



MANUAL LENSOMETRY

Norma Garber, COMT
University Park, Florida



© 2011 Norma Garber



OBJECTIVE

- ❖ To measure the prescription of a patient's existing glasses, contact lenses, magnifiers, or other optical devices
- ❖ The lensometer **MEASURES** the refractive power of the lens
 - ❖ Spherical and cylindrical power (Diopters)
 - ❖ Axis of cylinder
 - ❖ Presence of prism
 - ❖ Placement of the lens optical centers

Algebra Calculations

❖ Algebraic Addition

❖ Like signs add

$$❖ +3.00 + +1.00 = +4.00$$

$$❖ -2.50 + -1.00 = -3.50$$

❖ Unlike signs subtract

$$❖ +6.00 + -5.00 = +1.00$$

❖ Algebraic Subtraction

❖ Like signs subtract

$$❖ +2.25 - +0.75 = +1.50$$

$$❖ -4.00 - -2.00 = -2.00$$

❖ Unlike signs add

$$❖ +5.00 - -1.25 = 6.25$$

TRICKS ON CALCULATING CLYINDER AND ADD

❖ Algebraic subtraction

❖ Like signs subtract

❖ +3.00

❖ +2.00

❖ 1.00 unit change

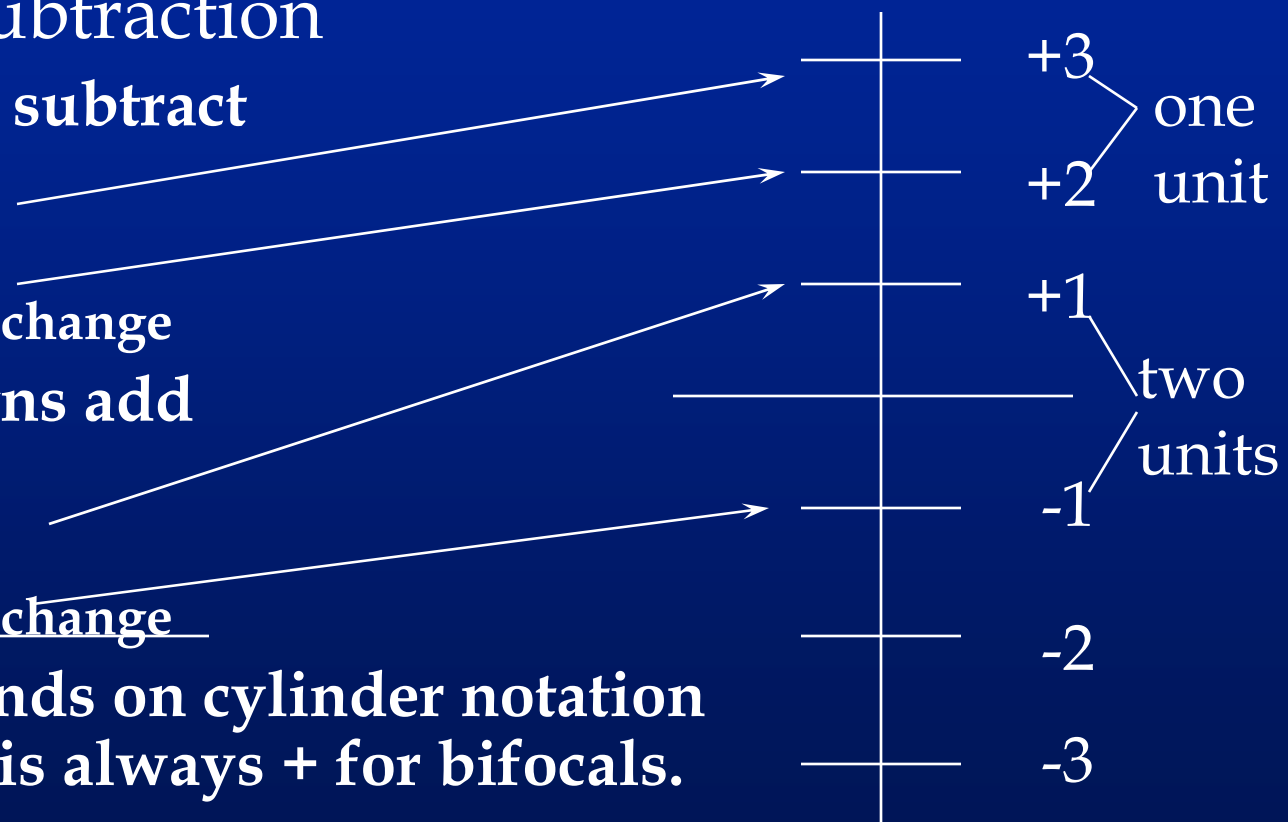
❖ Unlike signs add

❖ +1.00

❖ -1.00

❖ 2.00 unit change

❖ Sign depends on cylinder notation + or -, but is always + for bifocals.





