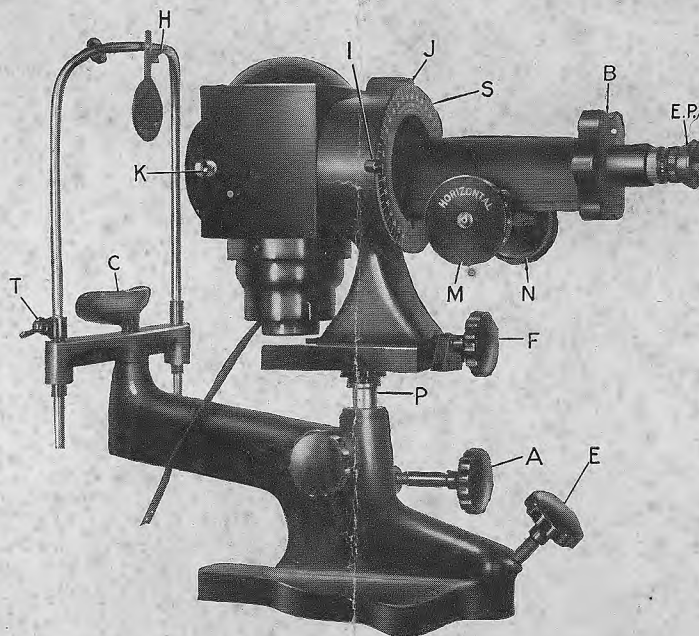


Instructions for Using the Bausch & Lomb H-135A KERATOMETER

The H-135A Bausch & Lomb Keratometer, or Ophthalmometer, is an instrument for measuring the radius of curvature, or refractive power of the cornea. The principal use of the keratometer is to determine objectively whether or not the curvature of the cornea is equal in all meridians, to measure the amount of corneal astigmatism, and to locate precisely the principal meridians of astigmatic corneas.



Locating the Instrument before the Patient's Face

1. Turn on the light. Place a white card in front of the target. Look into the eyepiece "EP" and rotate it until the small cross at the center of the field is in sharp focus for your eye.
2. Place the patient's chin in the chin rest "C" and adjust the head rest "H" by means of thumb screw "T" and knob "A" so that the patient's face is in an erect position, and is steady and comfortable.
3. Grasp the keratometer tube at "B" and rotate it about the horizontal axis to the position where zero of the axis scale "S" coincides with the horizontal index line "I," and the 90 degree mark of the axis scale coincides with the vertical index line "J."
4. Unclamp knob "D" and turn the instrument on the vertical pillar "P" to the position when the horizontal index line "I," and the projecting ring "K" are lined up toward the outer canthus of the eye.
5. *Adjusting the Height of the Instrument.* By means of knob "E" raise or lower the instrument to the position where the line of sight across "I" and through the ring "K" is on the same level as the patient's eye. Notice that there is a similar sighting arrangement on the right side of the instrument.
6. Adjust the height of the instrument and of the patient's head to the position where both sighting devices are lined up on the two outer canthi at the same time.

