

The Osborne Firefinder . . . the basic lookout tool

Smith River National Recreation Area
Six Rivers National Forest

Interior of the historic Camp Six Lookout, now located on Bear Basin Butte. Firefinder is on center platform.

From the *Firemans Guide California Region* by Grace, Asplund, Ely, Intorf, and Droege, U.S. Department of Agriculture Forest Service, 1955

The Osborne Firefinder is the basic tool of your job. It is used to accurately locate fires or smokes which you will discover. The accuracy of your reports of fires will depend, to a large extent, on how, well you keep the instrument adjusted and oriented. Knowledge of the various parts of your firefinder (see Fig.98) will enable you to keep it in adjustment.

How to Adjust and Orient the Firefinder

1. Leveling Your Firefinder

Each morning check to see that your firefinder is level in the following manner:

- Place a level tube on machined surface of graduate rim (Fig.99) at about 45 degrees (45°) azimuth.
- If the bubble in the level tube is not level, turn leveling screws until bubble in level tube is exactly centered. (See Fig. 99.)

THE OSBORNE FIRE FINDER

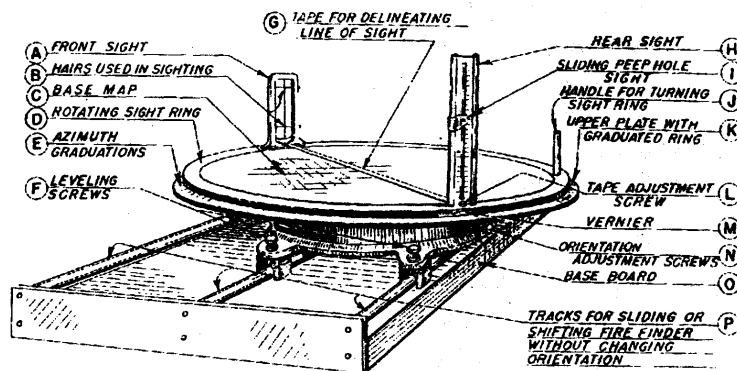


Figure 98 The Osborne Firefinder

- Then place the level on the graduated rim at approximately 135°, next at 225°, and last at 315°. If not level, adjust level screw at each setting.

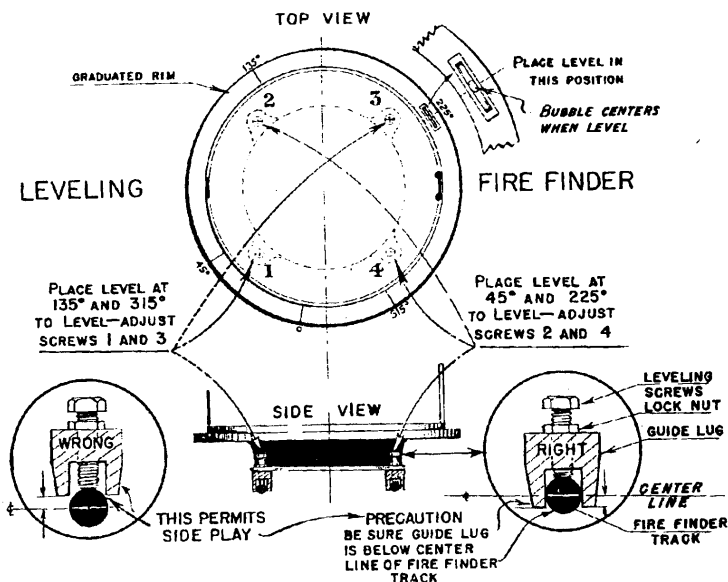


Figure 99 Leveling the Firefinder

- d. Keep guide lugs on the base of the firefinder below the center of track to prevent side play. WHY: To prevent errors in horizontal readings. The slightest side play will make horizontal angle readings incorrect. (See Fig. 99.)
- e. If you have trouble leveling the finder in more than one position, contact your Ranger for proper instructions.

The firefinder must be level before any further adjustments can be made.

