

Astroschool: Eyepieces 101



November 21, 2013

Eyepieces 101

- What can you learn from this presentation?

I am a TeleVue snob.

Everything I learned about eyepieces

I learned from Al Nagler:

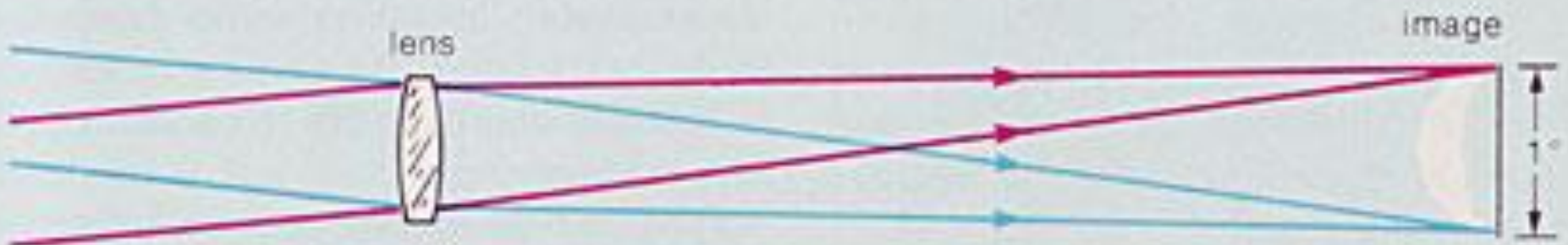
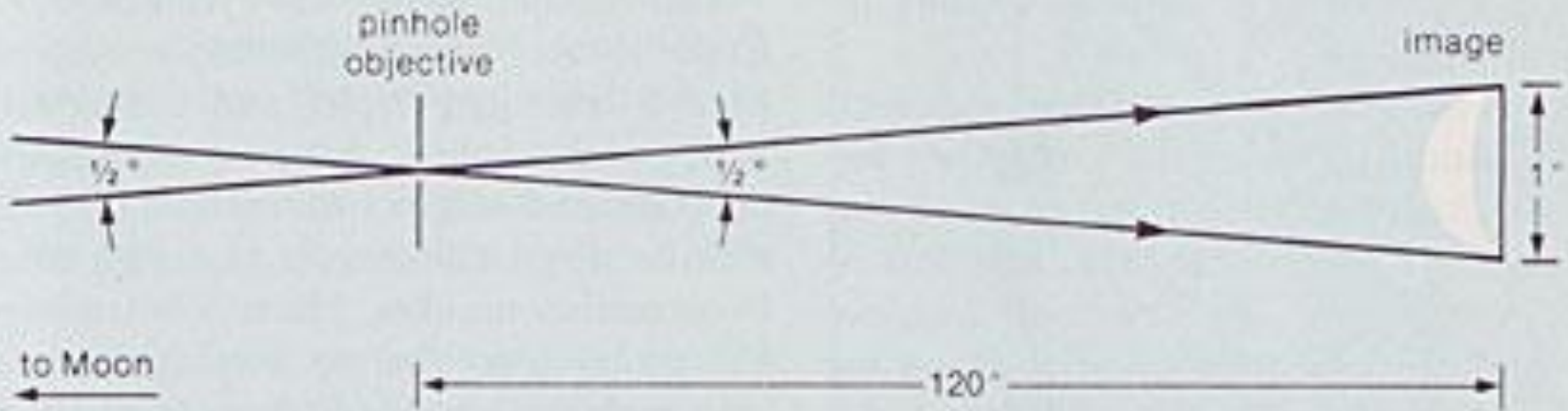
<http://tinyurl.com/yd6sswz>

