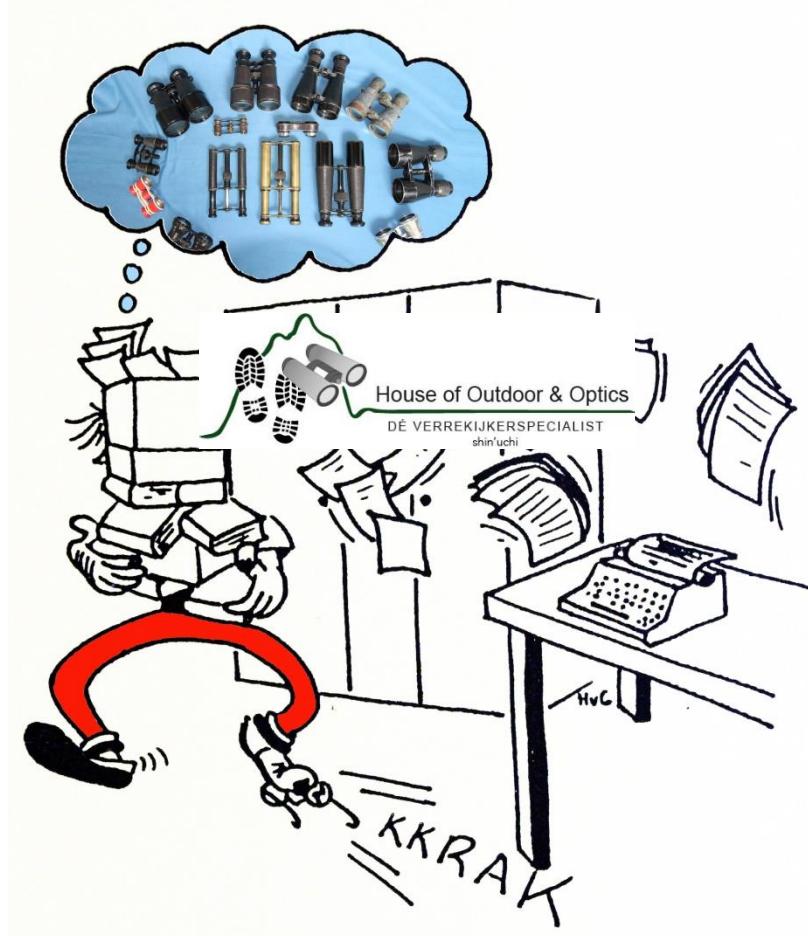


(1)  
**1608-2017**



# Multi-functional binoculars and telescopes in the past four centuries: a global overview

Dr. Gijs van Ginkel  
BHS meeting , Münich, Germany October 2017



(2)

## TOPICS ADDRESSED:

- (A) 1608-1900 Short historical overview of binocular/telescope designs
- (B) Binoculars with multiple magnifications
- (C) Photo binoculars
- (D) Binoculars/telescopes as a support for photography or measuring instruments
- (E) Spectacle binoculars
- (F) Musical binoculars
- (G) Range finding binoculars
- (H) Miscellaneous

(3)

## TWO QUESTIONS FOR LISTENERS WHO FIND THIS A BORING TOPIC:

- (a) WHAT IS THE CALIBER OF THE CARTRIDGE SHOWN LEFT
- (b) FROM WHAT COMPANY IS THE LOGO SHOWN RIGHT

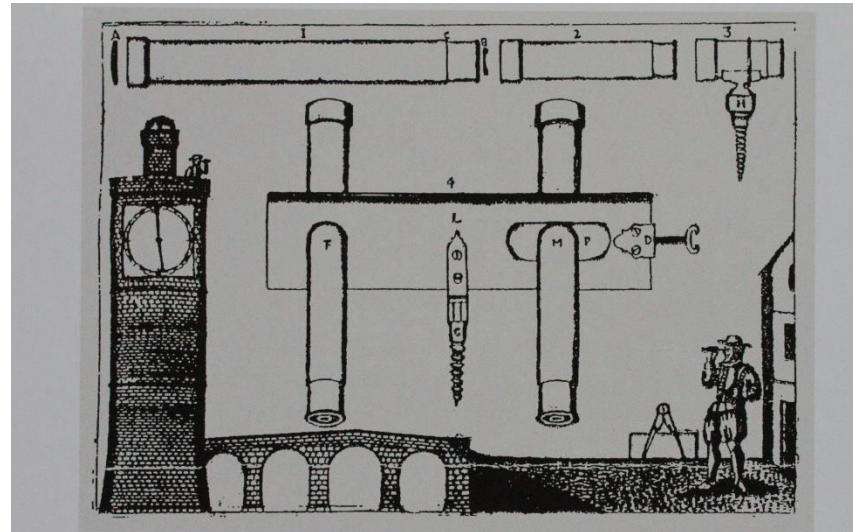


**1608: First binoculars in history made by spectacle maker Hans Lipperhey (Middelburg, The Netherlands).**

**1625: Oldest binocular picture found so far (1625 by Daniel Choretz, Paris)**



- | Hans Lipperhey was a native of Wesel (Germany) and lived in Middelburg since 1594. He became 'burgher' (citizen) of the town in 1602 and died there in 1619. Engraving by J. van Meurs after a painting by Hendrick Berckmans (1627-1679) taken from Borel's *De Vero Telescopii Inventore* (1656).



**Fig. 1** First Presentation of a binocular telescope,  
from "Les Admirables Lvnettes D'approche", 1625, Daniel Choretz, BnF Paris

(5)

**1610-1800: binocular production is not very abundant.**

**Some examples: Binocular telescopes in rectangular case (made by Chérubin d'Orléans-France, Patroni-Italy and Dobler-Germany).**



Fig. 16 Box-shaped binocular from Anain in Paris according to Chérubin d'Orléans, 1701, Optisches Museum Jena

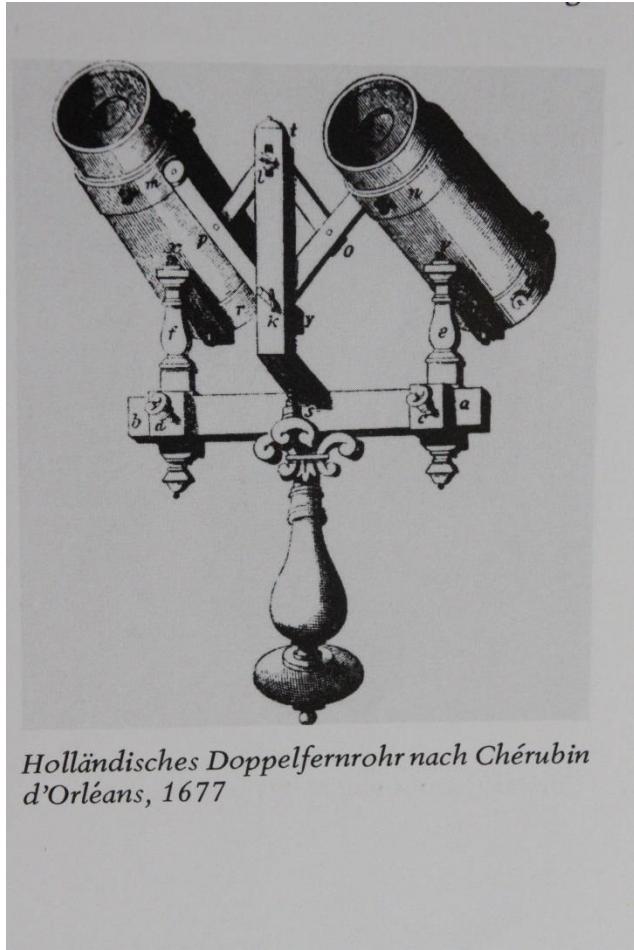


(6)

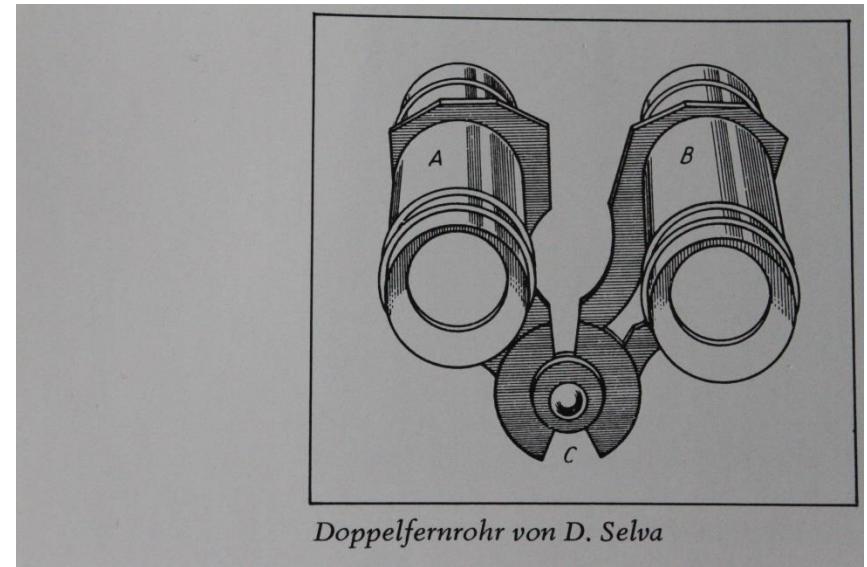
### Examples of 17-th century binoculars:

Left: binocular made by Chérubin d'Orléans (France 1677)

Right: binocular made by D. Selva (Italy 1758)



*Holländisches Doppelfernrohr nach Chérubin d'Orléans, 1677*



*Doppelfernrohr von D. Selva*

(7)

**1611-1615: Johannes Kepler designs astronomical and terrestrial telescope**

**1610: Galileo Galilei (1564-1642) improves Lipperhey design and uses his astronomical telescopes for the well-known study of stars and planets**



