A PLOT MARKER THAT TELLS A STORY
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The history and purpose of field study plots are frequently of interest to visitors. Even the observer sometimes has need for plot information when permanent records are not immediately available. Markers which carry such information, therefore, serve a useful purpose and enhance the value of plots.

Aluminum foil wrapped around and stapled to a 4 x 4 inch piece of board well serves this purpose, Figure 1. Information such as rate and date of planting, seedlings per acre, etc. can be impressed into the foil with a pencil or ball-point pen. The wood backing provides easy attachment to posts or trees.

One hundred of these markers were made at a cost of $1.90 for material. Three-fourths of the cost was for the wood backs. Even this nominal cost could be reduced by using scrap wood.

Markers of this type are showy and easy to find and they remain legible. In our experience they have lasted well and otherwise been entirely satisfactory.

RANGE UTILIZATION EXCLUSION
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The range survey crew at Gordon, Nebraska has designed and built a cage for use as a range exclusion particularly in connection with the study of range utilization on the Pine Ridge Indian Reservation (Figure 1).

The cage has a base five feet square. It is pyramid shaped, and rises to a height of three feet at the top of the pyramid. The frame is of ⅜-inch steel reinforcing rod. It is covered with 2-inch by 4-inch woven wire welded to the steel rods. The cage should be fastened to the ground by hooked, ⅜-inch steel stakes to hold the frame in place.

The pyramid shape of the cage permits nesting for transit. Several of them can be carried on a pickup at one time.

The cage protects a quadrat 37.2 inches square and containing 9.6 square feet which can be clipped to determine the amount of vegetation produced per unit area with protection from grazing. By clipping a similar quadrat outside and comparing the two amounts of vegetation harvested, an estimate of utilization can be obtained.

A MECHANICAL DEVICE FOR REPEATABLE RANGE MEASUREMENTS

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A device (figure 1) has been constructed which will mechanically locate short line intercept transects. If used with reasonable care, this device permits the accurate reading and rereading of transects with a minimum of human decisions in line placement. This device has been tested on foothill grasslands of southwestern Montana during...
FIGURE 1. The mechanical measurement device assembled for use.

the 1958 field season; 375 permanent line intercepts were located, read, and recorded.

Construction and Field Use

The device consists of a horizontal, supported, 1-inch aluminum rod approximately six feet long, in which a 5-foot segment of steel tape is imbedded. The steel tape is calibrated in tenths and hundredths of feet. The 1-inch rod is adjustable for height and is supported on each end by a tripod base system. A movable sleeve fits over the 1-inch rod. This sleeve can slide along the rod and can also be turned around the rod. An extension arm is attached to the movable sleeve. This arm holds a pointer to inscribe the imaginary line at ground level.

Location of the measurement device is accomplished by the use of holes in each of the tripod legs through which steel marker stakes are driven. The stakes protrude approximately \(\frac{1}{2}\) inch above ground level and are spray painted to aid in relocation. Stake protrusion of only \(\frac{1}{2}\)-inch above ground level insures a minimum of stake movement due to livestock trampling, compression by vehicles, or other causes. In the past field season, four pins were used to mark the location of each transect line. Therefore, the position displacement of a given pin will not interfere in accurate relocation of the line. The location of each transect is permanently recorded by noting the distance and direction of each transect to a permanent marker post.

After driving the transect marker stakes through the holes in the tripod bases, the device may be lifted from the stakes at will and may be replaced over the stakes at any given time interval desired. To allow the device to be easily lifted from the marker stakes, the tips of the marker stakes are rounded and a special driving head is used to prevent expansion of stake tips.

The measurement device is constructed to allow for adjustment in the height to which the cross-bar may be raised; adjustment of the length of the extension arm; and adjustment of the angle and the length of the pointer pin. The minimum height of the center support is 8 inches above ground level and the minimum arm length is 15 inches. Maximum heights approach 36 inches above ground level, allowing the use of this device over low-growing shrubs. Standard adjustments of the measurement device generally can be used when working in a given area. Standard height, arm length, pointer angle, and pointer length were used in all but a few of the 375 transects which were installed with this device during the past field season.

