6	steep	fair	550	4:00	5:20	1:20	0	9
7	steep	fair	350	5:00	6:40	1:40	0	7
1/5-ACRE PLOTS								
8	nil	good	400	5:30	6:10	0:40	2	12
9	nil	good	380	6:10	6:40	0:30	0	10
10	nil	fair	550	7:40	9:10	1:30	1	15
11	medium	good	400	11:40	13:40	2:00	3	9
12	medium	good	270	6:30	7:40	1:10	0	13
13	medium	poor	500	4:40	8:40	4:00	1	10
14	steep	fair	550	6:20	9:00	2:40	1	15
15	steep	fair	350	7:00	9:20	2:20	1	12

across obstacles between the plot perimeter and its center than to walk across them with a tape. It was found that the problem of underbrush restricting the view of the target could be largely avoided by placing the ring on a higher staff.

In only very few cases where trees were close to the borderline, was it necessary to check their distance from the plot center with the tape to establish whether or not they fell inside the plot (see Table 1). Since less time and physical effort are involved in checking borderline trees, such checks will in practice usually be made more often and result in more accurately defined plots.

REFERENCE

1. LEMMON, PAUL E. 1958. Aids for using wedge prisms. Jour. For. 56 (10).