Bild 2.8 *Johannes Kepler (1571–1630)*

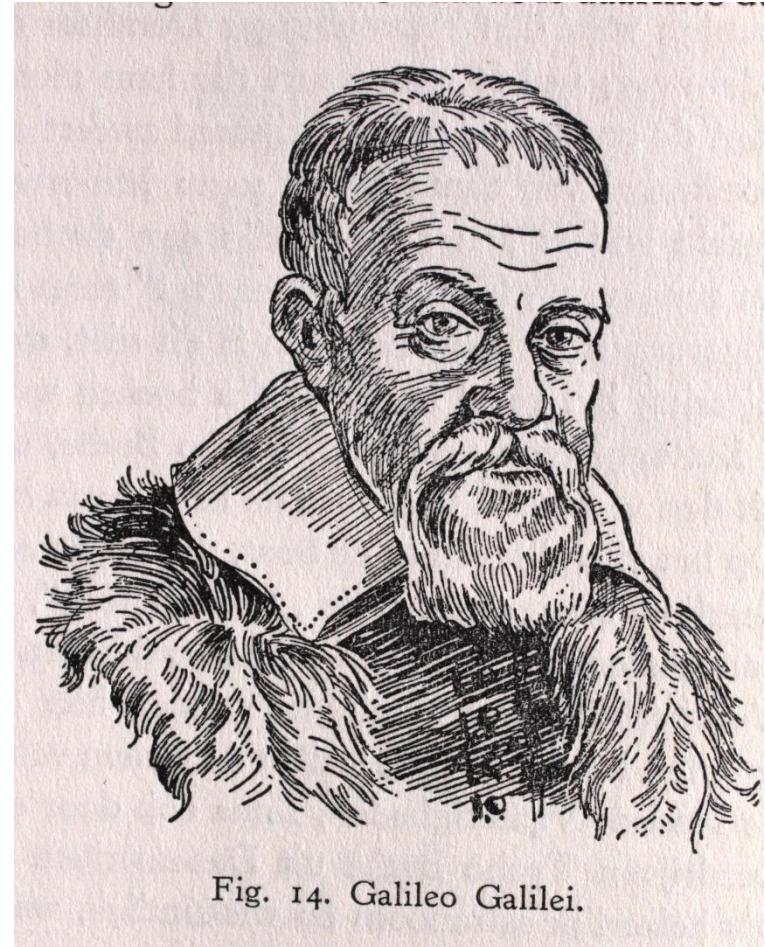


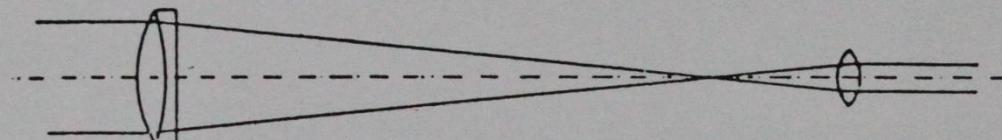
Fig. 14. Galileo Galilei.

(8)

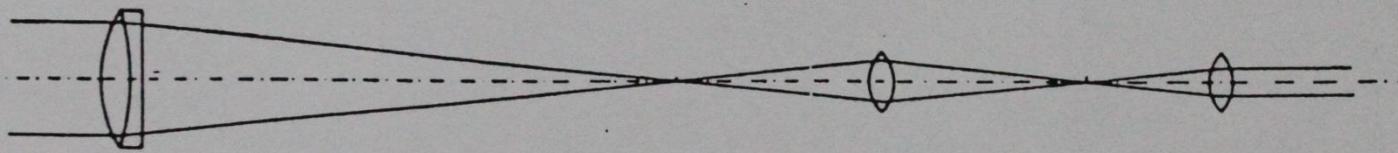
## OPTICAL CONSTRUCTION OF KEPPLER TELESCOPES:

(a) astronomical telescope (image up-side down)

(b) terrestrial telescope (image erect)



(a)



(b)

(9)

## Examples of telescopes made between 1600 and 1900 (many more to find in “*A certain instrument for seeing far*”, see references)



Terrestrische Fernrohre,  
17. bis 19. Jh.  
aus dem Mathematisch-Physikalischen Salon,  
Dresden

## 1807- 1810: Jean Gabriel Chevallier (France, 1778-1848) designs and patents compact binocular. At first no massproduction, starts later.

**THE BREAKTHROUGH OF THE BINOCULAR IN THE NINETEENTH CENTURY**

Only in the nineteenth century the binocular telescope reached the stadium in which the instrument, in a simple form, could be produced in large numbers. Especially the use of the binocular opera glass or *jumelle* became very popular in the theatres. This flourishing of the binocular spyglass was largely due to the French instrument maker Jean Gabriel Augustin Chevallier (1778-1848). In 1807 he patented a simple binocular, which design resembled the earlier Scarlett-spectacles with ear-springs made in the eighteenth century.



265 | Binocular opera glass with 'ear springs'. Length 5 cm, width 10 cm. With its original wooden case, signed: 'Chevallier, Paris'. Made according to the model patented in 1807, which design was produced until ca. 1820 (Cf. the engraving in Chevallier's 1810 sale catalogue).

Jean Gabriel Augustin Chevallier (1778-1848) worked in Paris between 1796 and 1840.

**LE CONSERVATEUR de la Vue,**  
*Savoir du Catalogue général et précis courant des instruments d'Optique, de Mathématiques et de Physique, de la Fabrique et du Magasin de l'Auteur.*

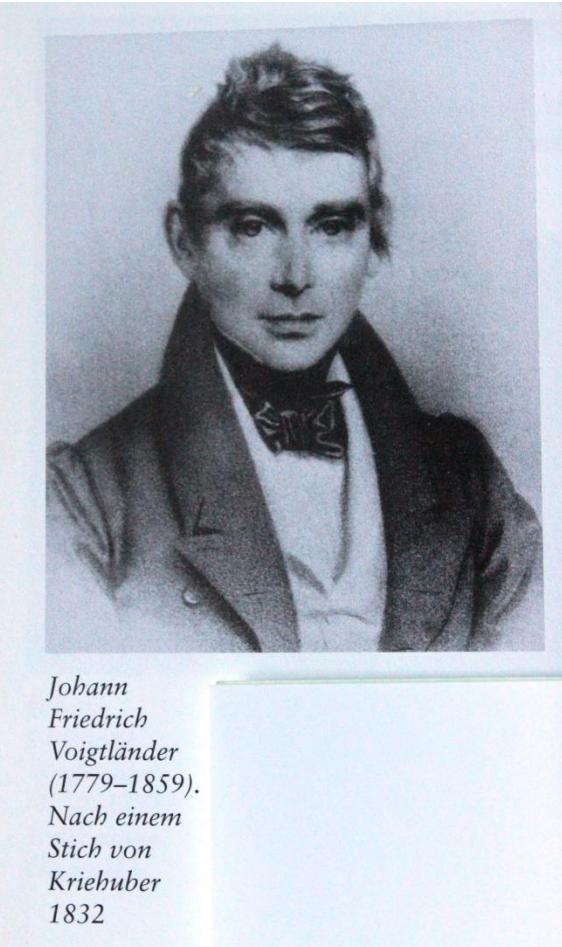
Par J. G. A. CHEVALLIER,  
Ingénieur Opt. de S. M. le Roi de Westphalie.  
Membre de plusieurs académies.

A PARIS,  
Chez l'Auteur, Tour de l'Horloge du Palais, 3<sup>e</sup>,  
vers à-vis du Pont au Change où se marche aux foires.  
1810.

Bonaparte imp.  
Desvignes sculp.

(11)

## 1823: Binocular patent from Johann Friedrich Voigtländer. Marks start of massproduction of two-eye binoculars in the 19-th century



**Fig. 2** Three very early ivory binoculars from the period from 1825–1830. The left specimen is one of the first serially produced two-eye binoculars (Voigtländer, patent in 1823). The centre binoculars dated 1825 (also from Voigtländer) is perhaps the oldest known extant instrument with a centre-mounted focusing mechanism. Right: Petitpierre, Berlin, around 1830/40. Centre-mounted focusing mechanism and screw focus for the ocular supports.

(12)

## EXAMPLES OF MASSPRODUCED LIPPERHEY-HOLLAND BINOCULARS IN THE 19- TH CENTURY



(13)

# 1830-1890: DIFFERENT BINOCULAR SHAPES



(14)

## Binoculars with multiple magnifications

Binocular with turnable eyepieces yielding different magnifications.

**Left:** mechanism with different eyepieces in turnable disk. **Right:** Similar construction, also magnification change by turning a disk with four different lenses in the eyepiece.



Abb. 20 b

### Galilei-Fernglas mit verstellbarer Vergrößerung

Drehen des oberen zentralen Rändelrads bewirkt Vergrößerungs-Wechsel: Über ein Getriebe im oberen Steg wird die Bewegung auf Okularscheiben übertragen, die ähnlich funktionieren wie die Konstruktion in Abb. 19. Drei Vergrößerungsstufen: Ca. 3, 4 und 5-fach , Objektivdurchmesser 50 mm.



Abb. 19

Geöffnetes Okular eines Perspektivs mit verstellbarer Vergrößerung, etwa 1860.

Im Okular befindet sich eine Scheibe mit 4 Okular-Linsen. Durch Verdrehen der Scheibe an der seitlichen Rändelung wird eine jeweils andere Linse in den Strahlengang gebracht, die Vergrößerung ändert sich.

- Sammlung Both -



Abb. 20 a

Galilei-Fernglas mit verstellbarer Vergrößerung  
Frankreich etwa 1900

(15)

## BINOCULARS WITH MULTIPLE MAGNIFICATIONS

EYEPIECE WITH THREE DIFFERENT LENSES.  
TURNING THE EYEPIECE YIELDS DIFFERENT MAGNIFICATION.



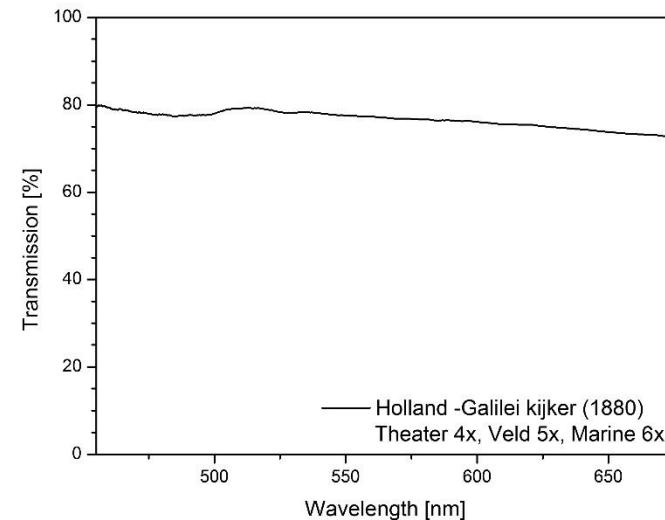
*Triple-power Galilean glasses were popular during the 1880s. Three sets of built-in eyepieces were located in the simple eyepiece-changing mechanism seen dismantled at right. It is marked THEATRE-FIELD-MARINE, but the differences in magnification are not great. The large triple-power binocular – seen with ray-shades extended – is signed 'J. H. Steward, London', although that company did not manufacture it.*

(16)

## Binoculars with multiple magnifications

Left: binocular with turnable eyepieces yielding different magnifications.