Purpose of lensometry

To have a starting point in
verifying that the
prescription gives the
BEST VISUAL ACUITY

Types of lensometers

❖ MECHANICAL

❖ Need to know

- ❖ Algebraic addition and subtraction
- ❖ Some basic optical facts
- ❖ Understand why measurement done
- ❖ How to transpose to required + or - cylinder prescription

❖ AUTOMATED

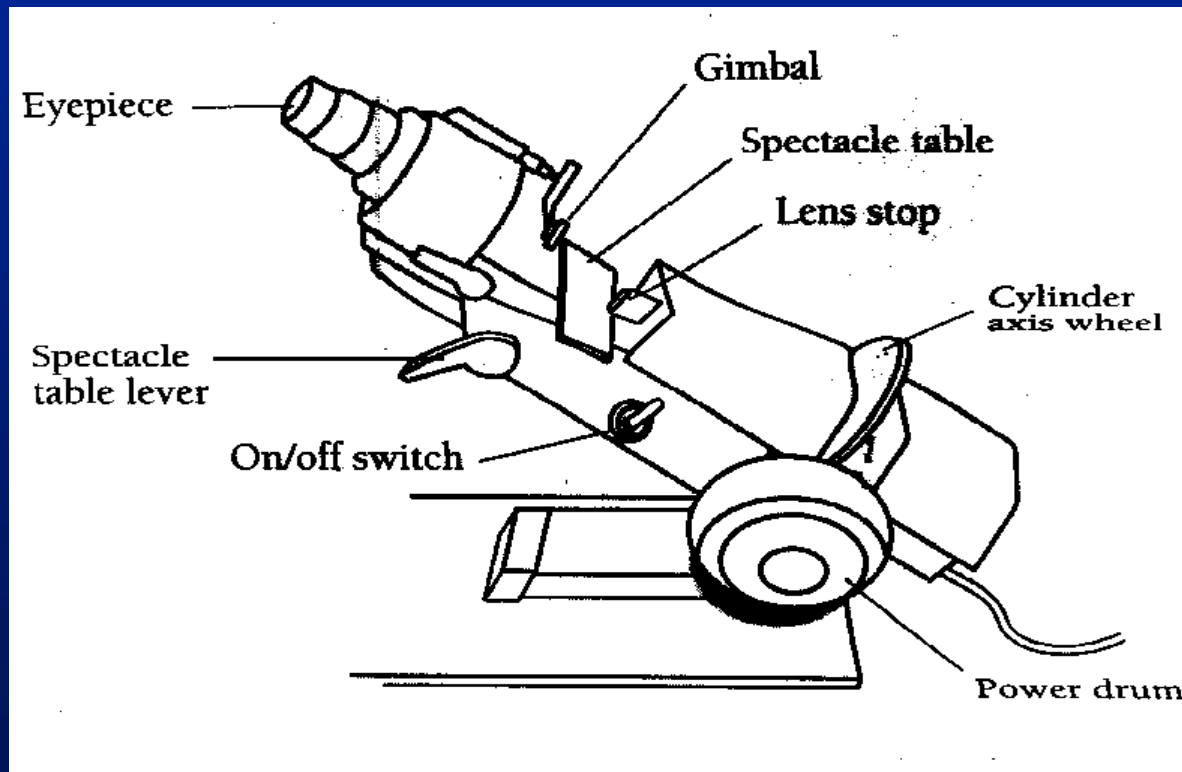
- ❖ Little understanding needed to get the measurement
- ❖ Must know how machine works
- ❖ Still need to know basic optical facts
- ❖ Machine can transpose to correct the + or - cylinder refraction required