A specially designed form (figure 2) is used to record the height of the cross-bar, length of the arm, angle and length of the pointer pin and basal intercepts, as well as pertinent site data.

This device withstands rough field use and yet is light enough for easy transportation. For transporting it is easily dismantled (figure 3) and packed in a specially designed sturdy wooden box (figure 4). The following table lists the parts of the device and accessories as shown in figure 3.

The accuracy of the prescribed line and correct alignment of the measurement device were periodically checked throughout the past field season. This was accomplished by placing the device on a large sheet of paper upon which the locations of the holes of the tripod legs and the line were marked. The position of the line was checked by sliding the sleeve and arm apparatus along the crossbar and noting whether or not the path of the tip of the pointer pin coincided with the check line marked on the sheet. The check sheet was carried in a cardboard tube in the box for the measurement device. The pointer was also periodically checked by rolling the pin on a flat surface to make certain it was true. Damaged point-
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<tr>
<th>Photo No.</th>
<th>Description</th>
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<tr>
<td>1</td>
<td>Pulley holder, ¼&quot; steel rod, 6'3&quot; long, threaded on each end.</td>
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<tr>
<td>2</td>
<td>Main rod, 1&quot; aluminum rod with groove cut for steel tape, 6'2&quot; long.</td>
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<tr>
<td>3</td>
<td>Steel tape, 5' long, calibrated in tenths and hundredths of feet and inches and 64ths, imbedded in the aluminum rod and secured with sheet metal screws.</td>
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<tr>
<td>4</td>
<td>End bases, 1&quot; angle iron welded to 2¾&quot; projections to which legs are attached (projection ½&quot; by 2&quot; iron bar).</td>
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<tr>
<td>5</td>
<td>Legs 14&quot; long of ¾&quot; x 2&quot; iron bar with 2&quot; ends, bent at 45°—7/16&quot; holes drilled in portions resting on the ground.</td>
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<tr>
<td>6</td>
<td>One-inch set dies, welded to the iron pipe.</td>
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<tr>
<td>7</td>
<td>Eleven-inch segment of iron pipe with “window” for viewing the tape.</td>
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<tr>
<td>8</td>
<td>Wire crosshair fastened with 4 screws in iron pipe.</td>
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<tr>
<td>9</td>
<td>One-inch x ¾&quot; iron bar welded to pipe—for attaching extension arm and braces.</td>
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<tr>
<td>10</td>
<td>Extension arm braces, 1&quot; x ⅜&quot; x 11&quot; iron.</td>
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<tr>
<td>11</td>
<td>Extension arm 1&quot; x ⅜&quot; x 14° angle with 1&quot; x ⅛&quot; 3&quot; cross-piece welded for attaching extension arm braces.</td>
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<td>12</td>
<td>One-inch diameter x 2&quot; aluminum rod with hole drilled for pointer and set screw for pointer height control—attached to rounded ¼&quot; aluminum plate with appropriate bolt positions for adjusting the angle of the pointer.</td>
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<tr>
<td>13</td>
<td>Spring and ¼&quot; pulley used to hold pointer tip just above ground level.</td>
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<td>14</td>
<td>Wire hook which attaches to the pulley rod holding the extension arm up during transportation.</td>
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<tr>
<td>15</td>
<td>One-fourth inch high carbon steel rod—sharpened to a fine point and notched at inch intervals.</td>
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<tr>
<td>16</td>
<td>Driving head for marker pins—6&quot; x 1⅜&quot; diameter iron rod, with 7/16&quot; hole 2&quot; deep in one end.</td>
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<tr>
<td>17</td>
<td>Iron marker stakes—7/16&quot; diameter—variable lengths 8&quot;-20&quot;.</td>
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Adaptations

This measurement device can be easily adapted for use under special conditions or modifications of the type of measurement to be taken.

It can be used to locate points or loops as well as to locate a line. Intercepts above ground level as well as at ground level can be recorded. With appropriate adaptations, this device can be used to measure height of vegetation. A series of several parallel lines, points, or loops can be installed at one setting by merely shortening or lengthening the extension arm and/or by adjusting the pointer angle.

For transporting on pack animals the six-foot rod may be bisected and threaded in the center for quick and secure reattachment. The pulley holder rod may be treated similarly.

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