Right: Transmission spectrum of this binocular





House of Outdoor & Optics  
DÉ VERREKIJKERSPECIALIST  
shin'uchi

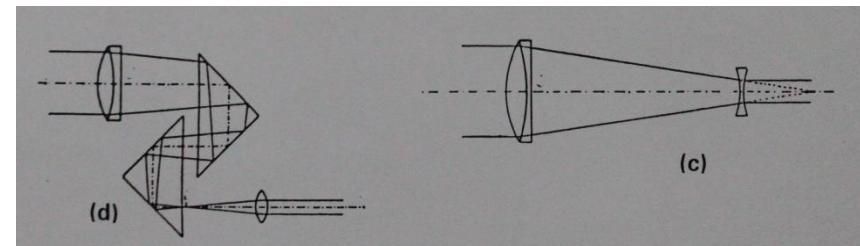
(17)

## HISTORIC PATENT IN BINOCULAR HISTORY

1854: IGNAZIO PORRO PATENTS “PORRO” PRISM SYSTEM (IMAGE D LEFT)  
FOR USE IN BINOCULARS  
*IMAGE C: LIPPERHEIJ DESIGN FROM 1608*



*Ignazio Porro*



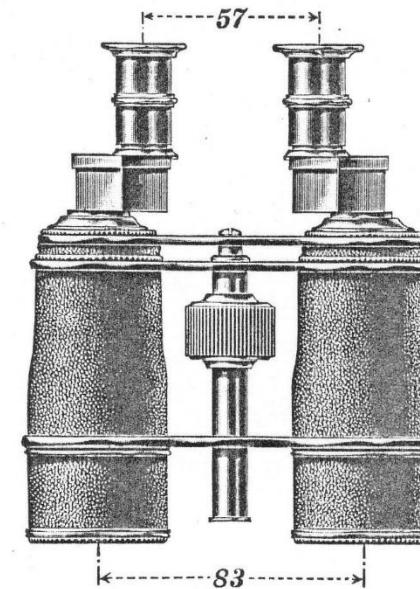
(18)

## First binoculars produced with porroprisms.



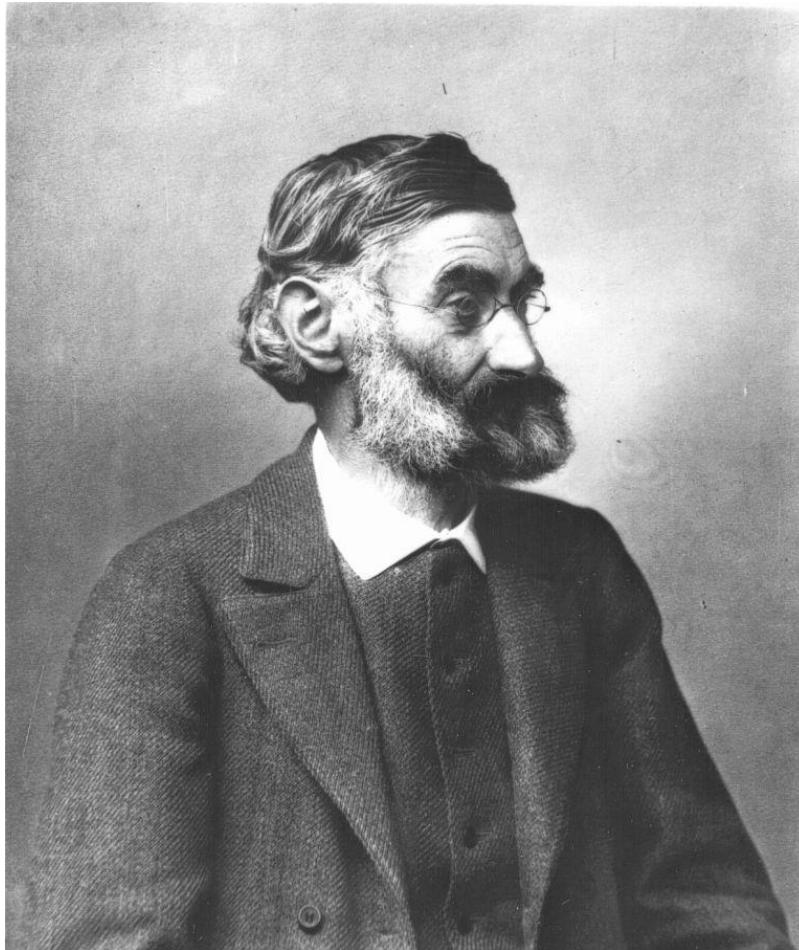
Left: binoculars with porro prisms made by Boulanger in 1859

Right: binoculars with porroprisms made by Nachet in 1875



(19)

**1894: Prof. Ernst Abbe (left) and Carl Zeiss succeed in designing high quality binoculars with porro prisms (right). Induces massproduction of prismbased binoculars.**



(20)

**1897-1900 start production of roof prism based binoculars**

**Left: Moritz Hensoldt**

**Right: Early Hensoldt roof prism binocular**

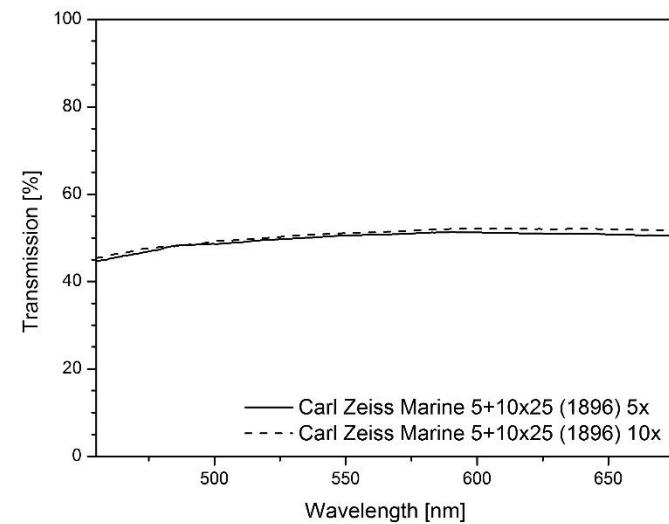


(21)

## Prism based binoculars with multiple magnifications.

Left: Carl Zeiss (Togo) binocular 5x and 10x25 (1896)

Right: Transmission spectra of this binocular



**PRISM BASED BINOCULARS WITH MULTIPLE MAGNIFICATIONS****CARL ZEISS JENA (1905-1910)****BINOCULAR TELESCOPE WITH THREE DIFFERENT MAGNIFICATIONS USING A REVOLVING  
EYEPIECE: 20x, 30x and 40x80**House of Outdoor & Optics  
DE VERREKIJKERSPECIALIST  
shin'uchi

Das Aussichtsfernrohr für beidäugigen Einblick, mit einem Okularwechsler versehen, bietet die Möglichkeit, drei verschiedene Vergrößerungen einzustellen. (zwischen 1905 und 1910)



Abb. 172. Ein binokulares Aussichtsfernrohr mit Okularrevolver



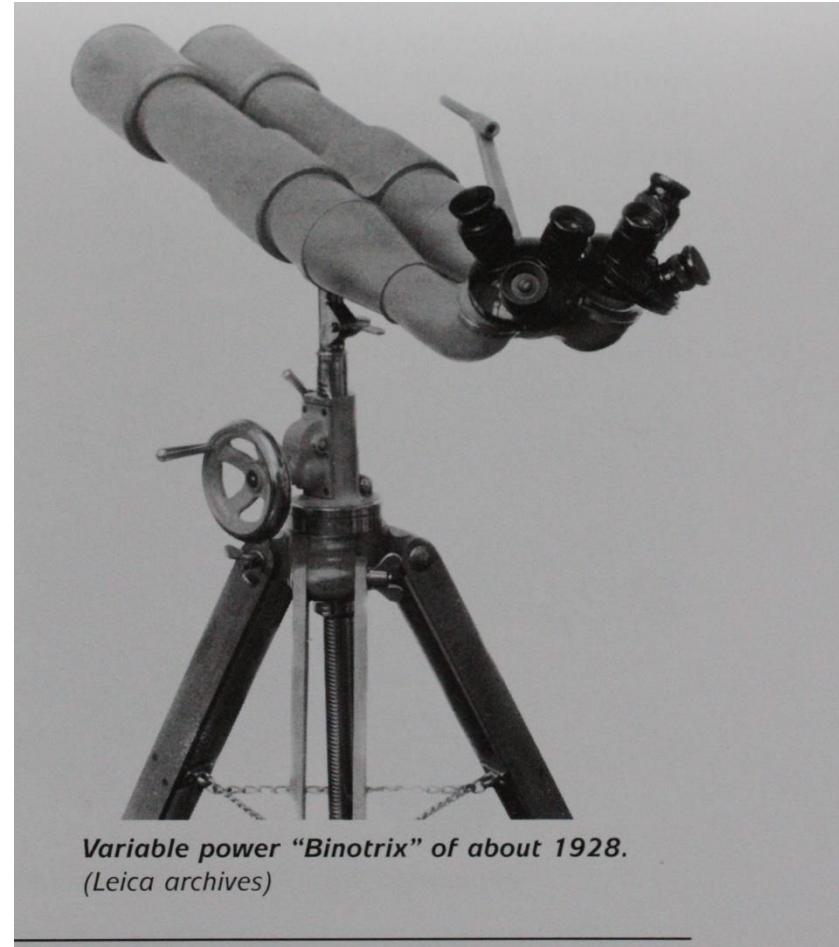
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(23)

**PRISM BASED BINOCULARS WITH MULTIPLE MAGNIFICATIONS**  
**LEFT: ZEISS BIFORT 10x AND 18x50 (1914-1920 AND DURING WW-2)**  
**RIGHT: LEITZ BINOTRIX FROM 1928**



