Axial Magnification
Appendix #1
Stand Magnifiers with Spectacle Adds

When D_3 lies at the spectacle plane in the form of a near spectacle correction for F_3' (instead of at B in the form of ocular accommodation or uncorrected myopia):

Figure #80 shows that the total axial magnification of the combined near correction, (at D_3 and D_2), equals:

$$\frac{F^TB}{F^TD_e} = \frac{D_2F_3'}{D_2F^T}\ \frac{F^TB}{D_3F_3'}$$

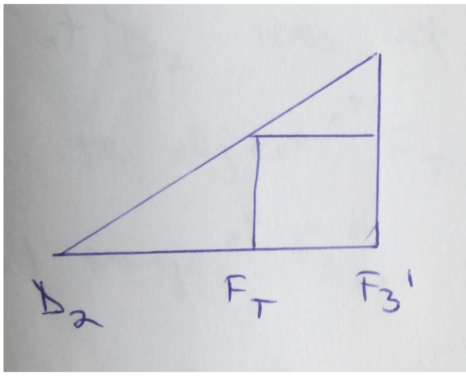
When referenced to a standard object distance BFs, figures #71 and #72 show that the axial near object angular subtense magnification, (or "relative distance magnification"), equals

$$\frac{\theta}{\alpha} = \frac{BFs}{BF^T}$$

so that the total axial near magnification becomes:

$$\frac{FsB}{F^TD_e} = \frac{D_2F_3'}{D_2F^T}\ \frac{FsB}{D_3F_3'}$$

Note that the converging lens at D_2 creates a virtual image at F_3' of the object at F^T:



The resulting virtual image enlargement equals:

$$\frac{D_2F_3'}{D_2F^T}$$

Also note that the near spectacle correction for F_3' at D_3 creates axial near magnification of the enlarged virtual image at F_3' equal to:

$$\frac{FsB}{D_3F_3'}$$

This illustrates the underlying principle of a stand magnifier. Its converging lens at D_2 lies at a fixed distance from its object at F^T and its enlarged virtual image at F_3'. Therefore, it has a constant, “enlargement factor”:

$$\frac{D_2F_3'}{D_2F^T}$$

as well as a constant lens to image distance:

$$D_2F_3'$$

The total near axial

magnification it produces equals that due to its required spectacle near correction at D_3:

$$\frac{FsB}{D_3F_3'}$$

multiplied by the virtual image enlargement it produces:

$$\frac{D_2F_3'}{D_2F^T}$$