2. Checking Sights and Vertical Hair for Plumb

- Firefinder has been leveled.
- Check vertical hair in front sight by following steps:
 - Hang weighted thread or string from nail inside window frame.
 - If vertical hair does not coincide with string, hair is not straight.
- Adjustment
 - Loosen screw on sight fastening the horsehair.
 - Pull the horsehair tight.
 - Tighten the screw again.
 - Hair is then tight and straight. If it does not coincide with string, notify Ranger.
- Replacing Vertical Hair
 - Have on hand extra supply of dark horsehair. (In emergency black thread or fine wire may be used temporarily.)
 - Loosen both top and bottom screws holding hair.
 - Thread new hair through bottom holes in sight standard.

- Wrap hair around bottom screw and tighten screw.
 - Thread hair through top hole.
 - Pull tight.
 - Wrap around top screw and tighten screw.
- c. Checking Rear Sight Slot to See If Vertical
- Finder has been leveled.
 - Hair on front sight is plumb.
 - Look through rear sight at small dot or point on the wall.
 - Raise eye slowly from bottom to top of slot.
 - If dot is visible from bottom to top, rear sight is vertical.
 - Report to Ranger if slot is not vertical.

3. Orienting Firefinder

This should be done daily. Firefinder has been leveled, cross hairs are plumb. A designated orientation point has been selected by the Ranger and the bearing recorded and posted in the lookout house. If this point does not check, the firefinder must be oriented in the following manner:

- Loosen orientation adjustment screws below the upper plate of firefinder. (See N, Fig. 98.)
 - Set vernier at correct reading of orientation point.
 - Revolve, not the sights, but the entire plate of the instrument until sights are trained on orientation point.
 - Tighten screws below plate of finder.
- c. Finder is then oriented.

4. Orienting Map Disk. This should be done daily.

- Finder has been leveled and oriented.
- Set vernier at correct reading/or designated orientation point selected by the Ranger. Locate this orientation point on your firefinder map. If the steel tape does not pass directly over the orientation point on your map, the disk is not oriented. Then follow these steps:
 - Loosen flat head screws around outer edge of map.
 - Revolve the map disk until the orientation point shown on the map lies directly under the steel tape.
 - Clamp disk in place by gently tightening the flat head screws being careful that the position of the disk is not disturbed in the process.
 - Repeat operation using a second and third orientation point to recheck your work.

Notify your Ranger if your map cannot be oriented within 15' (minutes) on at least three orientation points.

5. Adjusting Distance Tape

- Distance tape is suspended between front and rear sights by adjusting screws.
- Adjust screws at either end of tape so that "0" point on the tape will be directly over the center pin. (See Tape G, Fig. 98.)

Be careful -- too much tension on the tape will spring the sight ring and cause it to turn hard.

Care of the Firefinder

1. Keep your firefinder clean. Use solvent if sticky or rusty and a powdered cleanser for general cleaning. Polish all brass parts.
2. The firefinder is not intended to be a table. Don't use it as a place to set cups, ashtrays, binoculars, clothing, or books. Use the shelves of your firefinder stand for storing the items you need to do your job, such as binoculars, instruction booklets, pencils, diary and log book, records and first aid kit. Keep the items on the shelves arranged neatly.
3. Keep a thin coat of light oil or graphite on tracks and sight ring to prevent wear and rust.
4. Map should be kept clean and in good condition. If a new map is needed, notify your Ranger.

Before you close your station protect the Finder as follows:

- a. Clean thoroughly.
- b. Coat all metal parts with mineral oil.
- c. Release tension on cross hairs and distance tape.
- d. Remove map and store in dry place or send it to head quarters as directed.