0

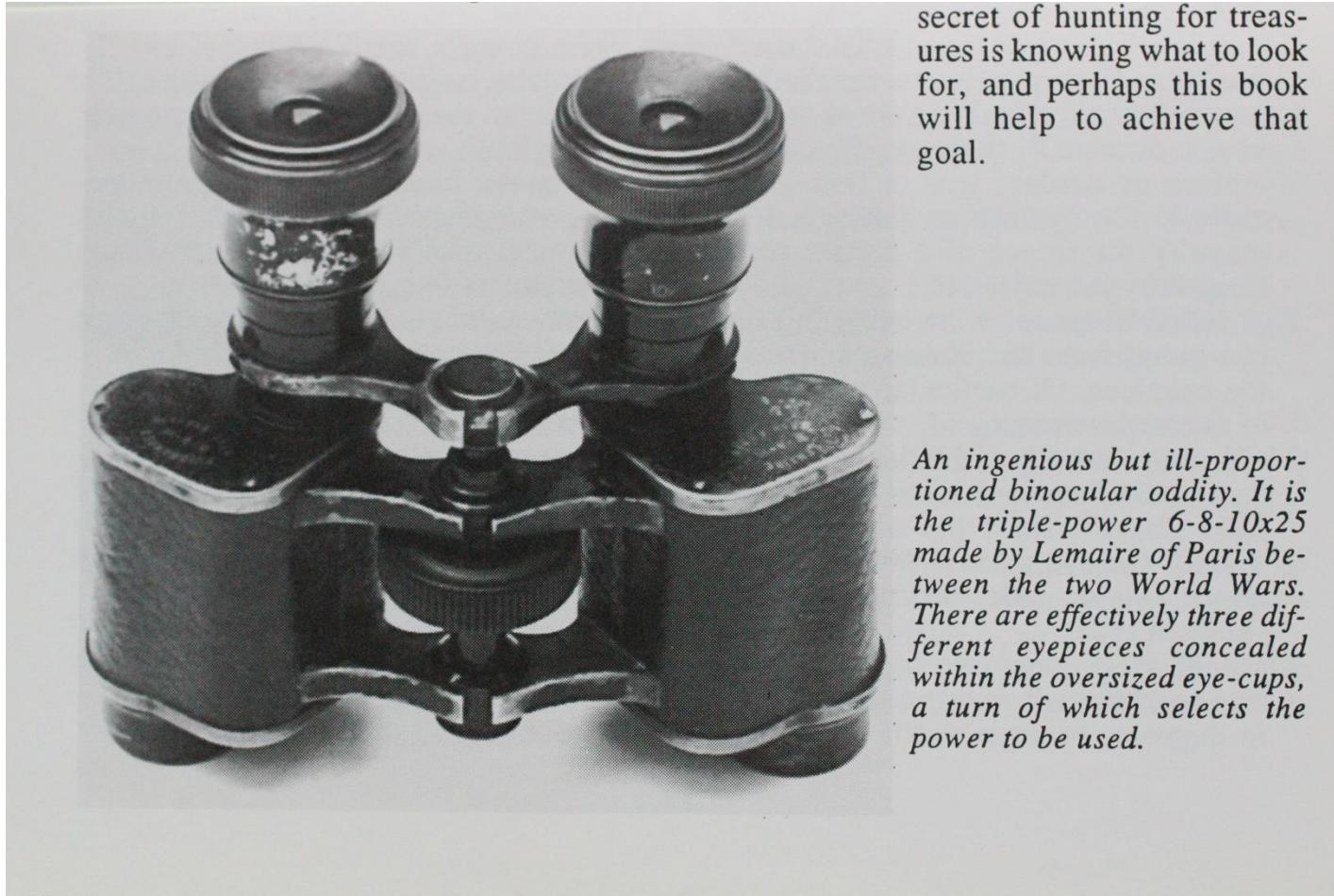


(24)

## PRISM BASED BINOCULARS WITH MULTIPLE MAGNIFICATIONS.

LEMAIRE BINOCULAR WITH PORRO PRISMS AND 6x, 8X AND 10x MAGNIFICATION.

Produced between 1918 and 1940



secret of hunting for treasures is knowing what to look for, and perhaps this book will help to achieve that goal.

*An ingenious but ill-proportioned binocular oddity. It is the triple-power 6-8-10x25 made by Lemaire of Paris between the two World Wars. There are effectively three different eyepieces concealed within the oversized eye-cups, a turn of which selects the power to be used.*

(25)

## PRISM BASED BINOCULARS WITH MULTIPLE MAGNIFICATIONS BUSH 12x and 20x80 (SWEDISH ARMY)





(26)

**PRISM BASED BINOCULARS WITH MULTIPLE MAGNIFICATION**  
**JAPANESE BINOCULAR WITH TWO MAGNIFICATIONS 8x and 12x50**  
**PRODUCED AROUND 1950-1960**



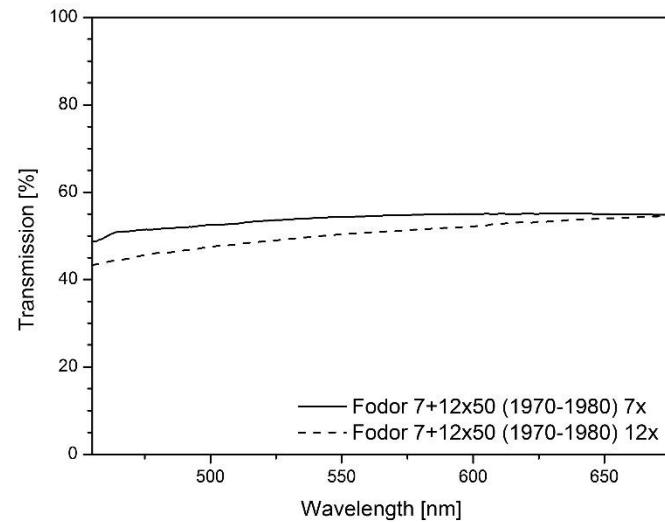
338 | Prism Binocular, with two magnifications (8 times and 10 times). Length 19 cm. Signed: '*Continental Coated Optics / No. 37919 / Variable 8x 12x*'. Middle of the twentieth century.

(27)

## PRISM BASED BINOCULAR WITH MULTIPLE MAGNIFICATIONS

Left: FODOR 7 and 12x50 binocular made in Japan (1960?)

Right: Transmission spectra of the Fodor binocular

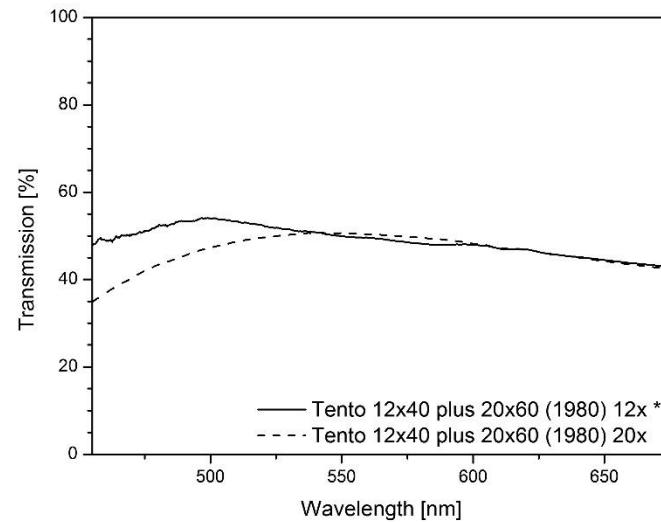


(28)

## PRISM BASED BINOCULAR WITH MULTIPLE MAGNIFICATIONS

USSR MADE BINOCULAR (1960??).

MAGNIFICATION CHANGE BY COUPLING ANOTHER OBJECTIVE TUBE  
RIGHT: TRANSMISSION SPECTRA OF THIS BINOCULAR

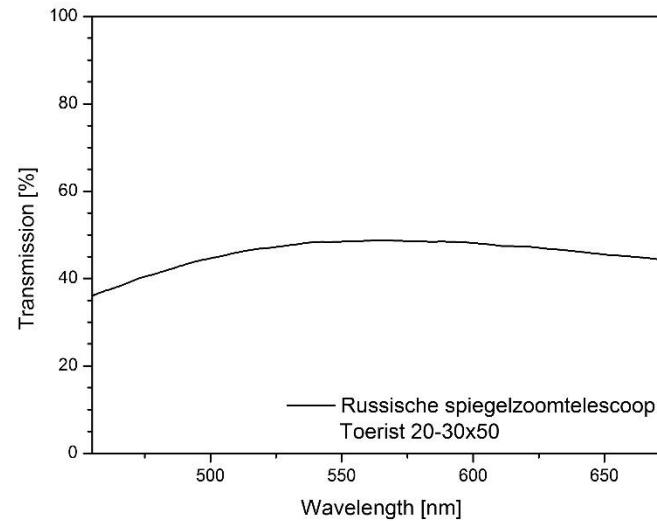


(29)

## BINOCULARS WITH MULTIPLE MAGNIFICATIONS

Left: Russian mirror zoom telescope 20-30x50. Production year 1950-1960 ???

Right: Transmission spectrum of this telescope



(30)

## BINOCULARS WITH MULTIPLE MAGNIFICATIONS

LEFT: HELLSO (= HANS HENSOLDT, WETZLAR) DUPLEX: 7X35 AND 12X60 USING THE SAME EYEPIECE PRISM HOUSING(1970-1980??)

RIGHT: HELLSO LOGON ON THE BRIDGE OF THE DUPLEX





## Prism based binoculars with multiple magnifications

LEICA DUovid 10 and 15x50, INTRODUCED IN 2003.

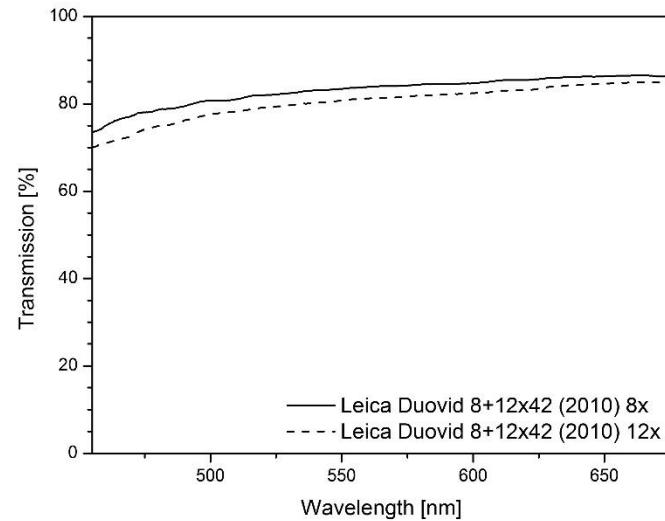
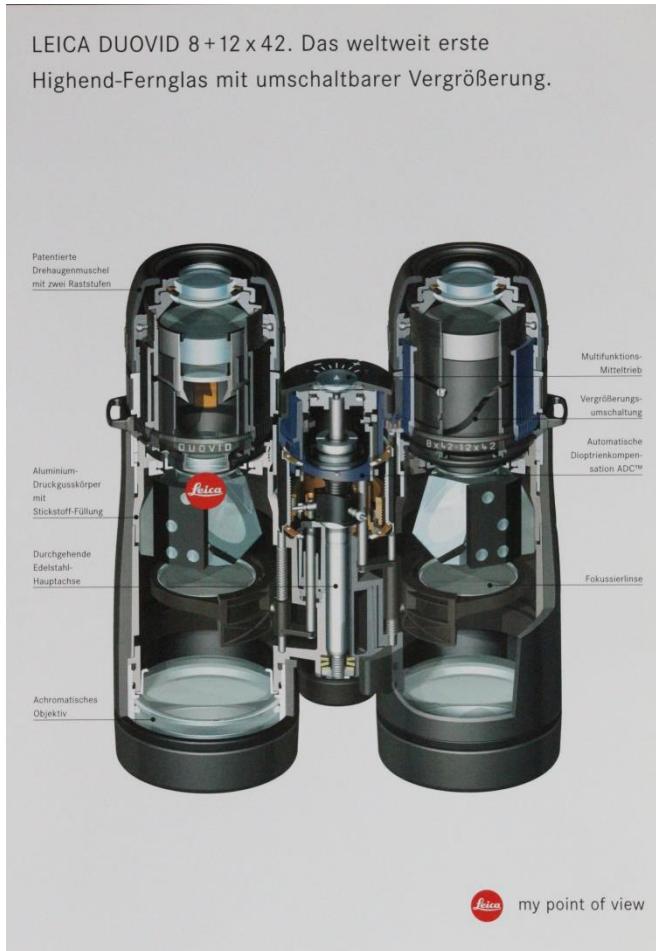
MAGNIFICATION CHANGE BY TURNING RING UNDER THE EYEPIECE