Steps in performing manual lensometry

- ❖ Setting eyepiece
- ❖ Positioning the glasses
- ❖ Measuring the sphere
- ❖ Deciding which way to read cylinders
 - ❖ Plus or Minus notation

PARTS OF THE LENSOMETER



FIRST STEP

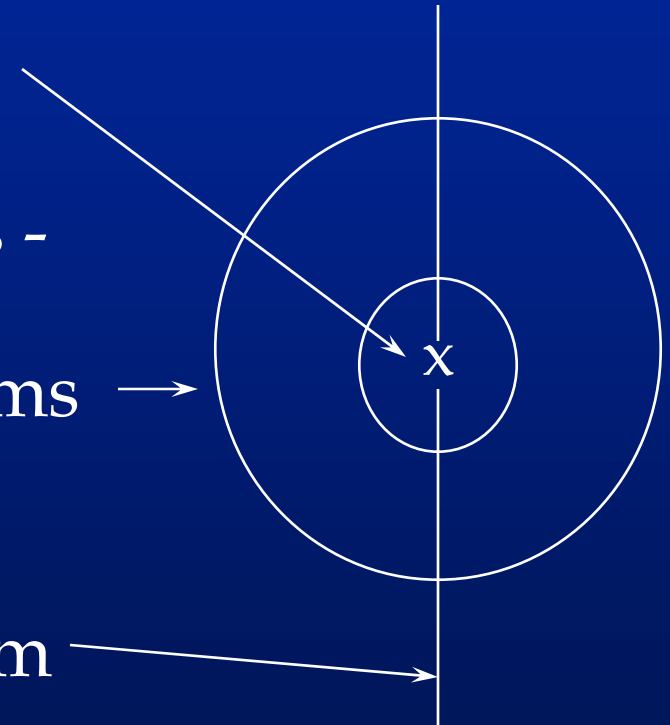
❖ SET EYEPIECE

- ❖ Turn eyepiece counter clockwise to full extent
- ❖ Set power drum to high plus (i.e.: +15.00)
 - ❖ Mires are out of focus
- ❖ Look in machine and turn the eyepiece until the small black cross, in the center viewer, is sharp
 - ❖ **Do not overturn - this induces accommodation**
 - ❖ **Want the MOST PLUS setting with the sharpest image - NOTE EYEPIECE SETTING**

WHAT YOU ARE VIEWING

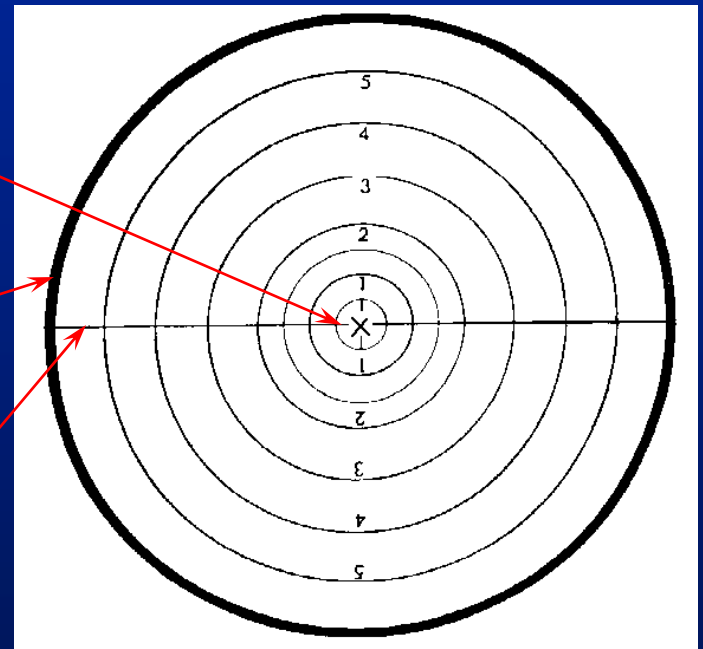
❖ BLACK MARKINGS

- ❖ Center black cross - for placement of optical center of lens
- ❖ Concentric black circles - for displacement of optical center with prisms
- ❖ Black diagonal line - moves by turning the Knurled knob - for prism power and base



The lensometer reticle

- ❖ Center “X” under which the lens optical center is placed. This is where the lens position is placed in front of the patient’s visual axis.
- ❖ Concentric rings designating prism power.
- ❖ The rotating prism axis line.

