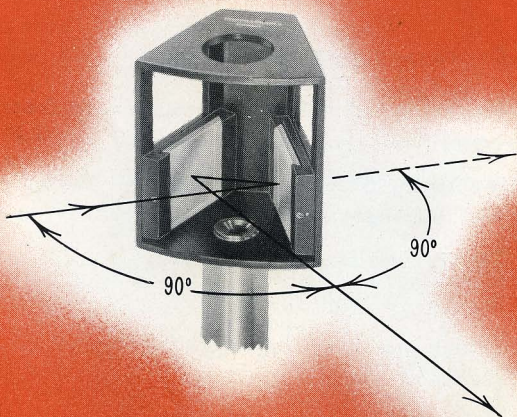


RIGHT ANGLES
with
POCKET INSTRUMENTS



for ENGINEERS
BUILDERS
ARCHITECTS
SURVEYORS
LANDSCAPE ARCHITECTS
FARMERS



KEUFFEL & ESSER CO.

Invaluable for:

Determining right angles

Measuring the plusses of objects not on the survey line

Measuring offsets (They eliminate "swinging" the tape)

Taking cross sections

Staking out small structures

Setting expansion joints at right angles to the forms

Lining up braces for shoring

Laying out squares for contouring

Accomplishing numerous surveying jobs

They may even be used for laying out circular curves and the angle prisms and mirrors can be used as hand levels in an emergency.

The Right Angle Prism

No. N5762

This is the smallest instrument. It consists of a single ground triangular prism, and it therefore cannot get out of adjustment. Its accuracy depends on the angles to which it is ground. A plumb bob can be attached to the hook of the handle.

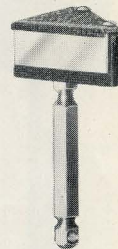


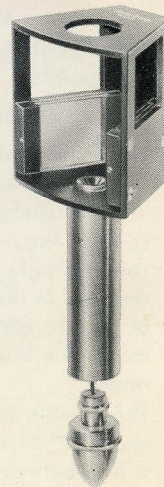
Fig. 1 shows how the instrument is used. The view of the instrument is divided into two parts by a vertical line as shown. The part next to the metal back is disregarded.

The Right Angle Mirror

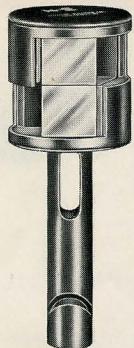
No. 5750

This instrument gives a slightly larger, field of view. It is adjustable, for greater accuracy. A small plumb bob is stowed in the handle.

To use the instrument, unscrew the handle from inside the mirror and screw it in the bottom. The instrument is turned, as shown in Fig. 2, so that one mirror is in full view. The results are shown in the figure.



The Double Right Angle Prism



No. 5760

This instrument consists of two large ground pentaprisms, firmly cemented together. It therefore can never get out of alignment. Its accuracy depends on the angles to which the two elements are ground. It is completely protected by a metal cover, which slides around the head of the instrument to expose the prisms. A plumb bob can be attached by a cord. The hollow handle can be mounted on a staff if desired.

Fig. 3 shows how the instrument is used. The object can be seen both over the instrument and under it through the wide vertical slot in the handle. The results are shown in the figure. As can be seen, this instrument has the advantage that it can be placed on a line between two points.

HOW THESE INSTRUMENTS WORK

The instruments bend the line of sight exactly 90° . This is true no matter how you turn the instrument in a horizontal plane.

Look at the mark beyond the instrument (like the ranging pole in Figs. 1 and 2). The object that appears in the instrument directly in line with the mark (the corner of the house) is at 90° to the mark. The instrument is at the vertex of the right angle.

The Double Right Angle Prism bends the line of sight 90° in both directions. It will put itself on a line between two points.

Line up a mark at each end of the survey line

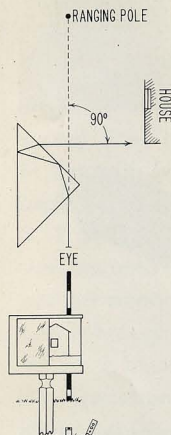


Fig. 1

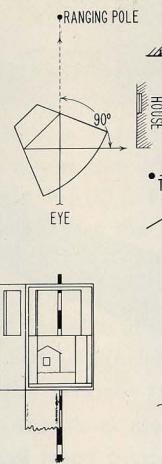


Fig. 2

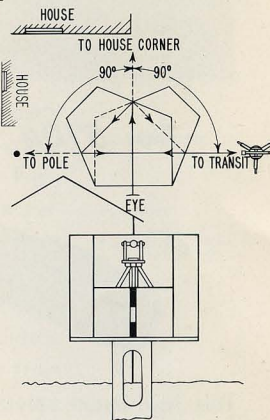


Fig. 3

(the ranging pole and the transit in Fig. 3). The object at 90° to the line (the house corner) appears in line with the two end marks.

WHY ROTATING THEM DOES NOT AFFECT THE RIGHT ANGLE

Figs. 4 and 5 show what happens when the instruments are rotated. The 90° angle is not affected.

Rotating the instruments merely varies the field of view.