## Prism based binoculars with multiple magnifications

**Left : Leica Duovid 8 and 12x42 , introduced in 2003. Test sample is from 2010**

**Right: transmission spectra of this Leica Duovid**



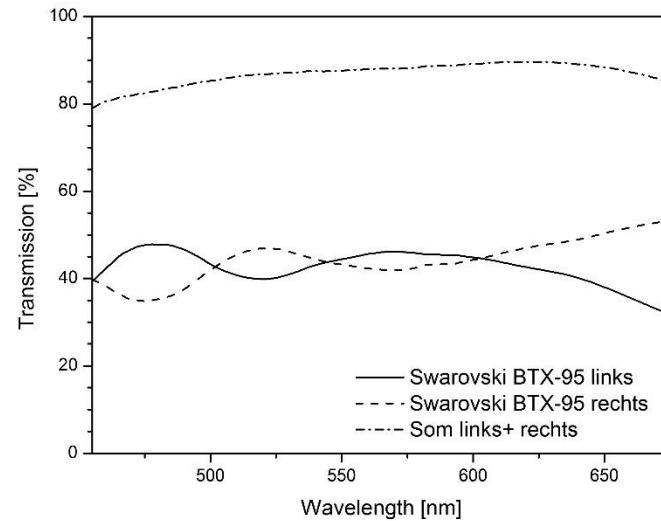
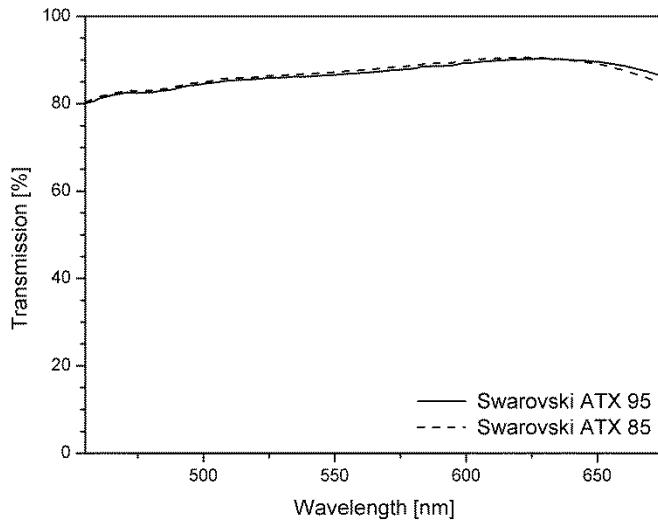
**2012: SWAROVSKI ATX/STX 65, 85 AND 95 MODULAR TELESCOPE SYSTEM.** ZOOMRING IN THE EYEPIECE. REACH 25-60x (ATX 65 and 85) 30-70x (ATX 95), INCREASED 1,7X WITH EXTENDER.

**2017: ADDITION OF BINOCULAR EYEPIECE TO THE ATX/STX SYSTEM. MAGNIFICATION 30x FOR BTX 65 AND 85, 35x FOR BTX 95. WITH 1,7x EXTENDER: resp. 50 and 60x.**



(34)

## TRANSMISSION SPECTRA OF SWAROVSKI ATX 85 AND 95 (LEFT) AND OF THE BTX 95 (RIGHT)



(35)

## BINOCULARS AND PHOTOGRAPHY



**1839: Nicéphore Niépce and Louis Mandé Daguerre invent photographic process**  
**They fixed an image on a silver-coated copper plate.**  
**Combination of this process with binoculars is impossible**



NIEPCE



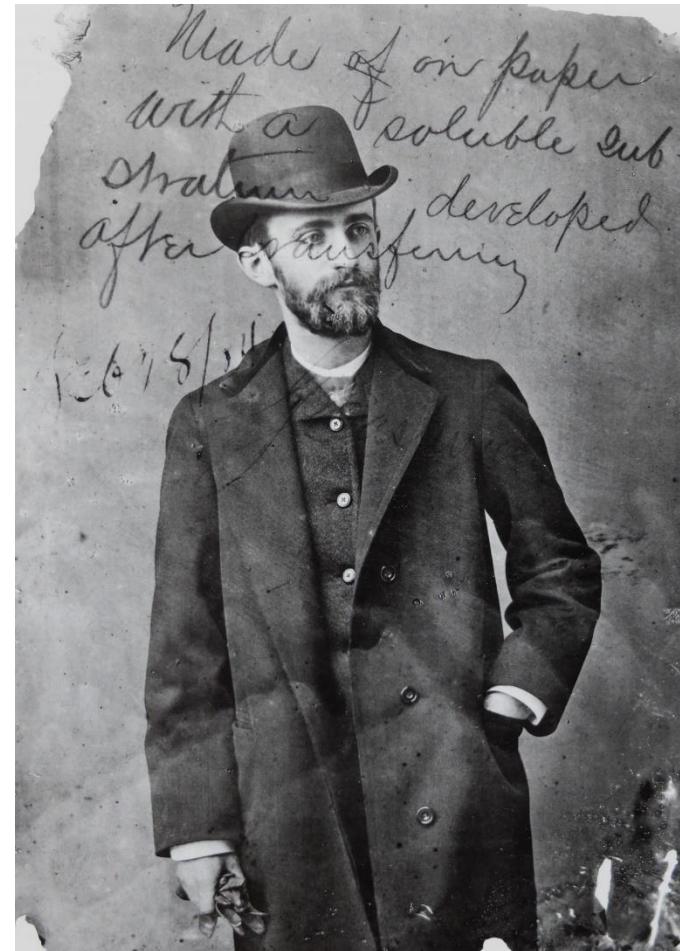
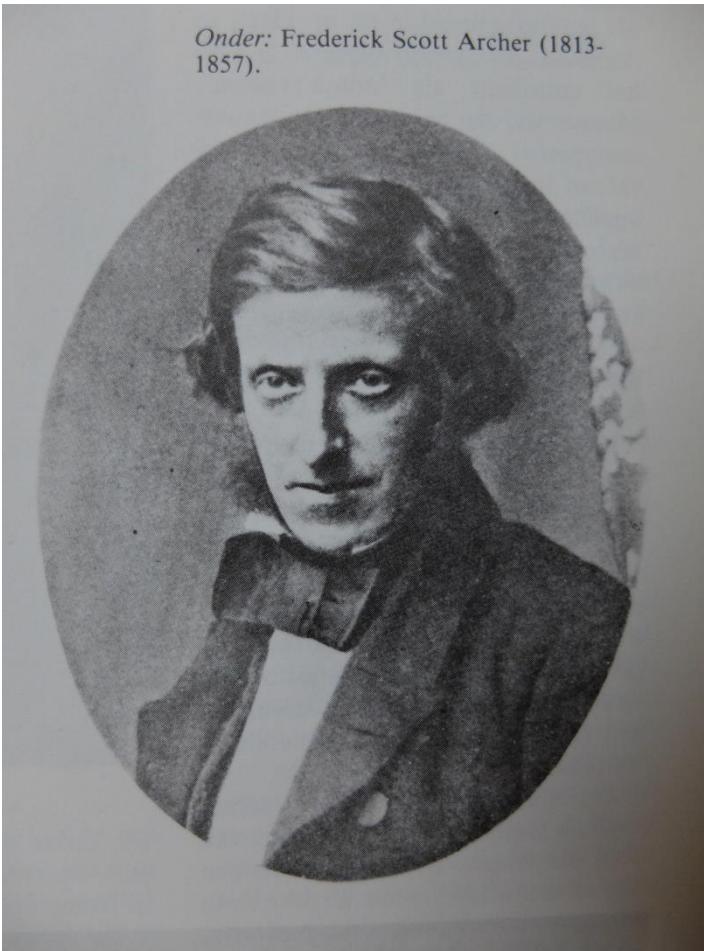
Louis Jacques Mandé Daguerre (1787–1851). His partnership with experimenter Nicéphore Niépce finally permitted a fixed image on silver-coated copper. Without a negative, his inflexible process crumbled when photography on paper, later on glass, became the processes that led to photography's rapid growth.

**Revolution in photography: Left: Friedrich Scott Archer invents glass negatives (1851)**

**Right: George Eastman (founder of Kodak), invents rolfilm (1880)**

**THESE PROCESSES CAN BE AND WILL BE COMBINED INTO PHOTOBINOCULARS**

Onder: Frederick Scott Archer (1813-1857).



## BINOCULARS AND PHOTOGRAPHY

**1866 Jumelle de Nicour binocular camera operating with glass plates.  
(recently sold for almost 39.000 euros). Viewfinder-telescope in the right-hand tube.**



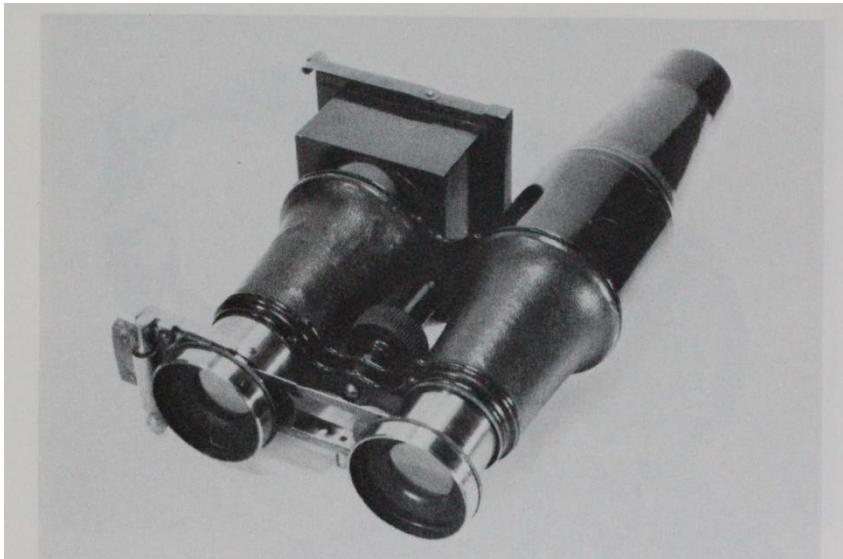
Similar to the Goldschmidt but much earlier was the **Jumelle de Nicour** bearing the name of its inventor, Octave Nicour, and which was manufactured by Geymet & Alker (French patent No. 72873, 10 September 1866). The moveable drum contained 50 collodion dry plates, 40×40 mm. In the left-hand tube was a ground-glass screen with magnifying-glass for fine adjustment; the right-hand tube took the pictures. Plate changing was simple: the camera was turned upside down, allowing the exposed plate to drop into the drum-shaped magazine; the latter was advanced one click, and when the camera was righted again a new plate fell into place. Sold with the camera was an ingenious walking stick which doubled as tripod.