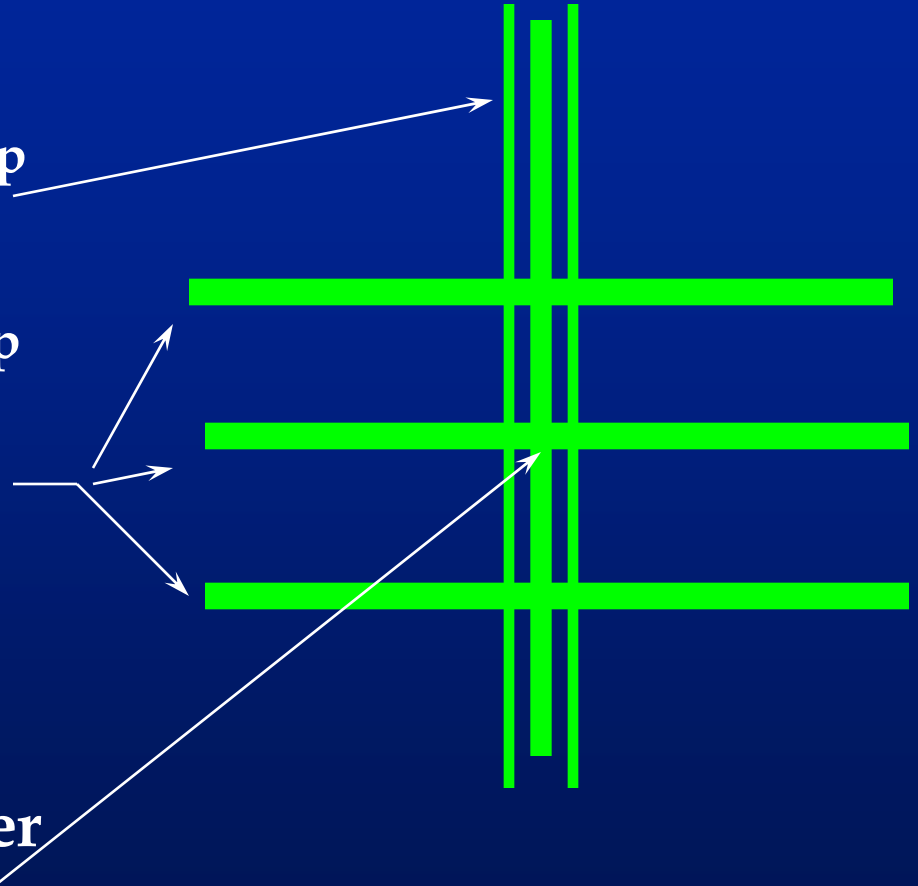


What you are viewing

❖ GREEN MIRES

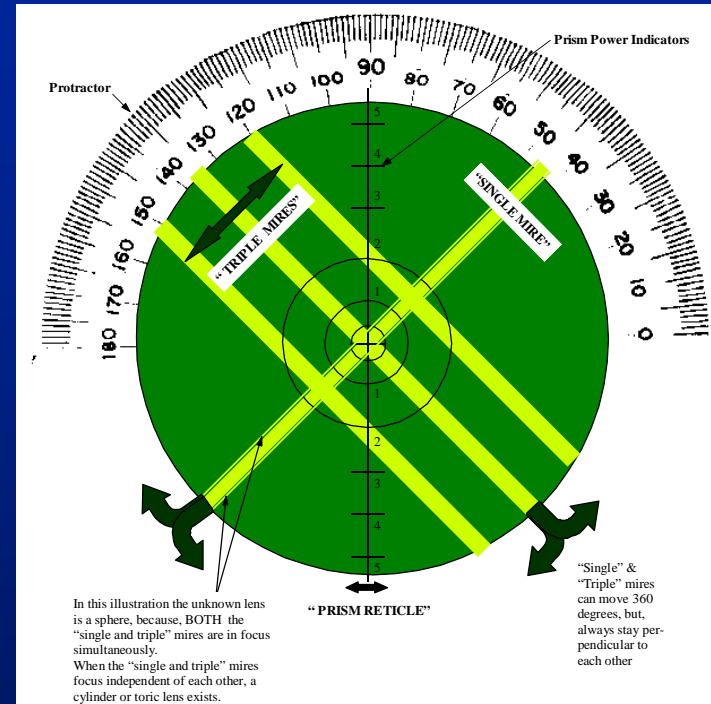
❖ TWO TYPES

- ❖ Single line made up of three lines close together
- ❖ Triple line made up of three fat lines spaced apart
- ❖ Each type of mire focuses independently
- ❖ Placement of the lenses optical center