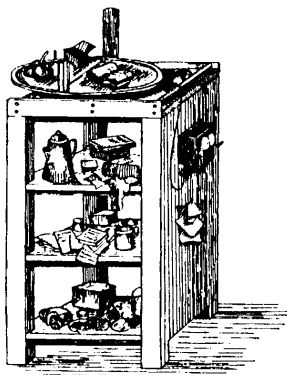


Figure 100 Improper Use

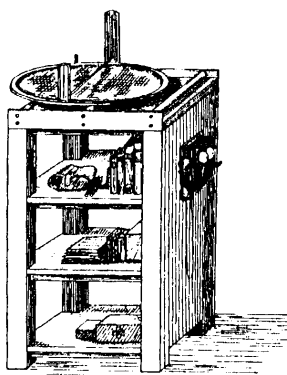


Figure 101 Ready for Use

How to Use the Osborne Firefinder

The Osborne Firefinder measures angles similar to compass readings to smokes. These angles are known as "horizontal angles" and "vertical angles." The horizontal angle is called "Azimuth" and is measured from the north in a clockwise direction. The azimuth circle is graduated into 360 degrees with true north indicated by "0". The horizontal angle, or azimuth, is more important than the vertical angle in cases where two or more lookouts see the fire. Vertical angle readings are helpful where only one lookout can see the fire. Azimuths are read from the graduated azimuth rim

around file firefinder, and vertical angles are read from the scale on the rear sight.

You will notice that the azimuth circle, or the rim around the outside of the Finder Plate, is marked with degrees and fractions of degrees. "0" (zero) on this rim, when the firefinder is properly oriented, is on the south side of the rim. This has been done for convenience in reading the azimuth. If the figures were placed in their true position, you would have to go around the finder to the opposite side in order to take the reading, thereby consuming valuable time. Figure 98 pictures the Osborne Firefinder, illustrating the different parts referred to in the following paragraphs.

The Proper Procedure in Using the Firefinder Is As Follows:

When a fire is "spotted," turn the sighting ring (D) by use of handle (J). Your eye should be within two (2) inches of rear sight (H). Line up the vertical hair of front sight (A) and the slot in back sight (H) so that vertical hair appears in the center of the fire. Readings can now be made. (Slide firefinder on tracks or move to other set of tracks to clear line of sight around obstructions such as corners of buildings, stove pipe, or window frame.)

How to Read a Horizontal Angle Or Azimuth

To see how to make the proper azimuth readings, refer Figure 102. The vernier plate is attached to the movable sighting ring and is used to read the azimuth, not only in degrees, but in fractions of degrees. A degree is into smaller divisions known as minutes. There are 60 minutes in a degree. The symbol for degree is $^{\circ}$. 21 degrees and 30 minutes is abbreviated $21^{\circ} 30'$. Looking at the Azimuth Graduation in Figure 102 you will find "0" rests between $21^{\circ} 30'$ and 22° . In order to find how many minutes past $21^{\circ} 30'$ the marker lies, run the eyes toward the left until you see a line on the Vernier with a line on the Azimuth Graduation. You will find that the line on the Vernier that does coincide with a line on Azimuth Graduation is "15". The vernier is graduated in minutes, so add 15 minutes to $21^{\circ} 30'$ and you will get $21^{\circ} 45'$.

With the present string maps used by the Dispatcher on a fire, reading to the nearest $1/2$ degree is close enough for him to start action. You will want to use a finer reading for

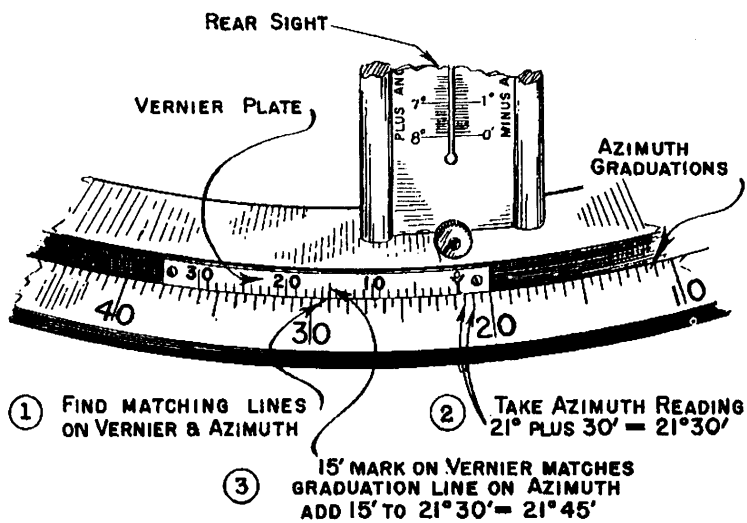


Figure 102 Vernier Plate on Osborne Firefinder

orienting your firefinder, studying the surrounding country, and measuring the size of fires.

