

Offered Title: Like a Horse and Carriage

Lately I've been going on and on about telescopes, but haven't touched on a critical component...eyepieces. No matter which type of telescope you choose, eyepiece selection will affect its performance, and consequently, your experience. An eyepiece to a telescope is like a horse to a carriage.

I'm not going into the sordid details of eyepiece design but I do need to provide some explanation to help you understand how they do what they do. There are numerous designs, but the reality is there are only a few general eyepiece types used by observers. The eyepiece used is sometimes determined by what you plan to look at.

Eyepieces are plastic or metal tubes that house from as few as 2, to 8+ small lenses (elements). The eyepiece tube is made to fit in the telescope's focuser mechanism. Desired eyepiece properties usually dictate the number of elements. The elements are shaped and combined in groups to achieve the designers goal, such as wide apparent field of view (AFV). AFV is how the view appears while looking in the eyepiece, but not the telescopes actual field of view. Eyepieces are also produced in varying focal lengths and this is what determines the telescope's magnification. Telescope focal length divided by eyepiece focal length = magnification.

For example, a telescope with a focal length of 1000mm combined with an eyepiece of 10mm focal length produces 100x magnification ($1000/10 = 100$).

Let's look at some commonly available eyepiece designs.

Recommended: Note – prices can vary by manufacturer

- Orthoscopic – four elements; very sharp, good for high power views of the Moon, planets. Has narrow 40-45 AFV, like looking through a straw.
- Plossl – four or five elements; very good all-around eyepiece with good 50-55 degree AFV.
- Konig – modern designs use 5-7 elements and are very good, with 60-70 degree AFV nice for deep sky objects
- Nagler – eight elements; very wide 82 degree AFV and very sharp. Great for deep sky or high power

Numerous manufacturers have devised variations of Orthoscopic, Plossl, Konig, and Nagler designs to achieve improved performance and wider AFV... 100+ degrees. Manufacturers typically create unique names for their eyepieces making it hard to know its design. Nevertheless, University, Televue, Explore Scientific, Pentax, Celestron, Meade, Brandon, Vixen, and Stellarvue are some of the better ones.

Limited Use: Kellner, RKE, Erfle. 3 – 5 element designs, are OK for low power viewing but unless it came with your scope, I do not recommend getting one. Kellner/RKE have 45-50 degree AFV. Erfles have 60 degree AFV.

Not recommended: Huygens, Ramsden. Simple 2 element designs with narrow AFV and poor performance.

What's in the Sky?

Find Gemini in the southwestern sky after dark. Northwest of Castor's foot are three open star clusters, M35, compact NGC 2158 just west of M35, and dim Cr 89 about 2-3 degrees to the southeast of M35.