

## Index

Preface  
Preface English Edition

Acknowledgements

### Part 1: A Look Back into History

Grinding Technology and First Optical Discoveries  
The Comedy "The Clouds" by Aristophanes  
The Burning Glass in Orphic Poetry  
Lenses for Loupes and Telescopes?  
The Sun, a Gigantic Crystal Lens  
Optical Lenses and Glass  
Awakening Curiosity  
Cristallo Glass  
Lead Glass  
From Lens Grinding to the New World View  
From Lens Grinding to the Atomic Model  
The Birth of Photography  
Back to the Lens Grinders  
Mathematical Description of Light Refraction  
Pioneers of Geometric Optics  
The Five Seidel Imaging Errors  
    I Spherical Aberration  
    II Coma (Asymmetric Error)  
    III Astigmatism  
    IV Curvature of Field  
    V Distortion  
Chromatic Aberration  
Lens Computed Using Mathematical Methods

6	Carl Zeiss – Ernst Abbe – Otto Schott	27
7	The Tessar Lens	28
8	<b>Part 2: Ludwig Jakob Bertele</b>	
	Childhood and Youth	30
	LJB as an Apprentice	32
	LJB's Method of Lens Design	33
10	Military Service	33
12	Change of Companies from Munich to Dresden	33
12	Optical Compensation	34
12	From Projection Lens to Photographic Lens	34
13	About the Design of the Ernostar	35
13	About the Success of Ernostar Lens and Ermanox-Camera	40
16	Theater Photographer Hans Böhm	40
16	Press Photographer Dr. Erich Salomon	40
16	Ermanox and Ernostar in Literature	49
16	A First Human Problem	50
17	Another Transformation	52
18	First Academic Pursuits	52
21	A Trip to the USA	53
21	Back from the USA – The Sonnar Lens	53
22	The Contax Camera – Biotar or Sonnar Lens?	56
23	Marriage and Starting a Family	59
23	LJB's Attitude Towards National Socialism	60
23	Focal Lengths at Two Extremes	
23	The Olympia-Sonnar Lens	60
23	The Biogon Lens	61
24	Many Prototype Lenses of the Sonnar Type	64
24	The Wide-Angle Ocular	64
24	Extreme Demands and the Solutions	69

Escape from the Destroyed City of Dresden	67	Epilogue	112
Emigrate?	68	Information Technology and Digitalization	112
The Break-Up with Zeiss and the Move to Steinheil	66	Grinding Technology	112
The Property at Liebigstrasse 23	67	Miniaturization	112
A Step Forward: 90° Image Angle	70	Gradient Optics	112
Another Step Forward: 120° Image Angle	70	Electroactive Polymers	113
The Reprogon Lens	71	Diffraction Optical Elements	113
An Honor	71	And Another Thing ...	113
The Trio of Aviotar, Aviogon and Super Aviogon	74	Picture Credits	114
A Lens for Terrestrial Photogrammetry	74	Literature Index	116
The Falconar and Reconar Lenses	82		
The Astrotar Lens – Satellite Photogrammetry	82		
The Wide Angle and Vignetting	83		
Problem: Reflections at Air-Glass Interfaces	84		
The Anti-Reflective Coating of Glass Surfaces	84		
Tools for the Computation of Ray Paths	85		
Another Child of the Aviogon – The Biogon 90° Lens	88		
The Difficult Situation of the Competition	88		
The Biogon's Career in Space	92		
Microscope Development	100		
The Oculars	100		
The Schacht Lenses	105		
An Affront and the Consequence	107		
A Lens with Variable Focal Length	107		
Optics for Endoscopes	107		
Stimulating Relationships	108		
A Practicing Humanitarian	109		
A Synopsis	110		
Honors in Recognition of his Achievements	111		