THE PERFORMANCE OF MICRO BINOCULARS AND TWO REGULAR SMALL 7X21 PORROS

Dr. Gijs van Ginkel

April 2023

INTRODUCTION.

In the past centuries many binoculars are produced by different companies. Among them also quite a few so-called micro binoculars: very small binoculars, some of which consist of only a metal skeleton around the optical components. We have made a short overview of the different types we could find and we have also made a list of some of their mechanical and optical properties. Photographs are added to give you an impression of the size and shape of the binoculars and in the tables some of the main characteristics are listed as well.

Picture 1: From left to right: Bushnell 6x15, Moeller Tourex7x28, Vixen 8x25, Ashreh 6x25

Picture 2. From left to right: Moeller Tourox 8x24 (1924), Hensoldt Diasport 8x20, Hertel und Reuss 6x20

Picture 3: From left to right: Steiner 8x25, Yashica 8x20, Fata Morgana 4x12 (1925?)

Picture 4. From left to right: Carton Adler Lux 7x21, Taiwan 8x20 on microscope stand, Horizon 7x21

Picture 5. From left to right: Zeiss Teletur 6x15 (1910-1924), Riken 6x15, Rodenstock Adar 3,5x

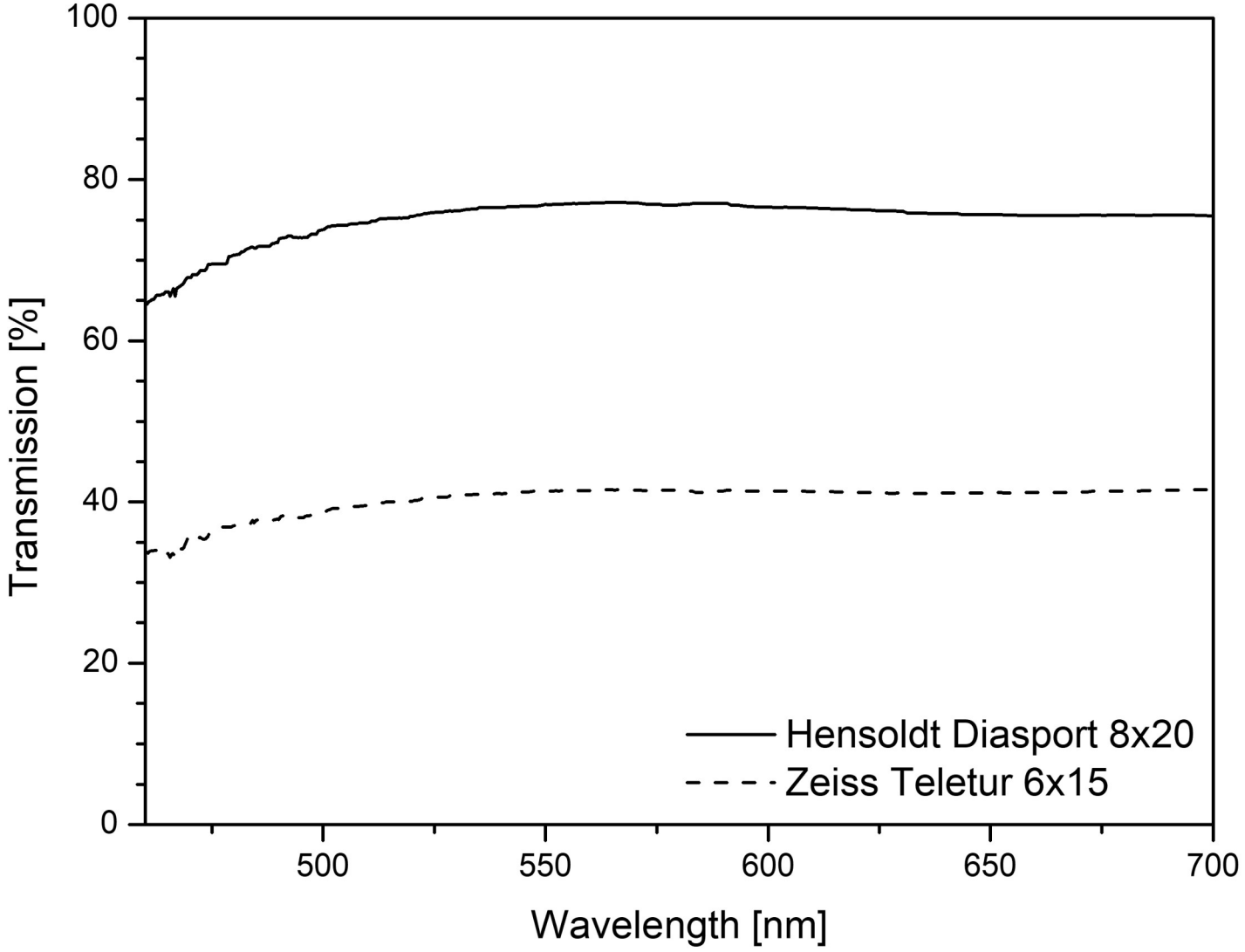
Table 1

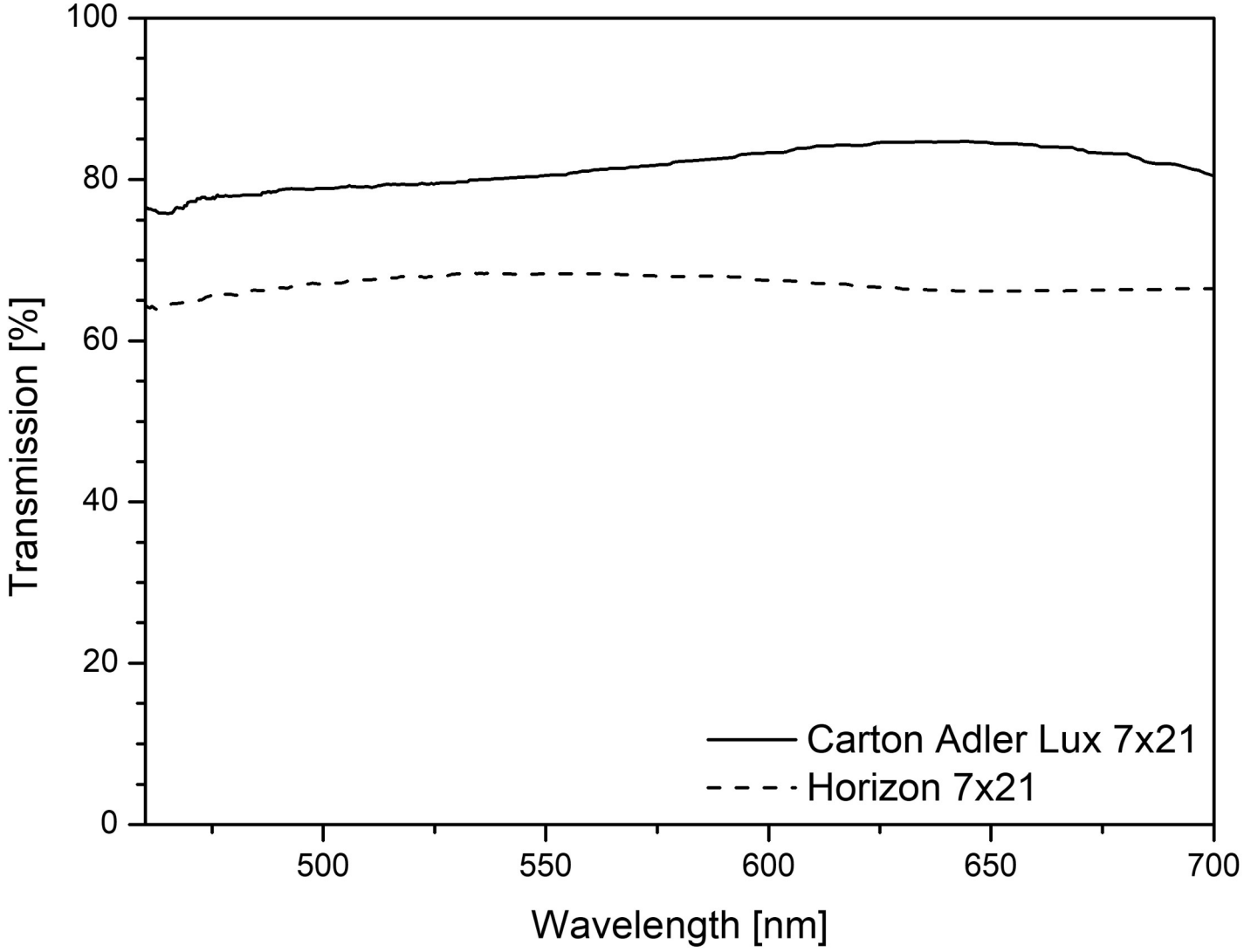
