

# *Ortho-Fusor*

**REFERENCE MANUAL**

---

---

**Modern Visual Training**

---

---

**Bausch & Lomb Optical Co.**  
Rochester, N. Y., U. S. A.

# *Ortho-Fusor*

**REFERENCE MANUAL**

---

---

**Modern Visual Training**

---

---

Copyright, 1941

Reprinted 1942

**Bausch & Lomb Optical Co.**

**Rochester, N. Y., U. S. A.**

**Bausch & Lomb**

# Ortho-Fusor

Cat. No. 71-80-41

---

## **EXPLANATION**

Ortho-Fusors are visual exercises, to be used as prescribed by your doctor. The name Ortho-Fusor is made from *ortho-*, meaning "correct," and *fusion*, which is the optical term for the blending of the visual images from right and left eyes into a single mental impression. The two eyes in normal vision must point precisely to the same thing at the same time. But they see all things from slightly different points of view. Proper fusion of these small differences gives to man the one sense he has developed probably far more keenly than any animal—three-dimensional vision.

Ortho-Fusors are designed to meet a modern need. The world of modern occupations has drawn many more thousands of us into factories, offices, libraries, schools, shops, and laboratories. Here for hours at a time we perform sustained and precise tasks with our eyes, frequently at very close distances. Modern machinery and

equipment have taken much of the hard physical work from our homes, farms, and factories. But the manipulation and supervision of many of these machines calls for swift, accurate, and tireless performance of the eyes. Many of these modern visual tasks were not at all common a generation ago. Today most of our vital activities are directed by vision.

Glasses can eliminate many of the visual deficiencies which cause eyes to fumble or suffer in their work. But glasses alone cannot always guarantee that a pair of eyes will make the best possible adjustment to their tasks and will become efficient and comfortable in their work. The precise teamwork of the eyes is a matter of coordination and habit. On a new task, or with changed working conditions, or with new eyeglasses, these habits frequently need to be re-educated. The Ortho-Fusors are a means of re-educating and training visual skills, in the same way that skills of hands or feet are trained—by performing certain exercises as recommended by your doctor.

Another feature of the Ortho-Fusors is their training value in improving perception of distance. This is important in judging distance, speed, and direction of moving objects. It is most important for operators of automobiles, airplanes, and tractors, for shooters and operators of military range finders. Perception of distance, or depth perception, is a necessary preliminary in the visual exercises which comprise the Ortho-Fusors.

# INSTRUCTIONS

**Thirty minutes a day.** From fifteen to thirty minutes a day is sufficient for Ortho-Fusor training. Several five or ten minute periods during the day are better than one long period. Interrupt long hours of continuous visual work by a few minutes with the Ortho-Fusors—they will refresh your eyes. Do not overdo the exercises the first few days.

**Use them anywhere** you can get very good light for reading—at your desk, at home, even on the street cars, as you ride to and from work. Hold the Ortho-Fusors in both hands or set them on your desk, at your usual reading or working distance. Avoid tilting them; look at them squarely. Have a pencil or small pointer handy.

**If you wear glasses** regularly or only for close work, use them during Ortho-Fusor training. Put on the Polaroid 3-D\* glasses in front of your other glasses. Keep them clean and free from finger marks. (Do not attempt to wear these Polaroid 3-D glasses for sun glasses—they are not the right kind.)

**How to begin.** There are five Ortho-Fusor pictures in this set. Some of them will be harder exercises than the others. The hardest ones for you are probably the exercises you most need, but you should follow your doctor's special instructions for your case. Most persons will find the first picture easiest and the last one hardest.



Do not become concerned if even the easiest exercises cause discomfort at first. That is evidence that you need this training badly. If this discomfort persists, or if you cannot do any of the exercises correctly after a reasonable time, return to your eye specialist for further advice. Remember, do not spend too many minutes on these exercises at one sitting.

**Be sure you are doing the exercises right.**

There are four steps in the exercises on each picture:

1. See everything in the picture single, as if there were only one view on the screen.
2. See everything with both eyes. You can not determine whether both eyes are working by closing either eye, but careful instructions and special markings in each picture will enable you to know whether both eyes are working together.
3. See everything in the picture with real spaces between, like looking through a window at a real scene.
4. Follow the instructions for looking at the different parts of the picture.

Master each picture thoroughly before attempting another. Review frequently the ones you have mastered. Re-read these instructions *at each sitting* for the first few days to be sure you are doing right.

## I. THE TULIP GIRL

You are looking through a window at a girl sitting on the lawn behind some tulip blooms in a garden. You should see the girl and the tulips clearly and as in a single picture.

**Seeing a single view.** If you have any difficulty seeing all parts of the picture without doubling, do the following exercises before you proceed:

- a. With a pencil (or your finger) reach over the picture and point the pencil down directly over the girl's head but *several inches behind the screen*. Look intently at the pencil, then at the girl. Both pencil and girl will appear single if you adjust the distance of your pencil properly.
- b. Move the picture steadily closer to your eyes, then farther away to arm's length, and repeat this movement several times.
- c. Test your accomplishment by looking at each of the separate letters and numbers in the picture; you should see only one of each.