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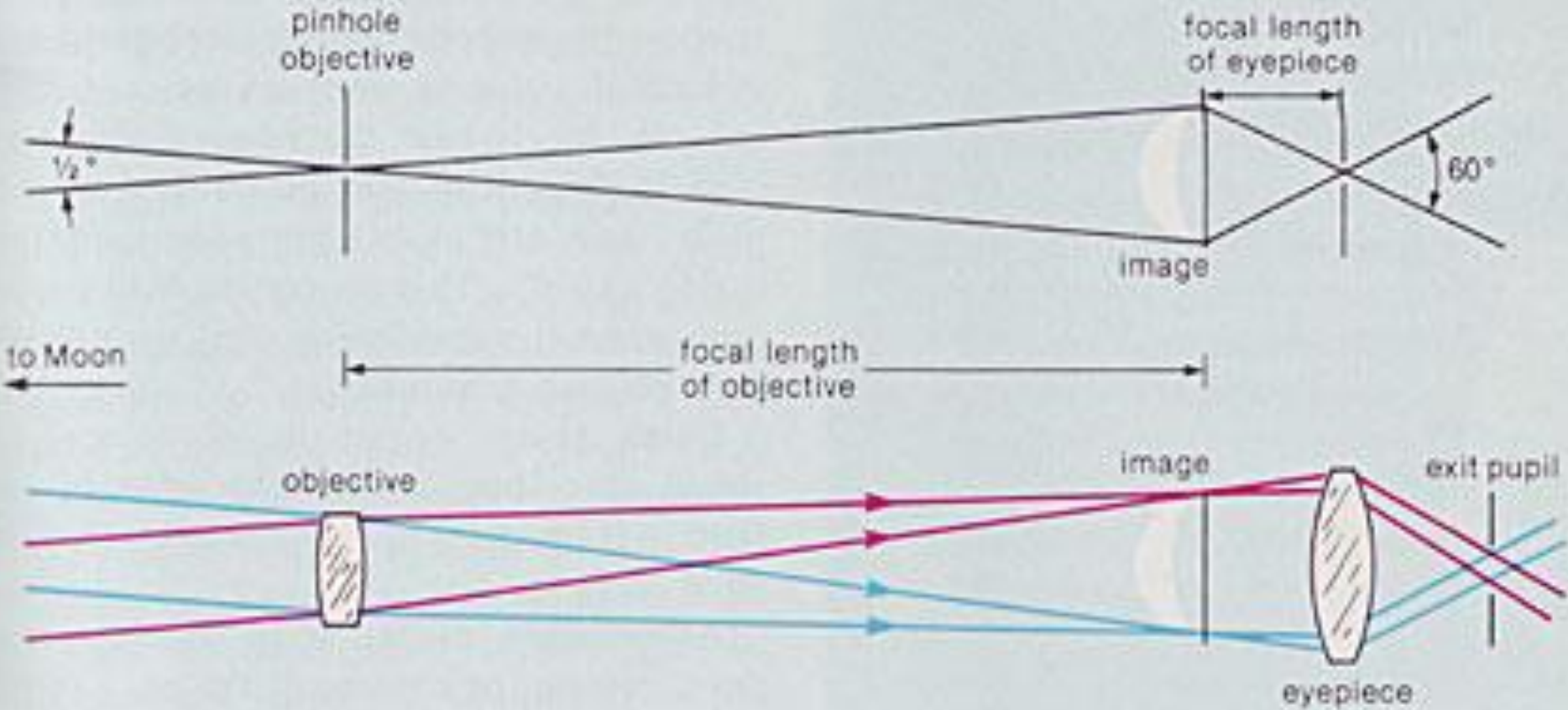
What is an eyepiece?

Essentially, a microscope.

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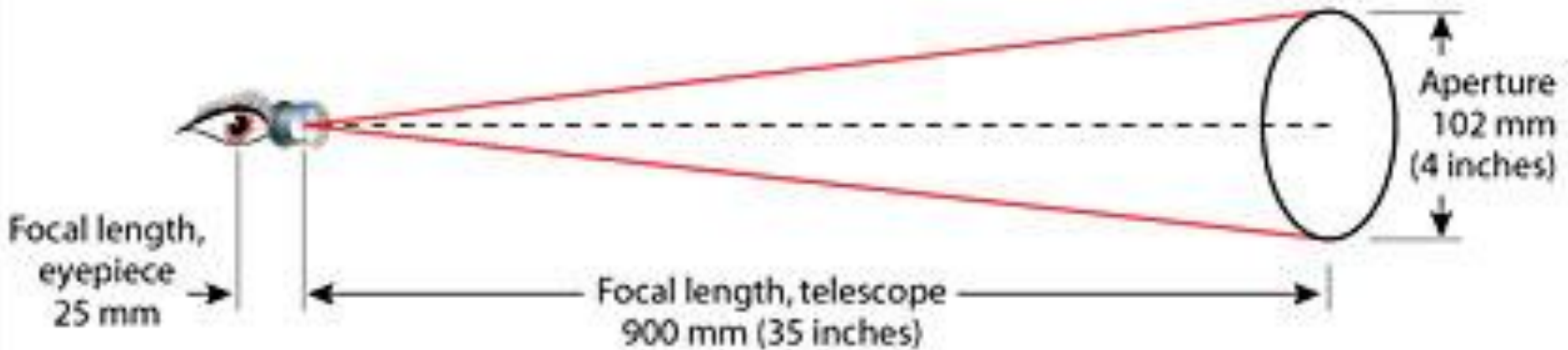


Eyepieces 101



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$$\text{Focal ratio} = \frac{\text{focal length, telescope (900)}}{\text{aperture (102)}} = f/8.8$$



$$\text{Magnification} = \frac{\text{focal length, telescope (900)}}{\text{focal length, eyepiece (25)}} = 36 \times$$

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Important eyepiece formulae:

Mag = telescope f.l. / eyepiece f.l.

Exit pupil = eyepiece f.l. / focal ratio
of telescope

Actual F.O.V. = (e.p. field stop /
telescope f.l.) * 57.3

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What eyepieces should you own?

Al Nagler recommends eyepieces with exit pupils of $\frac{1}{2}$, 1, 2, 4, and 7 mm.

I suggest 2, 3.5-4, and 5.5 or 6 mm.

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What eyepieces should you own?

Consider eye relief as well,
particularly if you wear glasses for
astigmatism.

Eye relief is the distance beyond the
eyepiece objective where you can see
the entire field of view (you see the
field stop).

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Here's what I own:

telescope f.l. with paracorr

2077

(With Paracorr)

	e.p. f.l.	Apparent FOV	Exit pupil	Magnification	Actual FOV
21mm Ethos	21	100	5.3	99	60'
14mm Pentax XW	14	70	3.5	148	28.3'
10mm Pentax XW	10	70	2.5	208	20.2'
7mm Nagler	7	82	1.8	297	16.6'

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Eyepiece designs:

Plossl: 50* AFOV

Panoptic/XW/Delos: 68-72* AFOV

✦ Nagler/WideField: 82* AFOV

Ethos/knock-offs: 100* AFOV