## BINOCULARS AND PHOTOGRAPHY

**Goldschmidt binocular camera (patent 1889).**

**Camera worked with 5x6 cm glass plates .**

**Right hand tube is viewfinder and telescope**

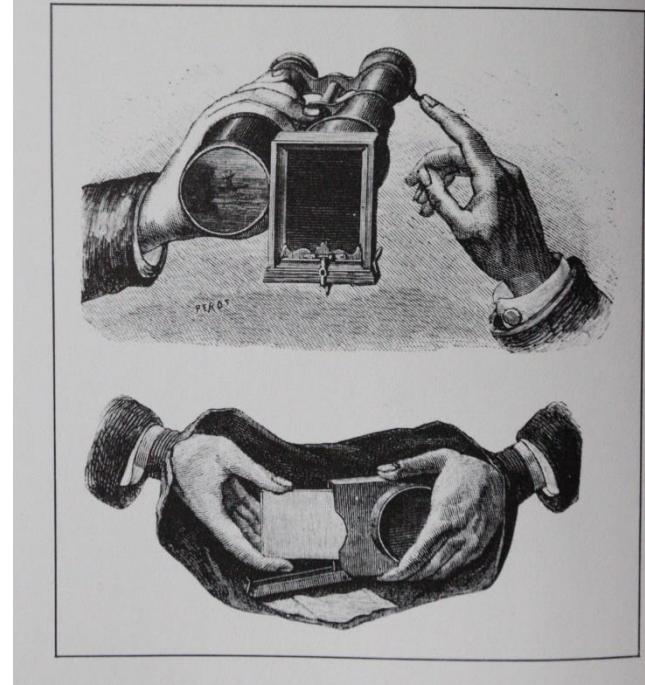


3272

Goldschmids Fernrohrkamera für Platten, 5x6 cm, Goldschmid, Zürich, Objektiv Steinheil 6,3/150 mm, Fallverschluß. Das lange Fernrohr dient als Sucher, das andere als Aufnahme-Objektiv.

ca. 1889

**La Jumelle de Goldschmidt.**, alias Goldschmidt's Binocular Camera, bore the name of its inventor, who came from Zurich (Swiss patent No. 1241 of 30 July 1889). One tube is a view-finder, the other takes the pictures, on 5×6 cm plates. The lens is an f/6.3 Steinheil 150 mm, with drop shutter.



(39)

## BINOCULARS AND PHOTOGRAPHY

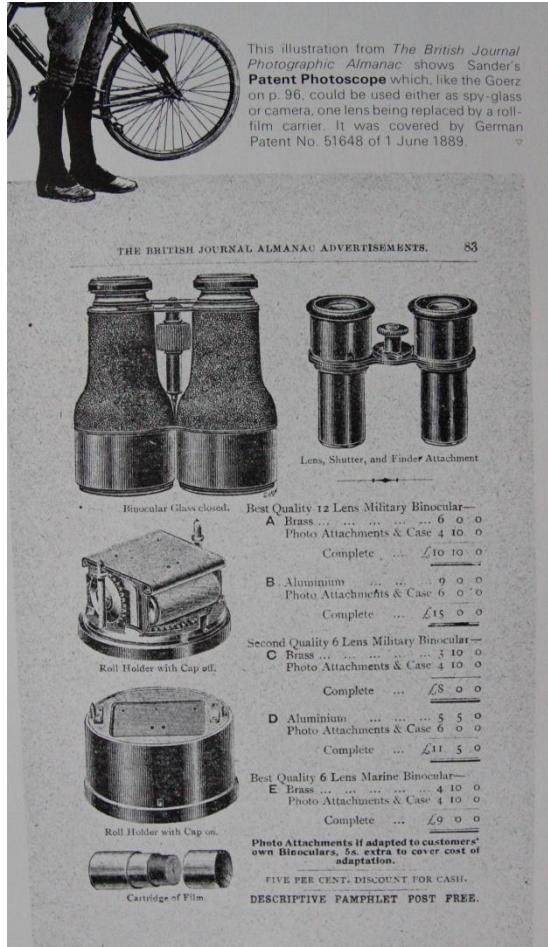
1899-1901: Goerz photobinoculars. The operaglass magnified 2,5x



<p>Nummer 39.</p> <p><b>Photographisches.</b></p> <p>Die Präzisionstechnik hat wieder einmal einen Triumph gefeiert: es ist ihr gelungen, das Doppelfernrohr und die photographische Doppeltamponna zu kombinieren und durch raffinierte Raumausmündung ein kleines, handliches Instrument herzustellen, welches beständige Dienstleistung und Manövrierei bei der Handhabung einzufordert.</p> <p>Das Goerz Photo-Stereo-Binocle (dies ist der Name des neuen Instruments), D.X.-Pat. Nr. 101609, gleicht äußerlich vollkommen einem Opernglas; man vergleiche die nebenstehende Abbildung. Es vereinigt in sich einen Operngucker mit <math>2\frac{1}{2}</math>-facher Vergrößerung, einen Feldscheiter mit <math>3\frac{1}{2}</math>-facher Vergrößerung und eine photographische Kamera für einfache und stereoskopische Zeit- und Momentaufnahmen im Format <math>4\frac{1}{2} \times 5</math> cm. Es braucht kein Teil abgenommen oder abgeschraubt zu werden, wenn man das Instrument aus der Kamera zum Fernglas machen will oder umgekehrt; zwei Revolverbeschläge, mit dem Finger zu</p>	<p>28. September 1901.</p> <p>Seite XI.</p> <p>drehen, ergeben im Augenblick die Verwandlung! Es sei bemerkt, dass das Instrument keine Spielerei, sondern ein Universal-Instrument ersten Qualitäts ist. Im Hinblick hierauf ist der Preis von 200 Mark mit Zubehör kein hoher, beträgt doch der Wert der beiden photographischen Objektive (Goerz-Doppel-Anastigmate) allein schon 200 Mark laut Preisconvent. Das Instrument ist eben in jeder Beziehung gediegen ausgestattet und optisch wie mechanisch auf das präziseste gearbeitet.</p> <p>Die Bilder, welche das Binocle liefert (siehe die Illustration), sind tadellos scharf bis in die Ecken und vertragen sehr gut eine Vergrößerung bis auf <math>24 \times 30</math> cm. Auf diese Weise erhält das kleine Photo-Stereo-Binocle eine große, schwere Reisekamera von 20 mal größeren Dimensionen.</p> <p>Ausführliche Prospekte über diese Neuerheit verfendet die Optische Anstalt C. P. Goerz in Berlin-Friedenau 10 auf Verlangen kostenfrei. Das Instrument selbst ist durch jede photographische Handlung oder direkt ab Fabrik zu beziehen.</p>
--	--

## BINOCULARS AND PHOTOGRAPHY

**Left: Sander's Patent Photoscope (1890-1900?) based on German patent of 1889**  
**Right: Hammond binocular camera from 1938**



(41)

## BINOCULARS AND PHOTOGRAPHY

### BINOCA BINOCULAR-CAMERA (1950)



Binocular 2,5x. Camera worked with 16 mm cassette film with 12 pictures 10x14 mm

3278  
Binoca Fernglaskamera 10x14 mm für 12 Aufnahmen auf 16 mm Kassettenfilm, Binoca, Japan, Objektiv Bicon 4,5/40 mm, Verschluß 25/100 Sek. Fernglas-Okulare 2,5x2,5-fach, elfenbeinfarbiges Gehäuse.  
ca. 1950

(42)

## BINOCULARS AND PHOTOGRAPHY

BINOCA CAMERA'S FROM 1950 WERE PRODUCED IN DIFFERENT COLORS



(43)

## BINOCULARS AND PHOTOGRAPHY

### MÖLLER CAMBINOX BINOCULAR (7x35) CAMERA FROM 1954



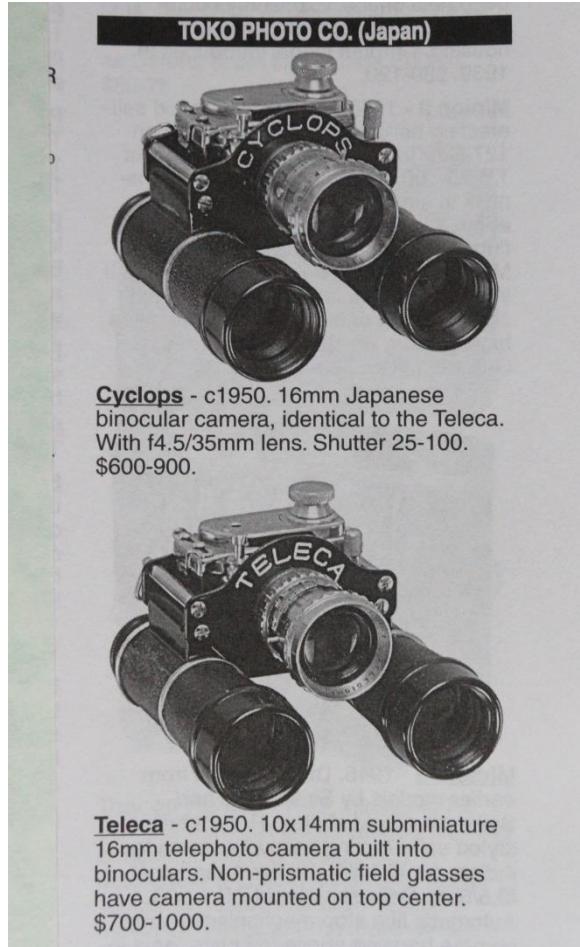
860

**Cam Binox**, 10 x 14 mm, J. D. Möller Wedel/Hamburg,  
Fernglaskamera für 20 Aufnahmen auf unperforierten 16-mm-  
Film, Aufnahme-Objektiv Idemar 3,5/90 mm, Metallschlitz-  
Verschluß 30/800 Sek. mit Filmtransport gekoppelt, Synchron-  
anschlüsse für M u. X. Das Fernglas dient bei Aufnahmen als  
Sucher für die Kamera, ca. 1954

## BINOCULARS AND PHOTOGRAPHY



**LEFT: IDENTICAL CYCLOPS AND TELECA BINOCULAR CAMERA'S (1950)  
RIGHT: NICNON 7x50 BINOCULAR WITH BUILT-IN RICOH 18x24 MM CAMERA (1969)**



(45)

## BINOCULARS AND PHOTOGRAPHY



### 1968: TEFLEX 7x50 AND NICNON 7x50: IDENTICAL CAMERA BINOCULARS BUT WITH DIFFERENT NAMES



4347

Teflex Nicnon Fernglaskamera 18 x 24 mm auf K-B Film,  
Nichiryo Int. Corp., Japan, Fernglas 7 x 50, Objektiv 3,5/165  
mm, Copal-Verschluss 60/250 Sek.  
ca. 1968



