

CONTENTS

	PAGE
CHAPTER 1—INTRODUCTORY	1
<p>Fundamental ray tracing formulæ—sign convention—methods for facilitating calculations—initial ray tracing examples with spherical surfaces, plane surfaces and parallel plates—chromatic and spherical aberrations of simple lens—variation of spherical aberration with change in shape of lens—analytical formulæ for calculation of spherical aberration and coma—checks—achromatism formulæ for zero, and prescribed amounts, of chromatic aberration—trigonometrical tests on an achromatic objective, including determination of chromatic aberration, spherical aberration and OSC'—optical tolerances.</p>	
CHAPTER 2—THE DESIGN OF TELESCOPE OBJECTIVES	34
<p>Systematic procedure of the method—analytical calculations for doublets employing various pairs of glasses—summary of results together with graphed values—choice of best solutions—trigonometrical test on final solution—adjustment of last radius for correction of achromatism—differential method for securing correct “bending” of the lens system for variation of the spherical aberration—uncemented or broken-contact objectives—triple lens telescope objectives.</p>	
CHAPTER 3—THE DESIGN OF EYEPIECE LENS SYSTEMS	54
<p>General remarks on the designing process—advantages and disadvantages of various types of eyepiece—ordinary Huygenian and Ramsden eyepieces—chromatic difference of magnification—sequence of operations in the designing procedure—systematic design of an Huygenian eyepiece, a Ramsden eyepiece, and an achromatized Ramsden eyepiece—trigonometrical tests on these three types of eyepiece.</p>	
CHAPTER 4—THE DESIGN OF PHOTOGRAPHIC LENSES	73
<p>Simple meniscus lens—choice of glasses—Petzval curvature calculations—use of analytical formulæ for aberration contributions surface by surface in relation</p>	

	PAGE
to spherical aberration, coma, astigmatism, distortion— numerical examples with choice of suitable solution— trigonometrical tests—ray tracing for oblique rays—deter- mination of exact coma—astigmatism calculations—method of plotting the astigmatic fields—calculation of size and position of discs of least confusion—tolerances for the photographic image—achromatized meniscus lenses, “old” glass and “new” glass forms—procedure for systematic design of these types—symmetrical type photographic lenses, “old” glass and “new” glass forms—anastigmat lenses (Rudolph type)—anastigmat (Cooke type).	
CHAPTER 5—THE DESIGN OF MICROSCOPE OBJECTIVES	141
Types of microscope objectives—initial data—numerical aperture and tube-length—systematic design of a low- power objective—the $(d - D)$ method for effecting chromatic correction when using steeply curved surfaces, with numerical illustration—systematic design of a Lister type microscope objective—the “matching” principle for simultaneous correction of spherical aberration and coma—higher-power objectives with numerical example—Optical path difference (<i>OPD</i>) methods—immersion objectives, numerical illustration for the designing of the “duplex front”.	
INDEX	172