List of (historical) micro binoculars

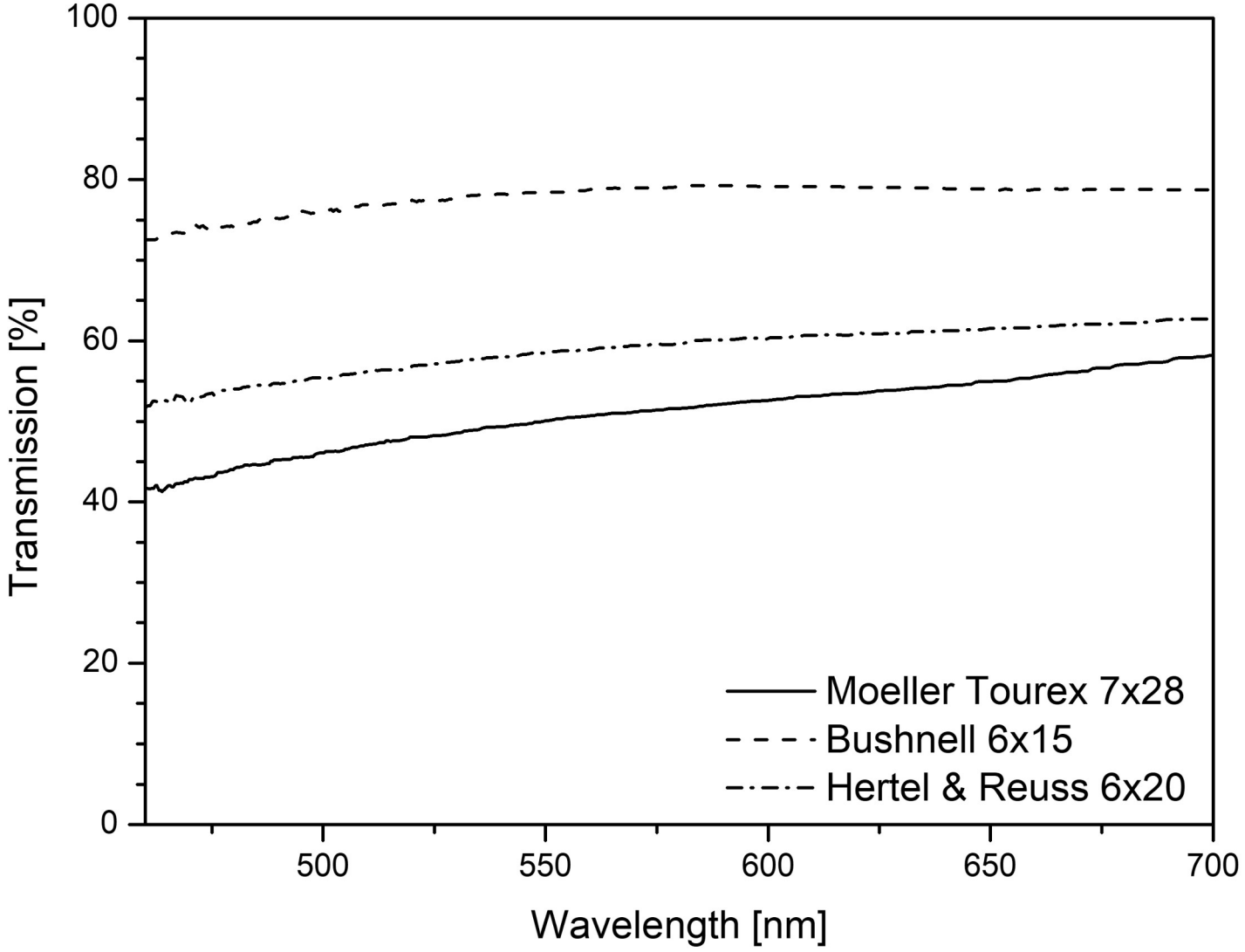
Binocular	**1 Hensoldt Diasport 8x20**	**2 Zeiss Teletur 6x15 (1910-1924)**	**3 Möller Tourex 7x28**	**4 Bushnell 6x15**	**5 Yashica 8x20**	**6 Ashreh 6x25**	**7 Vixen 7x25**
Weight	251 g	213 g	425 g	202 g	167 g	439 g	458 g
Objective diameter	19,8 mm	13,8 mm	27,7 mm	14,4 mm	19,7 mm	24,8 mm	24,75 mm
Exit pupil	2,5 mm	2,3 mm	4 mm	2,5 mm	2,4 mm	4 mm	3,3 mm
Eye relief	7 mm	5 mm	11 mm	5 mm	4 mm	7 mm	8 mm
Transmission 633nm	75,8%	41%	54%	78,9%	71,4%	63,3%	44,7%
Transmission 500nm 550 nm	74,3% 77%	39% 41,2%	46% 50%	76,4% 79%	Not measured	Not measured	Not measured