(46)

## BINOCULARS AND PHOTOGRAPHY

### 1969: Monocular Nicnon 7x50 camera



## BINOCULARS AND PHOTOGRAPHY

**Left: Tasco 8000 binocular (7x30) camera and  
Right: identical Orinox 7x30 binocular camera**

**Both were produced around 1980**



(c) WestLicht Auction

## BINOCULARS AND PHOTOGRAPHY

**Left: (1980) Telespot 110 binocular camera contains 4x30 binocular**

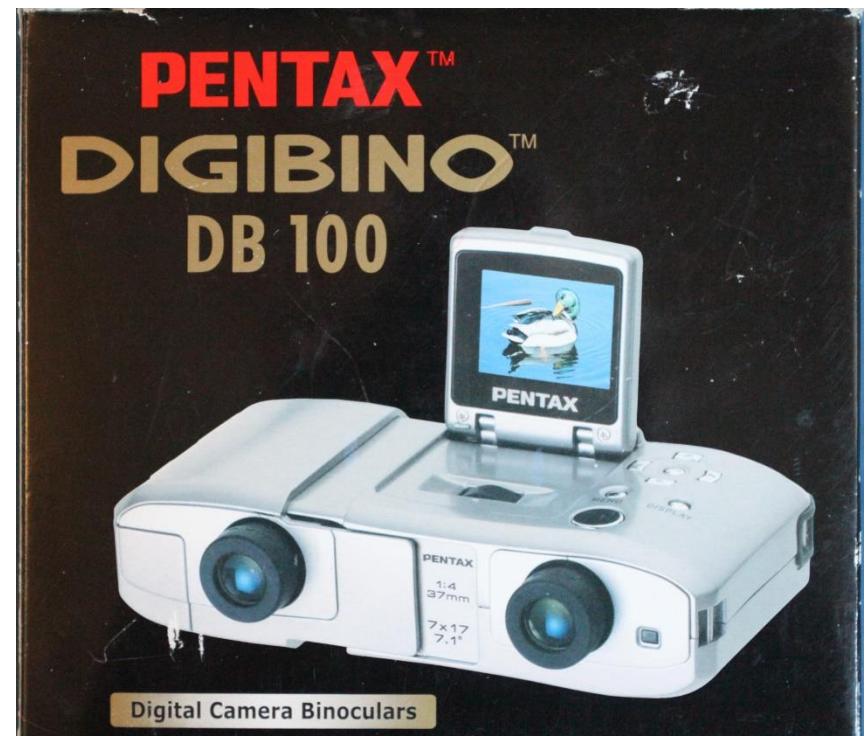
**Right: (2000?) Asahi Pentax 7x17 binocular camera (early digital camera)**



3281

Fernglaskamera Tele-Spot 110 für den Pocketfilm, made in Japan, Telephotolinse 11 / 80 mm, Fernglas 4x30, Verschluß 125 Sek., schwarzes Kunststoffgehäuse.

ca. 1980

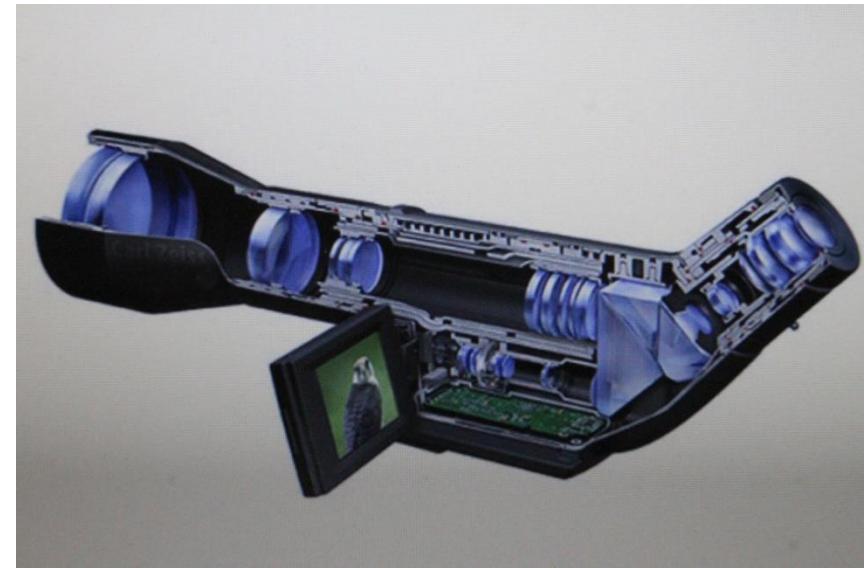
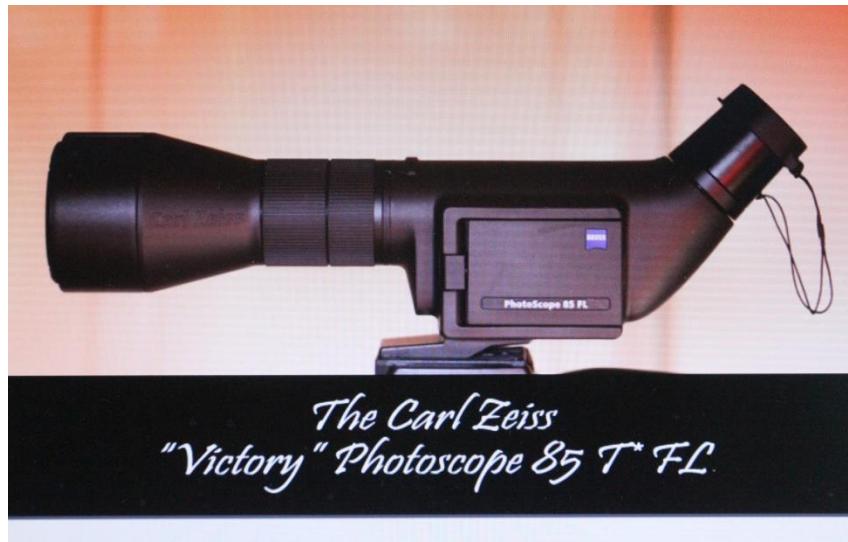


(50)

## BINOCULARS AND PHOTOGRAPHY



CARL ZEISS "VICTORY" 85 T\*FL PHOTOSCOPE (OBSERVATION TELESCOPE) WITH 7 MP DIGITAL CAMERA . PRICE 5400 EUROS



## BINOCULARS AND PHOTOGRAPHY

### SONY DIGITAL BINOCULARS.

**THREE TYPES: DEV-3, DEV-5 AND DEV-50 (LATEST AND MOST ADVANCED)**



- **DEV-50:**
- **Magnification: 0,8-12x optical, 25x digital.**
- **Resolution: 20,9 MP**
- **Weight: 765 g**
- **Eye-relief: 17 mm**
- **Price about 2000 US dollars**

**FROM WHICH COMPANY IS THE LOGO OF THE BINOCULAR SHOWN ??**

**LEFT: INSTRUMENT MADE BY THE UNKNOWN COMPANY. RESEARCH INDICATES IS WAS  
FROM THE ASKANIA WERKE**

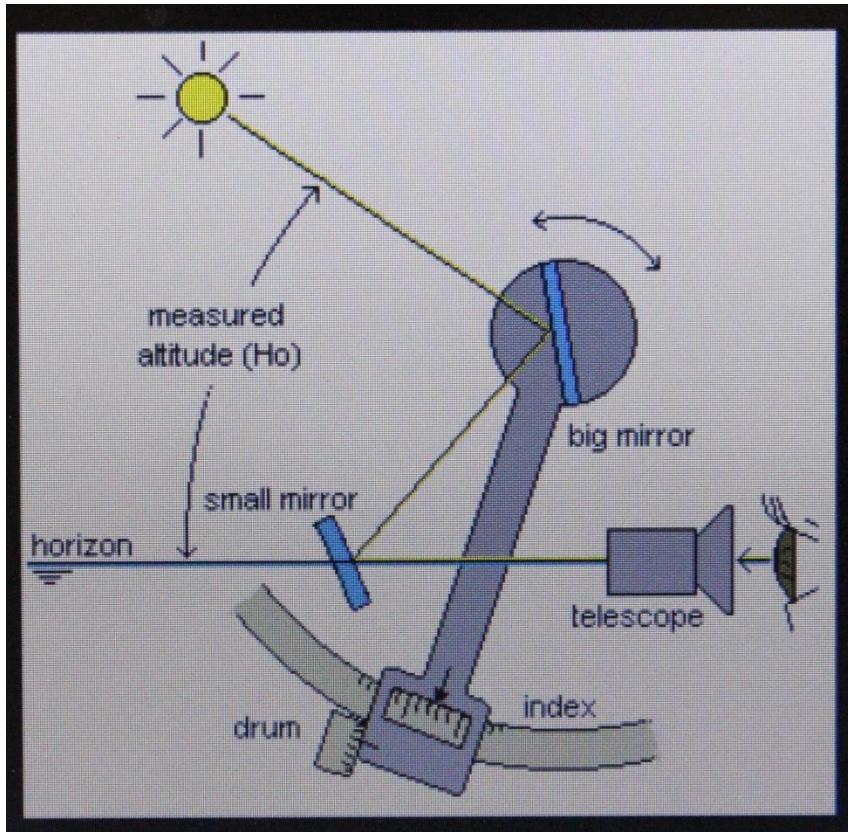
**RIGHT: LOGO OF THE 7x25 INSTRUMENT SHOWN LEFT**



(52)

