

# Notes for Lecture 15

## Optical devices

We discussed devices such as a magnifier or a telescope. We discuss the compound microscope in a forum question (<https://griffin.ucsc.edu/forum/question/310/magnifying-power-of-a-compound-microscope>).

These devices employ one or more optical elements, and there is really no new physics to discuss relative to previous lectures. However, one new thing is the notion of the **angular magnification**,  $M \equiv \theta'/\theta$  (Eq. T33-5), which is also referred to as the **magnifying power**.

Assuming that  $\theta'$  is the angle at which beams enter the eye, or more precisely the zero position of the thin lens that approximates the front part of an eye, we get  $S = \phi\theta'$ , where  $\phi$  is the diameter of the eye (i.e., the distance between the front to the retina), and  $S$  is the size of the image formed on the retina. The greater  $\theta'$ , the larger image that we will perceive. As a result, we will be able to resolve fine features. Indeed, optical devices such as magnifier, telescope, and microscope can be said to have a single purpose – to *enhance the resolving power of the bare eye*.