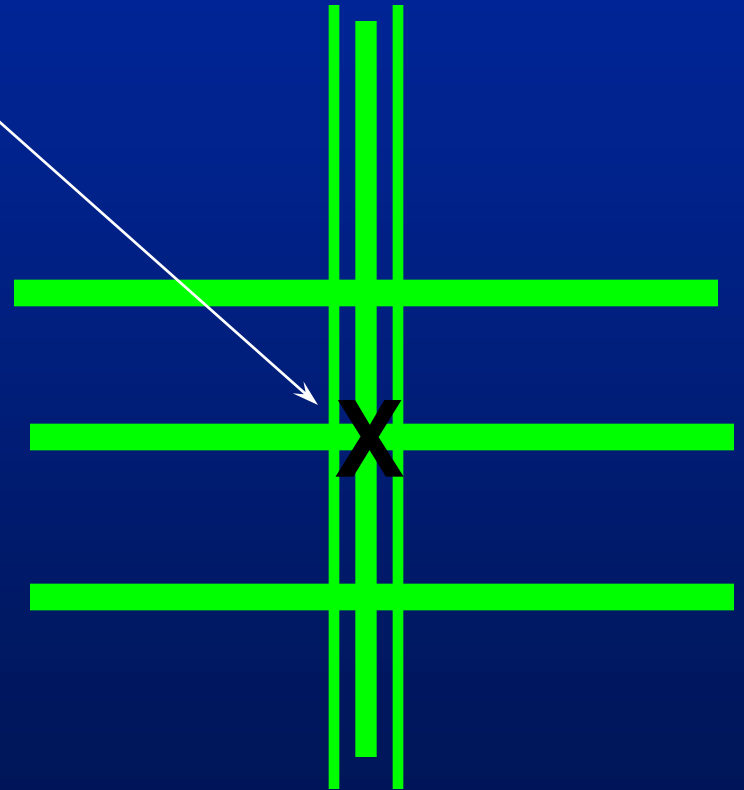
The lensometer mires

- ❖ “Single” line that reads sphere power
- ❖ “Triple” lines that reads cylinder power.



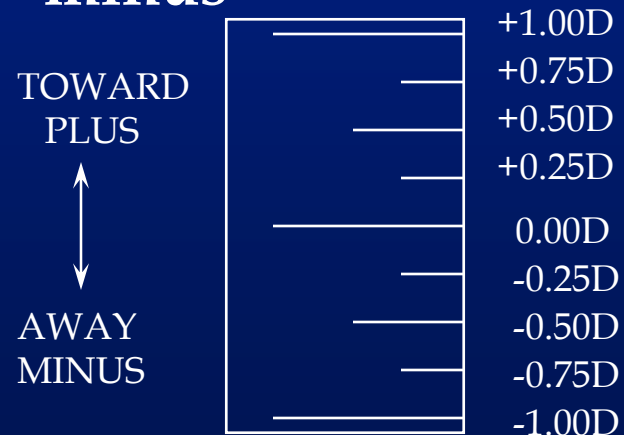
Positioning the lens

- ❖ Move the lens so the center of the green mires is under the black "X" in the viewer.
- ❖ Try to focus the green mires as best you can - one set may be out of focus compared to the other set - Switch back and forth to find the center of the green set in relation to the "X"