**Seeing with both eyes.** In the lower left corner are three designs numbered 1, 2, and 3. Design 1 contains a small square, 2 has a small circle, and 3 has two black lines crossing. Cover the right eye lens of your glasses and notice that the small square and one of the lines have disappeared. Now cover the left eye lens and notice that the small circle and the other line have disappeared.

Now, with both eyes seeing, you should see all of these markings *at any time*. These control markings are evidence that both eyes are working together.

From time to time during the exercises look at these designs to be sure you can still see all the markings. Unless you can see these markings, you will not be able to do any of the exercises correctly. If any of the markings tend to disappear, cover first one eye, then the other, until you discover which eye sees the disappearing marks. Look for a moment with that eye (the other eye still covered). Look intently at the control markings while you uncover the other eye.

See if you can in this way "trick" your eyes into seeing all the markings at the same time. When you have succeeded with this, you may have to review the exercise on "Seeing a single view."

**Seeing real space.** The girl and the flowers are actually beyond the "window" and some of the tulips are closer than others. Look at the nine black tulip designs and the three white ones at the left of the picture; count them. Tulip "R" is painted right on the window, but tulip "U" is several inches behind the screen. Can you see real space between the tulip designs?

**Exercises.** The training procedure consists of looking from one part of the Ortho-Fusor to another, and especially in looking alternately at a near part and a far part.



## II. NAVAJO WEAVER

You are looking through the Ortho-Fusor film into a room where a Navajo woman is weaving a rug. At the far end of this room is a small window through which sunlight is streaming. At the sides of the screen are four Navajo rug designs which are hanging on invisible wires stretching out toward you.

**Seeing a single view.** You should see each part of this Ortho-Fusor single without double-exposure effect. If you have difficulty seeing the rug designs single, try the following exercises before you proceed.

- a. Move the whole picture as close to your eyes as you can see it clearly, then move it slowly farther away and repeat the movement, watching intently all the time.
- b. Hold the point of your pencil *in front of the film* in line with one corner of a rug design; adjust the distance of the pencil until when you look from pencil to rug design they both appear single.

**Seeing with both eyes.** Discover for yourself in the picture these parts of the design: the numbers 14 and 20 each within a circle, and two black lines crossing to the left of the words "Navajo Weaver." Cover the right eye lens of your glasses and notice that the circle around 14 and one of the black lines have disappeared. Now cover the

left eye lens and notice that the circle around 20 and the other black line have disappeared. With both eyes seeing you should be able to see all these markings at all times. From time to time during the exercises look at these markings to be sure that both eyes are still working together.

If any of these markings tend to disappear while you are looking with both eyes, use the exercises recommended under this heading for "The Tulip Girl."

**Seeing real space.** The Navajo woman is really behind the film, but the frame holding her rug extends right up to the screen itself. The rug designs at the sides of the picture are in front of the film some distance. Verify this by pointing your pencil in front of the film to each corner of a design. But you will need to make much finer discrimination of space in this picture. For instance, the numbers 23 to 26 are not flat on the rug designs.

**Exercises.** Locate numbers 1 to 26 in their numerical order. Be sure each one is single and standing in space. Point with your pencil to some of those which are in front of the Ortho-Fusor. With your pencil trace the outline of each rug design, and then trace each line in the design. (Your pencil should not be near the film.)

Rest occasionally and look around you for relaxation. Each time you look at this Ortho-Fusor you can find something in it you didn't see before.

### III. BOULDER DAM

If you have mastered the previous Ortho-Fusor, you will have made substantial gain resulting in improved visual comfort.

Here you are looking through the Ortho-Fusor film at Boulder Dam seen from the Arizona side. In the background are mountains of Nevada. The numbered "streamers" extend through the screen toward your eyes when seen correctly.

**Seeing a single view.** You should have little difficulty seeing the dam, the lake, and the mountains clearly and single, without double-exposure effect. To help you to see each of the streamers single, point your pencil on the film as near as possible to the "root" of streamer 1. Watch the pencil as you move it toward your eyes and following the line of the streamer. Follow the same procedure with each other streamer in order. Also bring the whole Ortho-Fusor as close to your eyes as you can, then move it away and repeat.

**Seeing with both eyes.** Each of the four boxes at the left side of the picture has three numbers or letters on it. Cover the right eye lens of your special glasses and notice that one character on each box has disappeared. Cover the other eye lens and notice that some other character has disappeared. When you see all three letters or numbers *in a single row* on each box, then you are using both eyes. For another check notice the two lines crossing at "A" near the base of stream-

er 8. You should be able to see both lines together. Look at these control markings from time to time to be sure both eyes are still working properly.

If you have difficulty keeping some of the letters in view, follow the instruction on this part given for the "Tulip Girl" Ortho-Fusor.