The same principle applies to the double right angle prism. The hand level with the right angle feature works on a different principle.

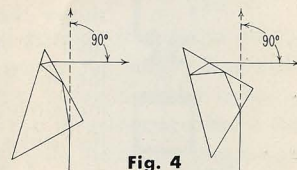


Fig. 4

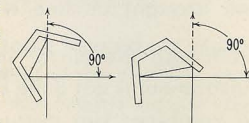
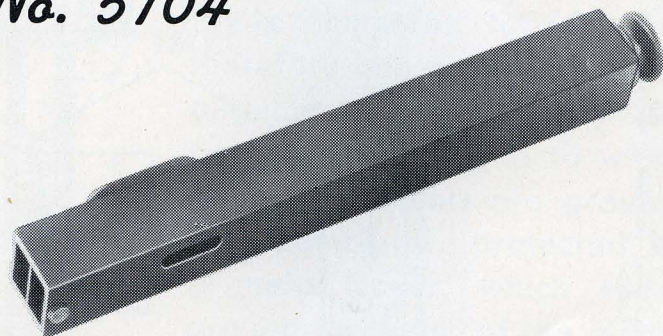


Fig. 5

The Hand Level with a Right Angle Feature

No. 5704



This instrument serves a double purpose. While its principal use is as a hand level, it offers the right angle feature as well. The field of view, however, is limited in comparison with the instruments described on the previous pages.

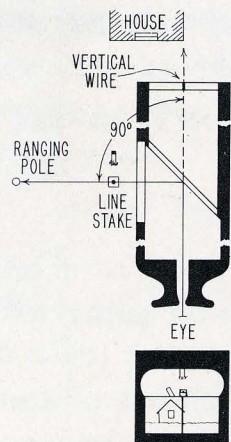


Fig. 6

When the half mirror of this hand level is pulled out and reversed, the instrument can be used to establish right angles. Fig. 6 shows the appearance of the field of view and how part of the line of sight is bent 90° by the mirror. The ranging pole and the stake (shown in the upper part of the field of view) and the object to be located (the house corner) are all brought on line with the vertical wire.

Although the mirror image is reversed and the instrument is not quite so easy to use as the others, it combines two instruments in one. With its flat base, it can also be used on a level board.

TO DETERMINE A PLUS AND OFFSET WITH A SINGLE RIGHT ANGLE INSTRUMENT

Stand at the approximate plus, looking along the survey line. Hold the instrument in line with two marks (the ranging pole and stake 2+00 in Figs. 1, 2 and 7. Walk along the survey line until the object (the house corner) appears in the instrument and is brought in line with the two marks. A plumb bob will facilitate this operation. The distance from stake 1+00 to the mark is the plus. The distance from the mark to the house corner is the offset.

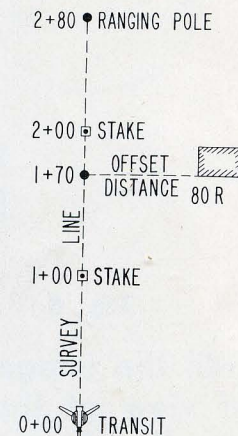


Fig. 7

Often the tape is laid on the ground so that it extends from one station to the next, in this case between stakes 1+00 and 2+00. The plus can be read directly from the tape. Other methods will occur to the user.

WITH A DOUBLE RIGHT ANGLE PRISM

Stand near the desired position facing the object to be located. Move across the survey line until the two end marks (the transit and the ranging pole) in Figs. 3 and 7 are directly one above the other. Move left or right until the object (the house corner) is in line with them.

WITH THE HAND LEVEL

It is best to face the object to be located, as shown in Fig. 6, particularly when cross sections are taken. Then the rodman's movements do not appear reversed, and the observer can direct him more easily.

TO LAY OUT A CIRCULAR CURVE

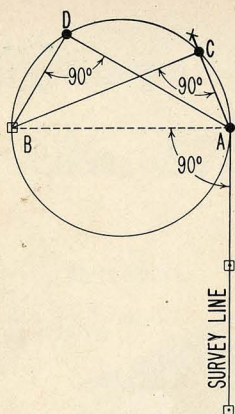


Fig. 8

Note Fig. 8. With the instrument over stake A, set stake B at 90° to the survey line and so that the distance AB equals twice the radius of the desired curve. If the double prism is used, only half the instrument (one side) need be used.

Hold the instrument at any point X. Observe stake A beyond the instrument. Move until the image of stake B comes into the field of view of the instrument and finally appears directly above stake A. The instrument will then be over a point on the desired curve.

Point D, and as many additional points on the curve as may be needed, can be located in the same way.

This method can be applied to any circular curve, but it is particularly useful when the radius is not great and objects prevent using the tape as a radius to mark points on the curve.

THE ANGLE PRISMS OR MIRRORS AS EMERGENCY HAND LEVELS

Hold horizontal, in front of the eye, with a plumb bob suspended by a cord tied loosely at the top end of the handle. Turn until the image of the cord is seen. When the swing is damped, this image marks a level line at eye height that points toward the object sighted.