mination along this line the aperture should
being divided into horizontal strips, as illustrated in Figure 95.

The central rectangular maximum of the pattern has the same proportion of length to breadth as the aperture, only it is laid over on its side. This will be proved: Referring to Figure 96, suppose P_0Z represents the central horizontal line and P_0Y the central vertical line. The first minimum along the

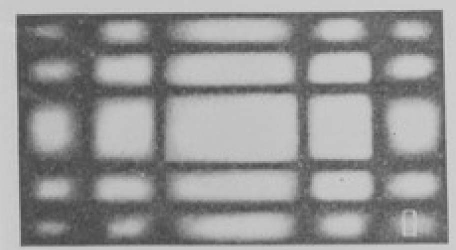

FIG. 94.—Pattern due to rectangular aperture; point source of light (Lummer und Reiche).

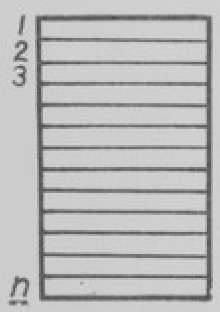

FIG. 95

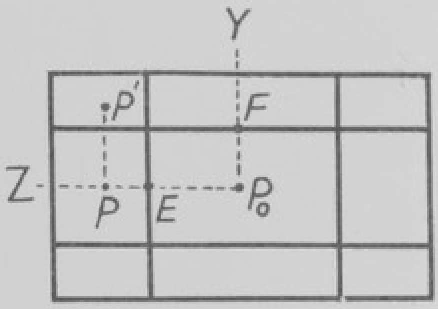

FIG. 96

horizontal line occurs, let us say, at E, which lies at the co-ordinate $z = f\lambda/w$, where f is the focal length of the second lens and w is the width of the aperture. The first minimum along the central vertical line occurs at F, which lies at the co-ordinate $y = f\lambda/h$, where h is the height of the aperture. The central maximum, therefore, has the proportion of width to height $z/y = h/w$, which is the proportion of the height of the aperture to its width.

We shall now derive a general equation for the amplitude of illumination, and then account for the remaining features of the pattern:

Consider the aperture to be divided into a large number, n, of horizontal strips, as in Figure 95. If the amplitude of illumination at the center of the

horizontal strip at the center of the pattern is $A_1 = A/n$.

Let us now proceed from the central point of the pattern horizontally to the left. As we proceed, the diffracted wave front turns about the left edge of the aperture as a hinge. Stopping at some point, P (Fig. 96), consider the vibration length of arc of this