**Seeing real space.** This Ortho-Fusor has much real space in it, but it may be difficult to perform some of the exercises in seeing this space. The eight streamers stick right out through the film toward your eyes, number 8 the nearest. Use a pencil to verify this series of steps formed by the near ends of the streamers. The four boxes, numbered 9 to 12, are four more steps still closer. If you see them properly, you can tell which one of the boxes has greater length than the others.

The most difficult exercises in seeing space in this Ortho-Fusor are in the words above and below the boxes. With your pencil point in turn to each letter in "Nevada Side," "Boulder Dam" and "from Arizona Side." At one end of each word the letters are closer to you.

**Exercises.** Continue your exercises in seeing with both eyes, and seeing real space until you have little or no difficulty. The chief exercise consists in looking first at number 1, then at the background, then at 2, then background, then at 3, and so on through number 12. Do this many times.

## IV. THE CATHEDRAL

You are looking into the Ortho-Fusor film at the Cathedral of Ste. Anne de Beaupre, with the St. Lawrence River in the background. On the hill in the foreground are some bushes, a pathway, and branches of an apple tree—actually in front of the screen.

**Seeing a single view.** You should not have any difficulty seeing the cathedral, the river, even the apple tree as single, without double-exposure effect. But the boxes floating like steps out in front of the screen may require considerable practice before you see each one single. Hold your pencil about an inch away from the film in line with the word "develop" on box 1. Look from pencil to box to letters to number 1 until all are single. In the same way, but holding the pencil farther away from the film, look at boxes 2 to 6 and the words on them.

**Seeing with both eyes.** At the left side of the picture are three white squares containing: two black lines crossing, letters ONE, number 124. If any of these markings tend to disappear while you are looking with both eyes, cover first one then the other until you discover which eye should see the disappearing marks. Look with this eye only (other eye covered), and put your



pencil on one of the marks. Then uncover the other eye and persuade both eyes to see, so that none of the marks disappears. This may take patience and many trials.

**Seeing real space.** The cathedral is approximately at the level of the film itself, and the rest of the picture is in front of the film. Looking past the tree and bushes, you should see real space between tree and bushes and between bushes and cathedral.

The major spaces are between the big boxes numbered 1 to 6. As you point to them in order your pencil will move from an inch in front of the film to about four inches in front.

**Exercises.** Continue the exercises under **Seeing a single view**, **Seeing with both eyes**, and **Seeing real space** until you have no difficulty. Look at each letter in the word "develop," and after each letter look at some part of the cathedral. Repeat this many times, and do the same with each word in the picture. This is the chief exercise.

Rest occasionally and observe objects in the room around you or off in the distance for relaxation. Then repeat some of the many fixation exercises in this beautiful cathedral scene.

## V. HIGH SIERRAS

Here you are looking over a cliff at Twin Lakes in the High Sierras. In the foreground is a mountain stream which plunges over this cliff into the lake below. The stream, the two tall fir trees, the projecting log, the girl, and the rock she is sitting on are all out in front of the Ortho-Fusor film.

**Seeing a single view.** Look first at the hills far in the background, then at the tall trees, then at the log, then at the girl. If you still have difficulty seeing the girl single, try these exercises: Bring the picture as close to your eyes as you can see it; look intently while you move it slowly away and then repeat the movement. Hold the point of your pencil about two inches in front of the film at the tip of the log; look from pencil to log several times. Adjust the distance of your pencil until you can see both pencil and log single at the same time. Then do the same, but with pencil still closer to your eye, with the girl.

The major problems in seeing single will likely occur in connection with the numbered designs around the Ortho-Fusor. Look first at design 1, hold the point of the pencil in line with one corner of the design, and vary the distance until pencil and design are both single. In the same way try design 2, 3, and on to 11. With each one in the series your pencil must come still closer to your eyes. Keep at this diligently until you can see each design single at will without use of the pencil.

**Seeing with both eyes.** It is most important to assure yourself repeatedly that both eyes are seeing properly. The control markings are in designs 1, 2, 3, A, and B. With either eye closed or covered you will notice that one character or marking in each of these designs disappears. With both eyes seeing you should see all these markings: two black lines crossing, number 101, letters TON, two white lines crossing, and letters BAR.

**Seeing real space.** There are several series of space tests in this picture. Hold your pencil point just over the girl's head, then move it back to the far edge of the lake. Do the same with the tip of the log and the tall trees. Does your pencil prove that there is real space between these objects?

For fine space perception look at designs 4, 5, and 6 and determine the relative nearness of each part of the design. Can you see a tower stretching toward you in 4, space between the ball and the square in 6? Is the number 11 closer or farther than the word "Sierras?"

**Exercise.** Review the previous exercises and rest occasionally. Remember, not too many minutes at one sitting. When you can see any part of the Ortho-Fusor single whenever you want to, then read each word in boxes 7 to 11, letter by letter, and after each letter look at some of the trees in the picture. In this way spell out "Sierras" forward and backward. When you have completely mastered this Ortho-Fusor, then you should report your success to your eye doctor.

