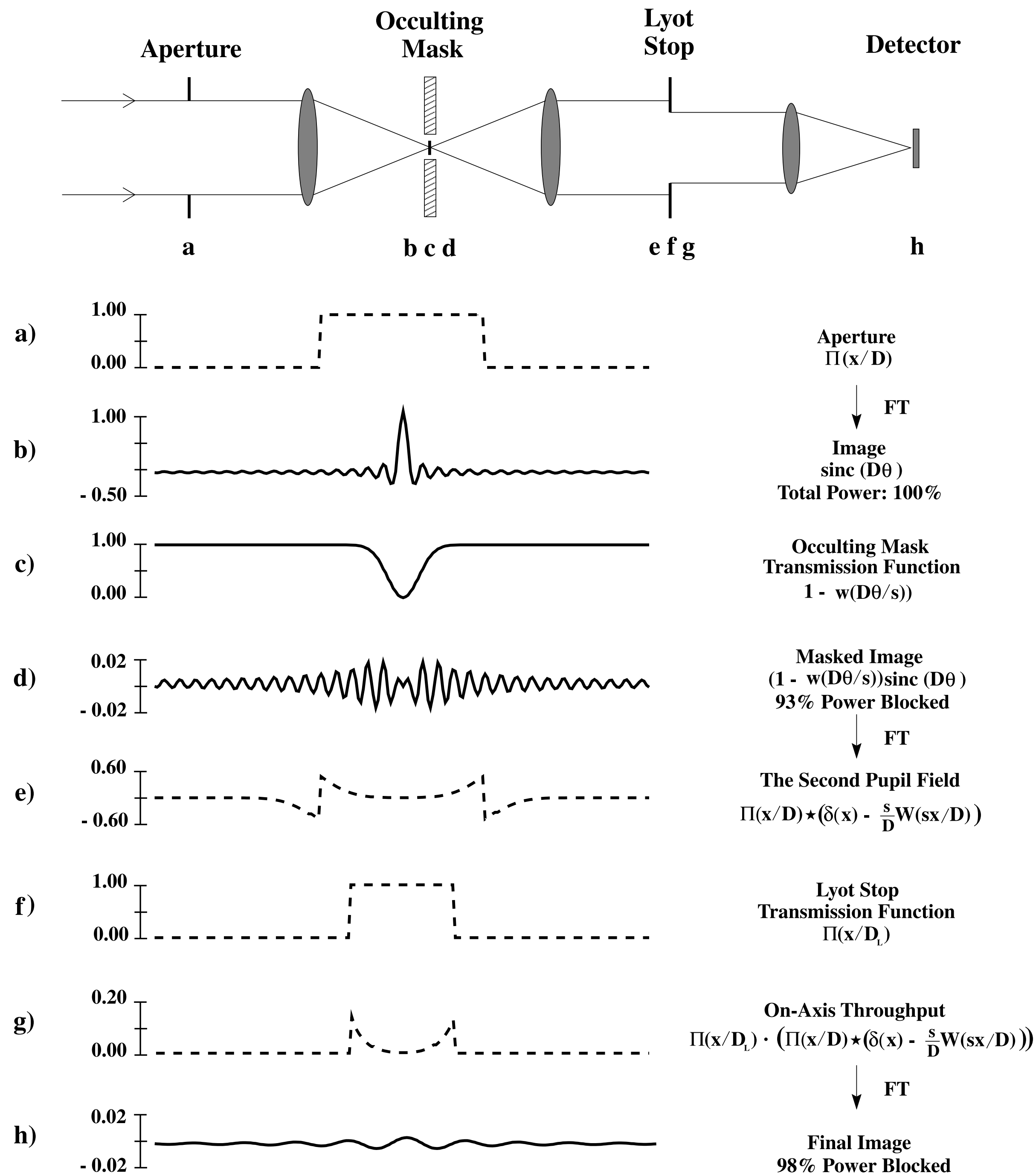

FIG. 1.—One-dimensional coronagraph summary, with locations and electric field or stop profiles of (*a*) primary pupil for on-axis source, (*b*) image before image plane stop, (*c*) image plane stop, (*d*) image after image plane stop, (*e*) pupil before Lyot stop, (*f*) Lyot stop, (*g*) pupil after Lyot stop, and (*h*) final on-axis image. In this example, 98% of the incident power is blocked by the coronagraph.

the image plane is therefore $1 - w(D_\lambda \theta/s)$ (Fig. 1*c*). To illustrate the present discussion, we take $w(\theta) = \exp(-\theta^2/2)$. The field in the first imaging plane after the occulting stop (Fig. 1*d*) can therefore be written as

$$E_d \propto \mathrm{sinc}\,(D_\lambda \theta)\left[1 - w\left(\frac{D_\lambda \theta}{s}\right)\right]. \tag{4}$$

This occulted image is relayed to a detector through a second pupil plane. The electric field at this second pupil is the Fourier transform of the occulted image field (see Fig. 1*e*):

$$E_e \propto \Pi\left(\frac{x}{D_\lambda}\right) * \left[\delta(x) - \frac{s}{D_\lambda} W\left(s\,\frac{x}{D_\lambda}\right)\right]. \tag{5}$$

Here W is the Fourier transform of the image stop function w, $\delta(x)$ is the Dirac delta function, and $*$ denotes convolution. W has width of order unity, although it will not have bounded support for occulting stop shape functions of finite extent, such as the hard-edged stop $w(\theta) = \Pi(\theta)$ (the support of a function is the set of points at which the function is