

Contents

Chapter 1

The Method of Lens Design 1

Chapter 2

The Achromatic Doublet 41

Chapter 3

The Air-Spaced Triplet 51

Chapter 4

Triplet Modifications 61

Chapter 5

Petzval Lenses 73

Chapter 6

Double Gauss and Near Symmetric Types 79

Chapter 7

Telephoto Lenses 87

Chapter 8

Inverted Telephoto Lens 99

Chapter 9

Very-Wide-Angle Lenses 105

Chapter 10

Eyepieces 119

Chapter 11

Microscope Objectives 131

Chapter 12

In-Water Lenses 143

Chapter 13

Afocal Optical Systems 155

Chapter 14	
Relay Lenses	169
Chapter 15	
Catadioptric and Mirror Optical Systems.....	183
Chapter 16	
Periscope Systems	211
Chapter 17	
IR Lenses.....	219
Chapter 18	
Ultraviolet Lenses and Optical Lithography	233
Chapter 19	
F-Theta Scan Lenses	245
Chapter 20	
Endoscope	253
Chapter 21	
Enlarging and Copying Lenses	259
Chapter 22	
Projection Lenses	265
Chapter 23	
Telecentric Systems	283
Chapter 24	
Laser-Focusing Lenses (Optical Disc).....	291
Chapter 25	
Heads-Up Display Lenses	299
Chapter 26	
The Achromatic Wedge	305
Chapter 27	
Wedge-Plate and Rotary-Prism Cameras	309

Chapter 28	
Anamorphic Attachments	317
Chapter 29	
Illumination Systems	325
Chapter 30	
Lenses for Aerial Photography	333
Chapter 31	
Radiation-Resistant Lenses	343
Chapter 32	
Lenses for Microprojection	347
Chapter 33	
First-Order Theory, Mechanically Compensated Zoom	351
Chapter 34	
First Order Theory, Optically Compensated Zoom Lenses	355
Chapter 35	
Mechanically Compensated Zoom Lenses	359
Chapter 36	
Optically Compensated Zoom Lenses	403
Chapter 37	
Copy Lenses with Variable Magnification	415
Chapter 38	
Variable Focal Length Lenses	423
Chapter 39	
Gradient-Index Lenses	431
Chapter 40	
Stabilized Optical Systems	443
Chapter 41	
The Human Emmetropic Eye	447

Chapter 42		Chapter 28
Spectrographic Systems	451	
Chapter 43		Chapter 29
Diffractive Systems	459	
Appendix A		Chapter 30
Film and CCD Formats.....	465	
Appendix B		Chapter 31
Flange Distances	467	
Appendix C		Chapter 32
Thermal and Mechanical Properties.....	469	
Appendix D		Chapter 33
Commercially Available Lens Design Programs.....	471	
Index.....	475	
Chapter 21		Chapter 34
Photocoupling, Copying-Lenses, and Beam-Splitting Devices	475	
Chapter 22		Chapter 35
Projection Lenses	495	
Chapter 23		Chapter 36
Telescope Systems	515	
Chapter 24		Chapter 37
Auto-Focusing Lenses (Optional)	535	
Chapter 25		Chapter 38
Close-Up Display Lenses	555	
Chapter 26		Chapter 39
Wide-Angle Wedge	575	
Chapter 27		Chapter 40
Wedge-Plate-and-Rear-Focus Cameras	595	
Chapter 28		Chapter 41
CCD-Hyper-Intensified Cameras	615	