Reading spherical corrections

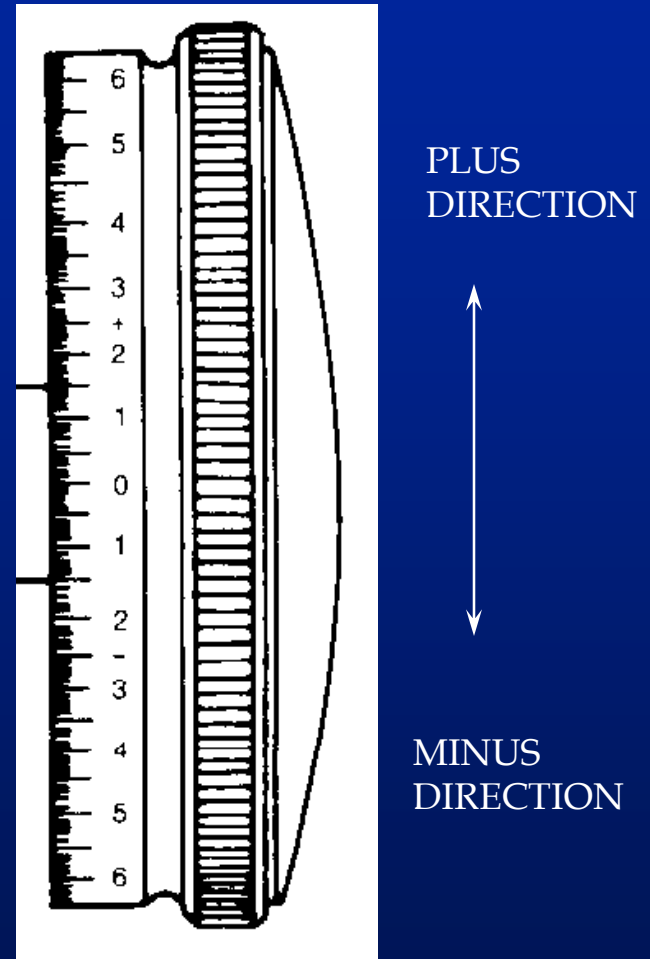
- ❖ Place the lens in the lensometer
- ❖ See if both green mires focus simultaneously with the power wheel
- ❖ If yes - note the power in the window or on the power dial in 0.25D steps
- ❖ If you turn the power wheel toward you - you are adding plus diopters
- ❖ If you turn the wheel away - you are going minus