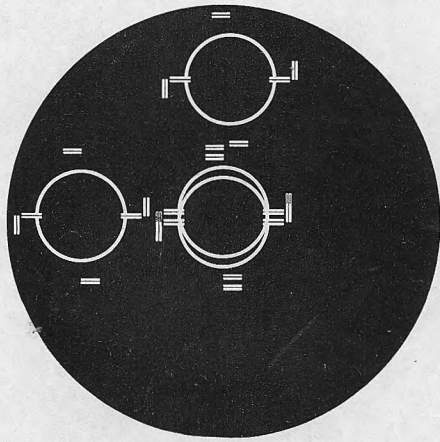


Figure 1

Target out of focus. Notice doubling of image at center of field

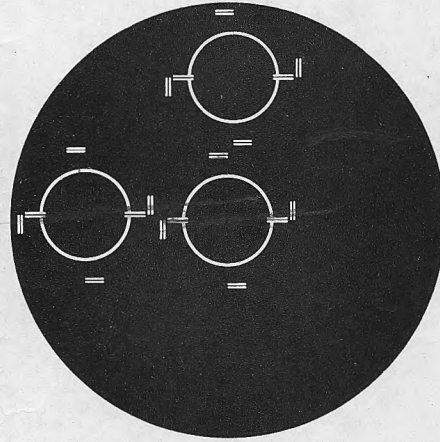


Figure 2

Target focused on patient's eye and central image appears single

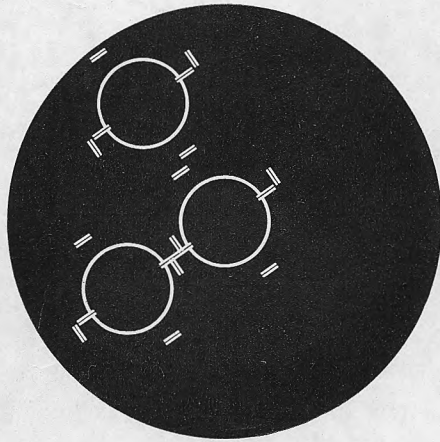


Figure 3

Cylinder axis located. "Flagstaffs" in line but flags not in coincidence

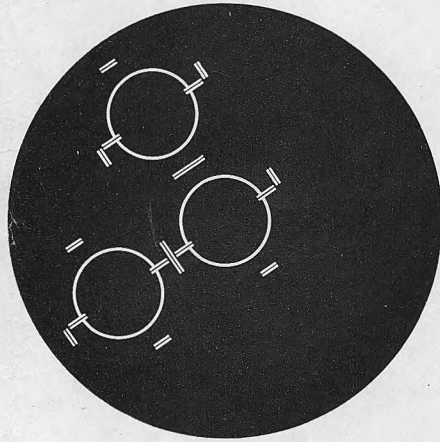


Figure 4

"Flags" are brought to coincidence by moving measuring drums M and N

Taking the Readings

There remain now only four steps in taking the readings:

1. Focus on the patient's eye. Swing the keratometer so that it points toward the cornea of the eye to be measured. By means of knob "F" move the keratometer tube toward, or away from, the patient's eye, to the position where the target image is in exact focus.

When the target is out of focus, the central image will appear doubled, as shown in Figure 1, and when it is in focus the target will appear single as in Figure 2.

2. Locate the cylinder axis. Grasp the left drum "N" and rack it in or out until the short horizontal lines between the circles overlap slightly. Grasp the keratometer tube at "B" and rotate it until the images of the "flag-staffs" are accurately in line, as shown in Figure 3. This is determined when the little black space between the horizontal lines appears continuous and unbroken.

3 and 4. Make the settings. Turn measuring drums "M" and "N" to the exact positions where the black line in the "flags" appear unbroken as shown in Figure 4.

On measuring drum "M" read the power of the cornea in the meridian nearest to the 0-180 degree line. On measuring drum "N" read the power of the cornea in the meridian nearer to 90 degrees.

If the two readings are the same, there is no measured corneal astigmatia. If the two readings are unequal, the difference between the two readings measures the astigmatia at the cornea.

If the power at or near 90 degrees is greater than that at or near 180 degrees, the astigmatia is *with the rule*. If the power at or near 90 degrees is less than that at 180 degrees, the astigmatia is *against the rule*.

Making the Record

Mark on a sketch the two principal meridians, and the two powers read. For example, if the readings are 42.0 at axis 170 degrees, and 45.0 at axis 80 degrees draw two crossed lines inclined slightly, and mark these according to the findings.

Interpreting the Findings

It is usual, and logical to consider minus cylinders in interpreting the findings. In this case we have a 3.0 diopter difference in power between the two principal meridians. It would require a -3.00 D, cylinder axis 170 degrees at the eye to correct this difference.

Inasmuch as the correction lens is to be worn a half inch or so away from the eye; and further, because there exists in the great majority of cases residual lenticular astigmatia, a modification of the actual reading is needed in interpreting the findings.

Javal has formulated a rule, based on experience, to be applied in determining the cylinder for correcting corneal astigmatia. His rule is as follows:

For astigmatia with the rule, use minus cylinders with axis at or near 180 degrees.

Increase the astigmatic finding by one fourth of its value and subtract from this -0.50 D.

Thus, in the example above, to -3.00 D, add -0.75 D, making -3.75 D, and from this value subtract -0.50 D, and we get -3.25 D as the cylinder to use.

For astigmatia against the rule, the astigmatic finding is increased by one fourth of its value, and -0.50 D is added. For example if the readings are as follows: 46.5 axis 180, 42.5 axis 90, the astigmatia is against the rule. The difference in power between the two axes is -4.00 D axis 90 degrees. Add $\frac{1}{4}$ of -4.00 D to itself and we have -5.00 D. To this add another -0.50 D, and we get -5.50 D as the cylindrical correction, according to the Javal rule.

BAUSCH & LOMB OPTICAL CO.

ROCHESTER, NEW YORK