You should try for accuracy and speed in taking your "shots" as time is precious where fire is concerned. By studying your country and using the orientation charts, you should become fairly proficient in the use of the firefinder.

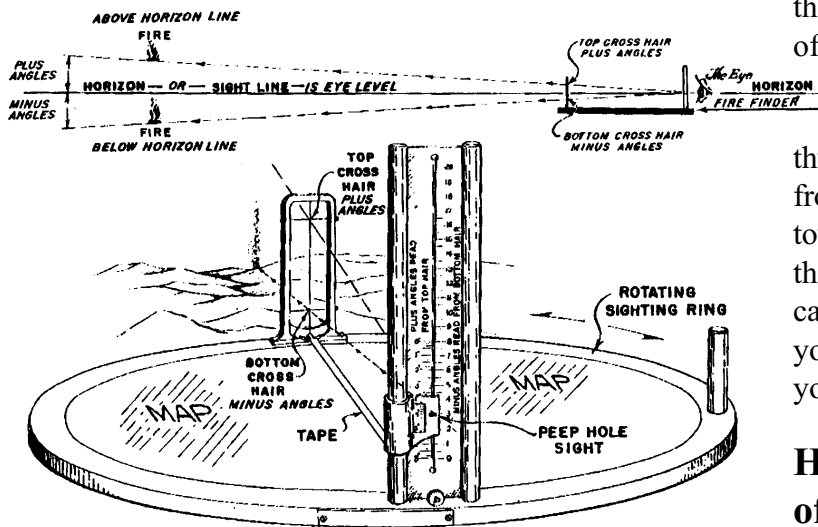


Figure 103 How to Read Vertical Angle

How to Obtain a Vertical Angle Reading

The vertical angle is measured by the sliding metal piece on the rear sight. Figure 103 shows a close-up of the rear sight mechanism. There are two sets of figures marked on this sight; one reads "Plus angle read from top hair" and the other reads "Minus angle read from bottom hair."

Adjust the sliding peep-hole so that it rests on "0" at the bottom of the right hand or "minus" scale and look through the peep-hole. The bottom cross hair should appear in the center of the peep-hole. All objects sighted with the sight in this position are on the same level as the lookout point; subsequently, as you raise the peep-hole, other objects seen (using bottom cross hair) are below the elevation of the lookout.

To sight objects above the level of the lookout, the left hand or "Plus" scale and top cross hair are used. Sighting the peep-hole with the marker at the upper "0", one can see that objects seen through the top cross hair are also on a level with the lookout; but as the peep-hole slides downward, objects seen are above the lookout level.

The vertical reading pictured in Figure 103 (using bottom hair scale) is -3° . Each mark between numerals is 10 minutes. The minus figure (-) indicates that the origin of the fire is below the lookout level. Most of the readings will be a minus figure as fires generally start at the lower, more heavily used elevations below the lookout point.

How to Use the Metal Tape

The metal tape stretched across the center of the map on the Osborne Firefinder is used for estimating the distance of a fire from the lookout point. The First mark near the center of the tape should be directly over the pin in the center of the map. The scale on the tape is in inches, thus on a 1/2-inch scale map a fire estimated to be 3 inches from the tower (on the map) would be 6 miles from the tower (on the ground). Sometimes it is very necessary that the distance to a fire be given to the Dis-patcher, as in the case where only one man can see the fire. In the study of your country you should stress this phase of the job so that you can become proficient in this operation.