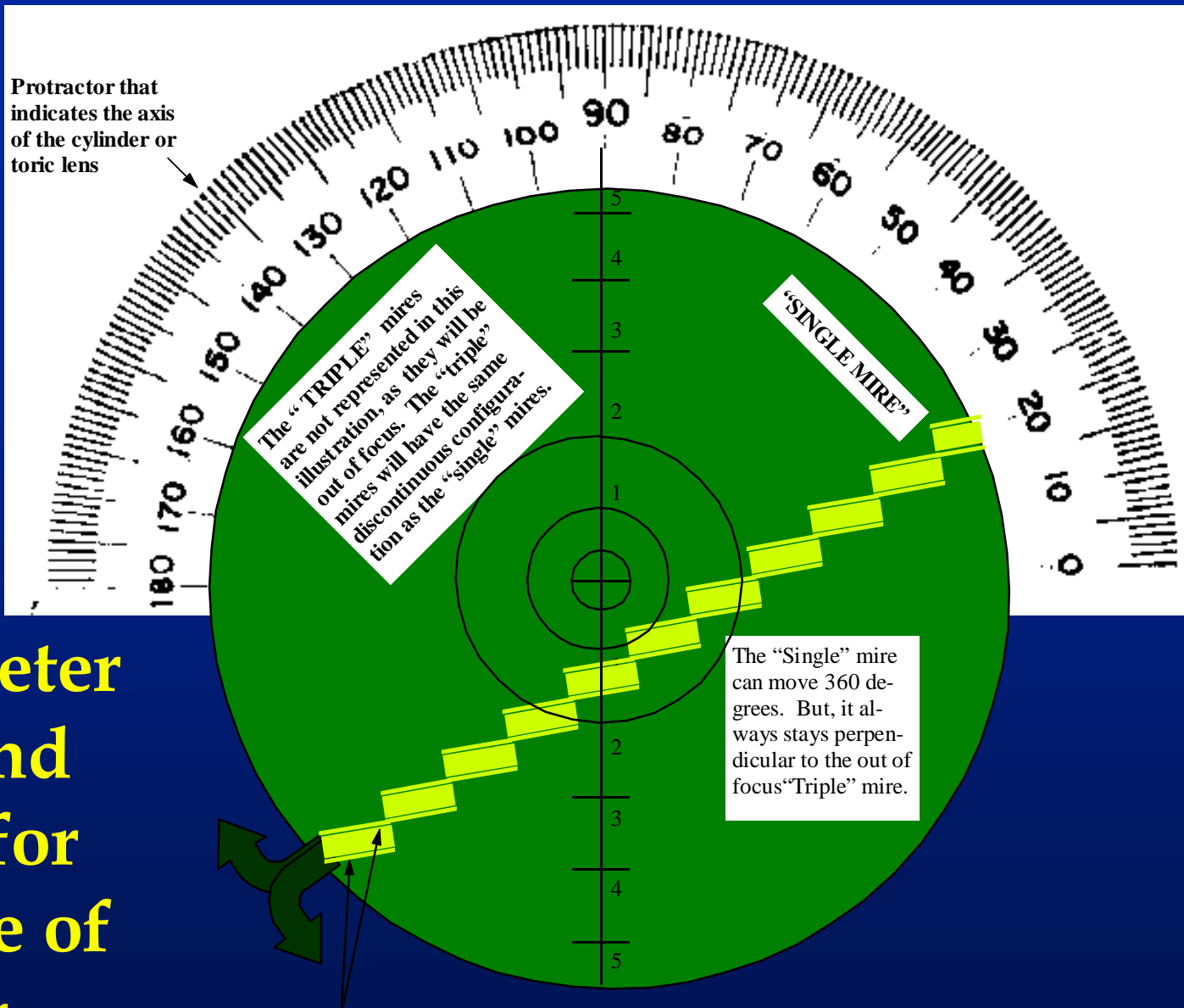


© 2011 Norma Garber

The power wheel

- ❖ The power can be marked on the power wheel
- ❖ Or read in a window inside the lensometer.
- ❖ To increase plus move the wheel toward you - for increased minus move the wheel away.





Lensometer Mires and Reticle for presence of cylinder



Reading cylinders

DECIDE IF READING IN PLUS FORM

❖ PLUS CYLINDER

❖ Set to -10.00D

❖ Focus single mire

❖ For continuous lines

❖ For sharp focus by turning the power dial TOWARD you

❖ Make sure the *first* line in focus is the SINGLE Mire - if not turn axis wheel for a continuous single line

❖ Write power as the sphere

❖ Do not move axis wheel

❖ Keep turning power *toward* you until the triple line is focused

❖ Algebraically subtract for cylinder power

❖ Note axis setting

Example for PLUS CYLINDERS

- ❖ Lens placed at optical center and power on - 10.00D setting
- ❖ Get Single line *continuous & first in focus*
 - ❖ by adjusting axis dial & turning power toward you: power at -1.25D, write -1.25S
- ❖ Triple line next in focus at +0.25D
 - ❖ Algebraic Subtraction $-1.25 + 0.25 = 1.50$ net change
 - ❖ Like signs subtract - unlike signs add
 - ❖ Write cylinder after sphere: i.e.... 1-.25S+1.50C
- ❖ Note cylinder axis on dial: i.e.... x 35°
- ❖ Full Rx: -1.25S +1.50C x 35°

Reading cylinders

❖ MINUS CYLINDER

❖ Set to +10.00D

❖ Focus single mire

❖ For continuous lines

❖ For sharp focus by turning the power dial **AWAY** from you

❖ Make sure the *first* line in focus is the **SINGLE Mire** - if not turn axis wheel for a continuous single line

- Write power as the sphere
- Do not move axis wheel
- Keep turning power *away* from you until the triple line is focused
 - » Algebraically subtract for cylinder power
- Note axis setting

Example for MINUS CYLINDERS

- ❖ Lens placed at optical center and power on +10.00D setting
- ❖ Get SINGLE line *continuous & first in focus* by turning dial AWAY FROM you
 - ❖ Power reads +6.00D - write +6.00S
- ❖ Triple line next in focus at +4.25D
 - ❖ Algebraic Subtraction $+6.00 + 4.25 = 1.75$ change
 - ❖ Like signs subtract - unlike signs add
 - ❖ Write cylinder after sphere: i.e.... +6.00S -1.75C
- ❖ Note cylinder axis on dial: i.e.... x 90°
- ❖ Full Rx: +6.00S -1.75C x 90°

SUMMARY

- ❖ Learn the parts and adjustments of the lensometer
- ❖ Learn the way to set up for manual and automated lensometry
- ❖ Understand optics and algebraic addition or subtraction
- ❖ Know the characteristics of spheres and cylinders and how to identify them
- ❖ Learn transposition