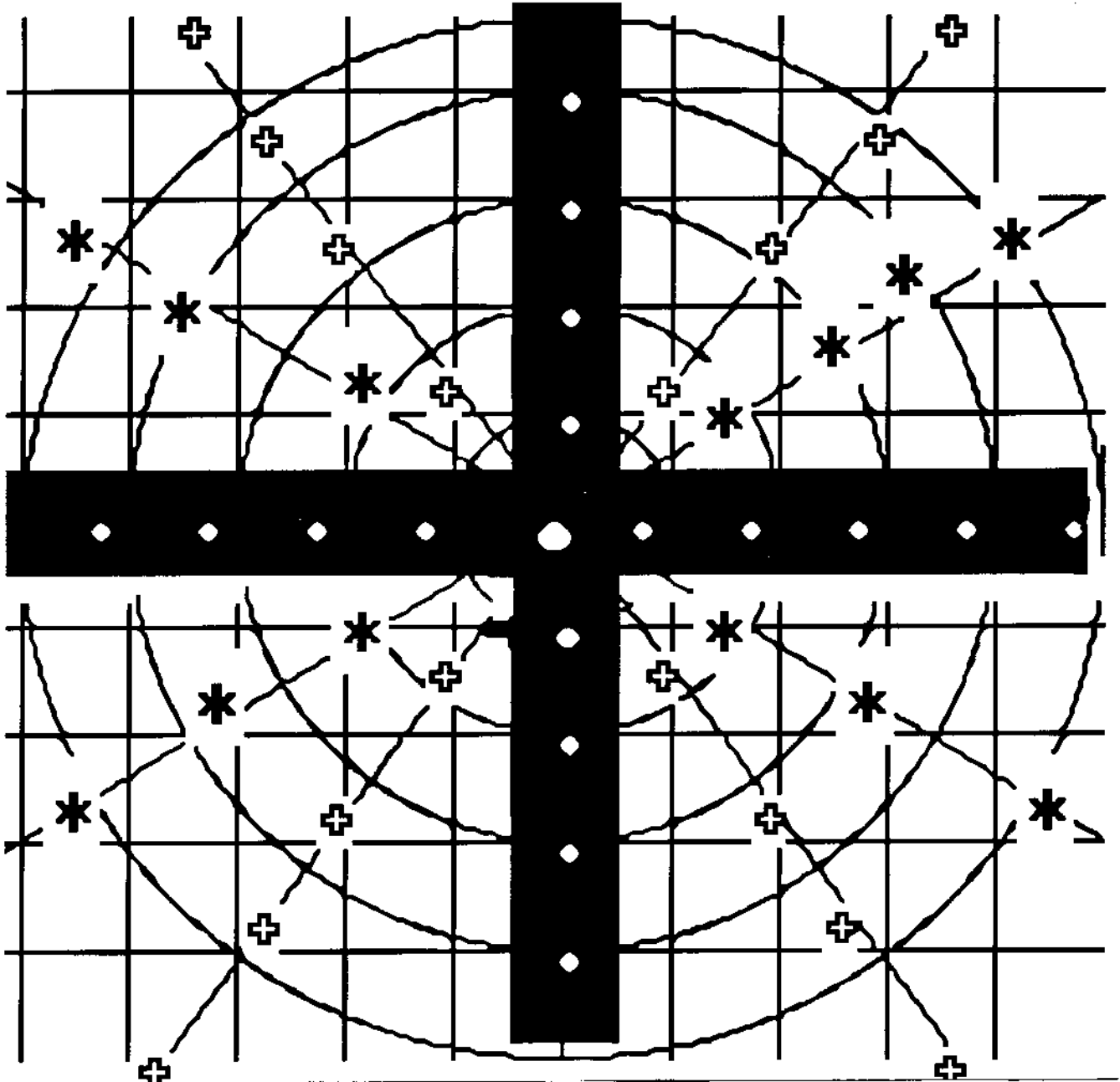


**OPTICAL ENGINEERING NOTE #35:
THE JOHNSON LENS TESTER**

Shown below is a lens testing pattern based upon the principles described in OPTICS AND OPTICAL INSTRUMENTS by B. K. Johnson¹. Although crudely rendered on a Macintosh, this graphic serves its purpose. The student may use this page, or blow it up larger, to study the performance of lenses.



Each part of the design serves a purpose in identifying an off-axis aberration:

The white dots on the black cross show the presence of coma when they have comet-like tails.

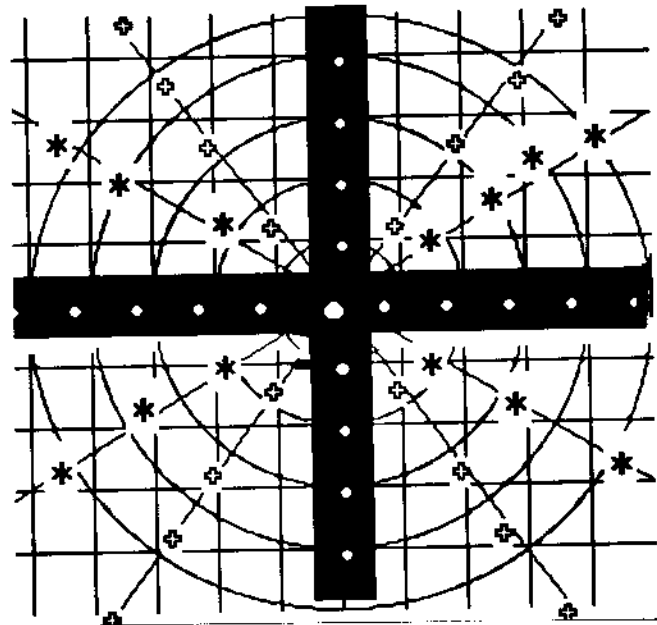
The bars of the asterisks and plus signs will demonstrate astigmatism when the different axes pop in and out of focus;

The horizontal and vertical bars will no longer be parallel if there is distortion;

The circles will illustrate curvature of field as they go in and out of focus as the lens is racked in and out of its mount.

The on-axis aberrations, spherical and chromatic, will cause the center dot to have a hazy, undefined edge and/or colored fringes around it. Using a 1951 USAF Resolution Target² in conjunction with this thing will tell you everything you need to know about your lens.

If you look at this chart through the viewfinder of a typical contemporary camera lens you will probably not see any of the aberrations. Years of optical engineering expertise have eliminated much of them in the field of the film format. However, if you look at the image projected by the same lens when removed from the camera, then they may become apparent at the edges of the image, outside of the film format.



REFERENCES

1. OPTICS AND OPTICAL INSTRUMENTS, B. K. Johnson, Dover Publications, p.115. The book I have is a 1960 reprint of a 1947 edition, but it is still available.
2. See the page in your text, TEST TARGETS, which is simply a page from the Melles Griot OPTICS GUIDE.