How to Determine the Size of A Fire by Use of Firefinder

You can determine the approximate size of a large fire, if you can see both sides of it.

1. Take accurate azimuth reading to each edge of fire. Use vernier to give reading in minutes.
2. Subtract to find the azimuth difference between readings, and then convert the difference to minutes. (1 degree - 60 minutes)

- Multiply the number of minutes by 1 1/2, and the result by the number of miles from the lookout to the fire.
- The final result will be the distance in feet, between the two edges of the fire at right angles to your line of sight.
- Estimate the other dimension of the fire, and size can be computed. Another lookout may see the other dimension and be able to compute its width for you. See Figure for sample problem.

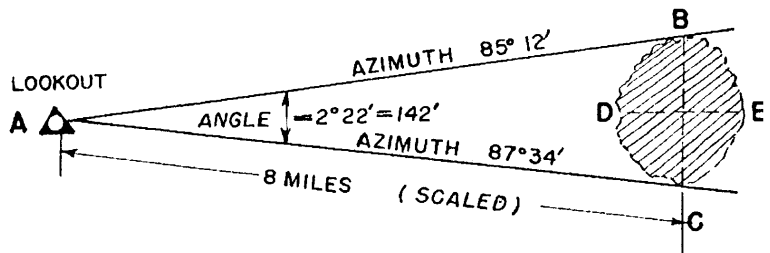


Figure 104 How to Determine Size of Fire

How to Report a Fire

When you see what appears to be a smoke, you must decide whether it is a false or real smoke. If it is a real smoke, is it a legitimate or illegitimate fire? These decisions must be made quickly and accurately and an immediate report made if a fire is starting. If you have any doubts about your decisions or what you have observed, report to your Dispatcher immediately, giving him all the facts. Don't take any chances. We would rather answer some "false alarms" than miss prompt attack on a potential big fire.

Lookout Report

The time when you decide to report the fire should be entered as "time sighted" on the "Lookout Report," Form 265-R5. Record the data for items 1 to 5 on Lookout Report. Report immediately to your Dispatcher the data for items 1 to 5. See Figure 105.

Instructions for completing Form:

The Dispatcher will request other data as needed. Record items 6 to 11 after the first report.

Item (1) Station Reporting

The name of your lookout station. (A supply of report forms with this item filled in should be kept ready for immediate use on your firefinder stand. These forms should be carefully stored at your station when completed.)

Item (2) Azimuth

Record angle to nearest 1/2 degree. The azimuth or horizontal angle is the reading given by your firefinder, (See above for "How to Obtain Horizontal Angle Reading.")

Item (3) Origin of Smoke Sighted

Check "YES" if:

- You can see actual starting point of fire.
- Or you can see the smoke rising through the timber cover at origin of the fire.

Check "NO" if neither of above is true.

Item (4) Vertical Angle

Record to nearest 10, (ten minutes), which is the small graduation on vertical scale. (See above "How to Obtain Vertical Angle

How to Determine Size of Fire

A = Lookout Station

AC = Azimuth reading, right edge of fire 87° 34'

AB = Azimuth reading, left edge of fire 85° 12'

Difference between azimuth readings 2° 22'

2° 22' converted to minutes = 2° x 60 + 22' = 142'

AC = 8 miles (scaled by metal tape on map)

Apply rule: Number of minutes x 1 1/2 x no. of miles

Insert value: 142' x 1 1/2 x 8 = 1,704 feet which is width of fire.

Distance DE - estimated to be 800- feet

$\frac{1,700 \times 800}{43,560}$

Area of fire = 43,560 = 31 + acres

Note: 43,560 is the number of square feet in an acre.

Reading.") Vertical angle reading will not be taken if "origin of Smoke" cannot be seen.

Item (5) Location by Local Landmarks

Describe location of smoke by generally known landmarks. Use accepted local names. Example "On small flat east side of Bear Creek, 1/2 mile below Red Bridge."

Report items 1 to 5 to Dispatcher and stop. This will clear telephone or radio circuit to start action if he desires to do so. Dispatcher will request additional information as needed.