Table 2

Binocular	**8 Hertel &Reuss 6x20**	**9 Fata Morgana 4x12**	**10 Riken 6x15**	**11 Steiner 8x25**	**12 Carton Adler Lux 7x21**	**13 Horizon 7x21**	**14 Yashica Monocular 8x20**	**15 Rodenstock 3,5 x (Lipperhey construction)**
Weight	200g	85 g	137 g	227 g	340 g	405 g	65 g (121 g + microscope attachment)	291 g
Objective diameter	19,65 mm	12,3 mm	14,7 mm	23,8 mm	20,5 mm	20,8 mm	2,1mm	
Exit pupil (mm)	2,5 mm	3,5 mm	2,3 mm	3 mm	2,9 mm	3,0 mm	2,1 mm	
Eyerelief (mm)	7 mm	9 mm	7 mm	7 mm	11 mm	5 mm	2mm	
633nm trans-mission	60,9%	50,3%	50,9%	38,5%	84,4%	66,3%	Not measured	82%
Transmission 500 nm 550 nm	76,4% 79%	Not measured	Not measured	Not measured	79% 80,4%	67,6% 68,2%	Not measured	Not measured


100
80
60
40
20
0
Transmission [%]
500
550
600
650
700
Wavelength [nm]
Hensoldt Diasport 8x20
Zeiss Teletur 6x15


100
80
60
40
20
0
Transmission [%]
500
550
600
650
700
Wavelength [nm]
Carton Adler Lux 7x21
Horizon 7x21


100
80
60
40
20
0
Transmission [%]
500
550
600
650
700
Wavelength [nm]
Moeller Tourex 7x28
Bushnell 6x15
Hertel & Reuss 6x20