Item (6) What Is Burning

Put check mark after the term best describing what you see or believe is burning. Write in your own terms after "Other" if not described above.

Item (7) Appearance of Smoke

Check one best descriptive term under each heading of Volume, Color, Character. (See page 133 for "How to Identify Smoke.")

Form No. 265-R5

LOOKOUT REPORT OF Slate Mountain
(Name of Fire)

(1) STATION REPORTING High Mt. Lookout

(2) AZIMUTH 91° 30'

(3) BASE OF SMOKE SIGHTED Yes No

(4) VERTICAL ANGLE -1° 30'

(5) LOCATION BY LANDMARKS Steepest slope of Slate Mountain near top!

(6) WHAT IS BURNING Check best descriptive term:
 Grass Reproduction Vehicle
 Brush Slash Unknown
 Timber Building Other (Specify)
Appears to be a single snag

(7) APPEARANCE OF SMOKE Check best descriptive term:
 VOLUME COLOR CHARACTER
 Small White Thin
 Medium Gray Heavy
 Large Blue Billowy
 Black Drift Smoke
 Yellow Blanket Smoke
 Coppery (Other) increasing column.
 (Such as puffs, column, increasing or decreasing)

(8) DIRECTION FROM WHICH SMOKE IS DRIFTING calm

(9) DISTANCE TO FIRE 3 miles

(10) SIZE (Estimated) spot on single snag

(11) LOCATION OF FIRE T 25 N. R 11 E. Sec. 18

DATE TIME

(12) ORIGIN 6/15/64 1402 Known Guess

(13) SIGHTED " 1402 By Lowe

(14) REPORTED " 1402 To Disp. Quick
 At High Mt. Lookout

(Over)

INSTRUCTIONS TO OBSERVER

- Record in item 13 "time sighted".
- Record and report items (1) through (5) to your Dispatcher.
- Upon completion of initial report to Dispatcher, record "report time" in item (14).
- Record items (6) through (10), but do not report them unless requested by Dispatcher.
- Later Dispatcher will furnish "name of fire" and "time of origin," item (12), and actual "location", item (11).
- Keep diary of subsequent action on this side of form (below) or in "Daily Log and Diary" as instructed.
- Completed form should be carefully stored at your station.

SUBSEQUENT ACTION LOG

AGRICULTURE-FOREST SERVICE-SAN FRANCISCO

Figure 105 Lookout Report

Item (8) Direction From Which Smoke Is Drifting

Enter one of the eight main points of the compass from which the wind is blowing at the fire. Examples: NE, E, SE, S. Wind direction is always recorded as the direction from which the wind is blowing, or from which the smoke is drifting.

Item (9) Distance to Fire

Report to nearest 1/2 mile the distance from your lookout to the fire. Use metal tape scale. (See above for "Flow to Use the Metal Tape.")

Item (10) Size (estimated)

- Report in acres if more than one acre.
- Report to nearest 1/4 acre if less than one acre. (See above for "How to Measure Size of Fire with Firefinder.")

Item (11) Location of Fire -Township, Range, Section

This is the map location by legal subdivisions. Enter your estimated location.

Time Blocks

Time Should be recorded in 24-hour clock time.

The above information on using the Osborne Firefinder is taken from Chapter 3 "Lookout Duties" in Fireman's Guide California Region by Harry Grace, Rupert Asplund, Joe Ely, Phil. Intorf, and R. F. Droege. It was published by the U.S. Department of Agriculture Forest Service in 1955.

7/98

For More Information please visit, call, or write one of the Forest Service offices below. Office hours at Smith River National Recreation Area are Monday - Friday, 8:00 a.m. - 4:30 p.m. All ForestServiceoffices are wheelchair accessible.

Smith River National Recreation Area

10600 Highway 199 P.O. Box 288

Gasquet CA 95543

707-457-3131 (also TTY#)

Six Rivers National Forest

1330 Bayshore Way

Eureka CA 95501

707-442-1721 (anso TTY#)

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