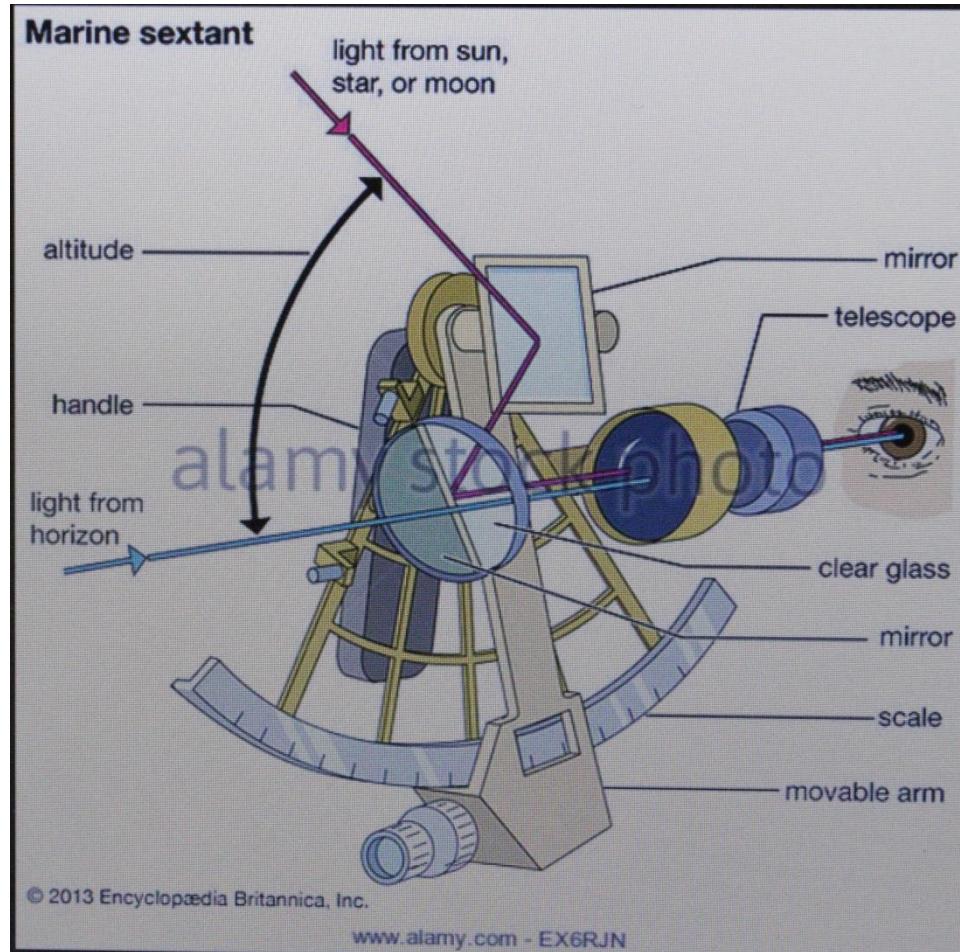
## BINOCULARS AS A TOOL FOR NAVIGATION INSTRUMENTS

LEFT: PAINTING SHOWING ALEXANDER VON HUMBOLDT WITH SEXTANT MID 1800



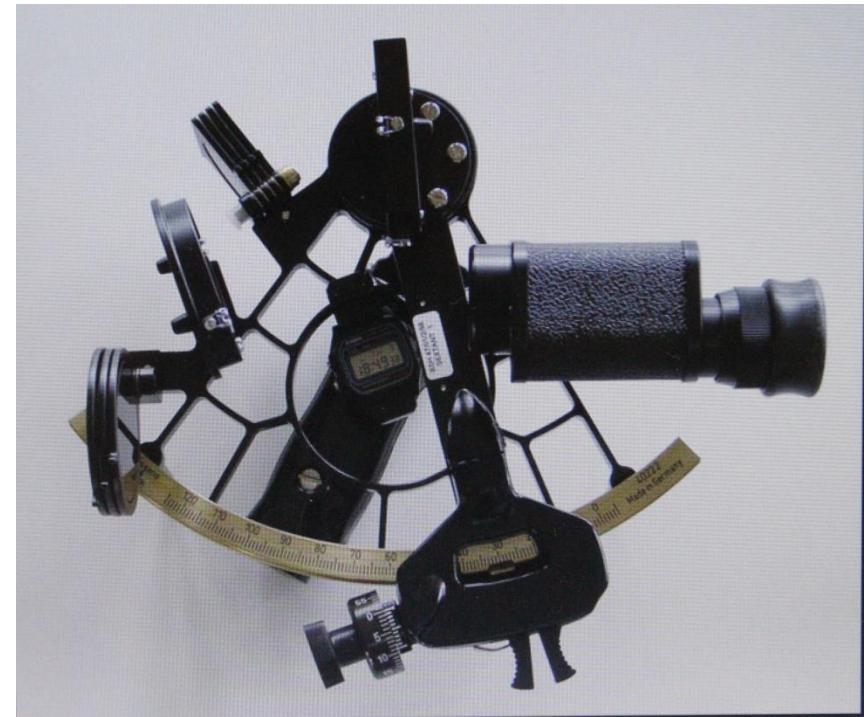
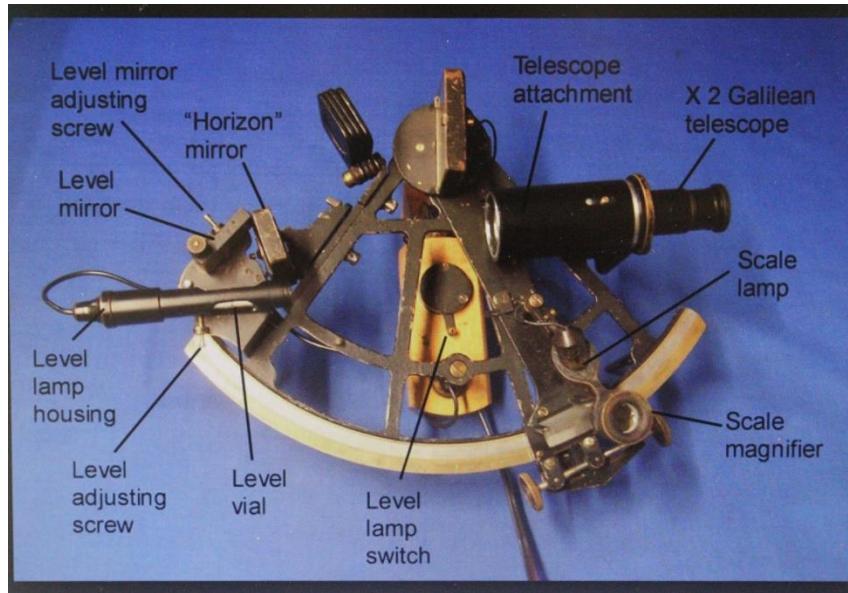
## BINOCULARS AS A TOOL FOR NAVIGATION INSTRUMENTS

### A SEXTANT AND HOW IT WORKS



## BINOCULARS AS A TOOL FOR NAVIGATION INSTRUMENTS

DIFFERENT MONOCULARS IN SEXTANTS. THE FIELD OF VIEW IS ADAPTED TO THE ANGLE OF VIEW OF THE NAVIAGATION INSTRUMENT.

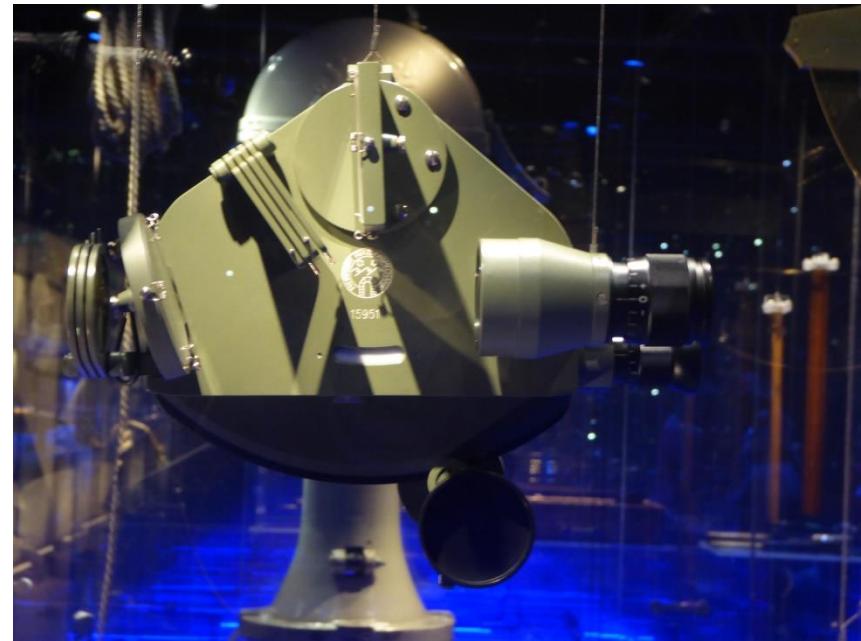
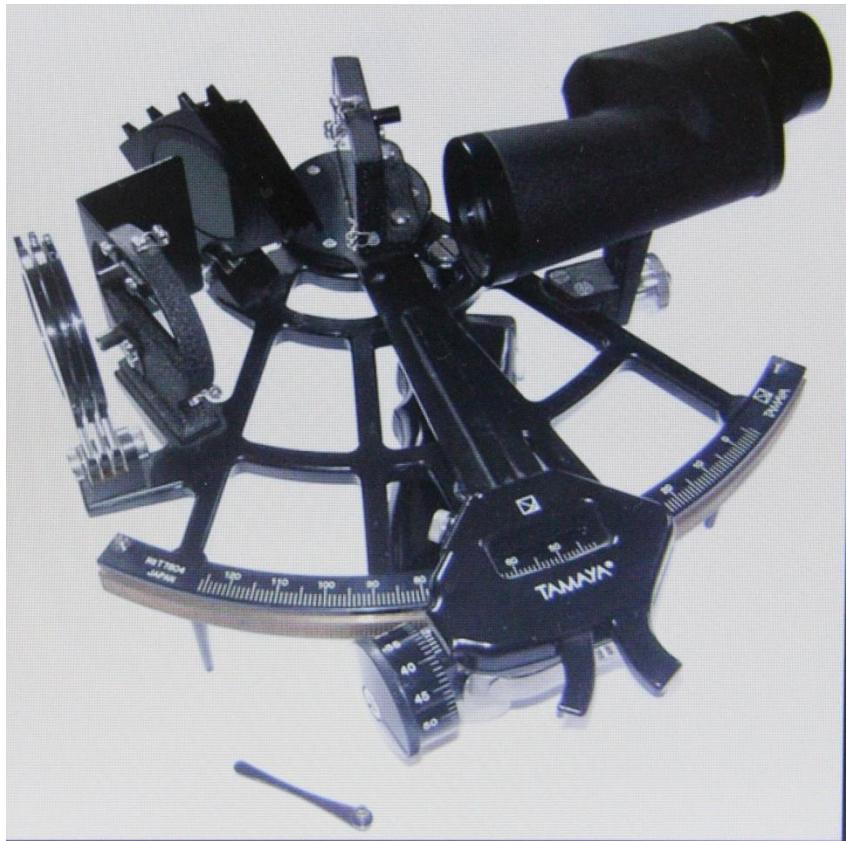


(55)

## BINOCULARS AS A TOOL FOR NAVIGATION INSTRUMENTS

MONOCULARS AS OBSERVATION TOOL FOR NAVIGATION INSTRUMENTS.

RIGHT: WIDE-ANGLE MONOCULAR



(56)

## BINOCULARS AS A TOOL FOR NAVIGATION INSTRUMENTS

BINOCULARS WITH INCORPORATED COMPASS

LEFT: COMPASS ON CENTRAL AXIS

RIGHT: COMPASS AS INTEGRAL PART OF THE OPTICAL TRAIN



(57)

## BINOCULARS AS A TOOL FOR NAVIGATION INSTRUMENTS

### BINOCULARS WITH INCORPORATED COMPASS



(58)



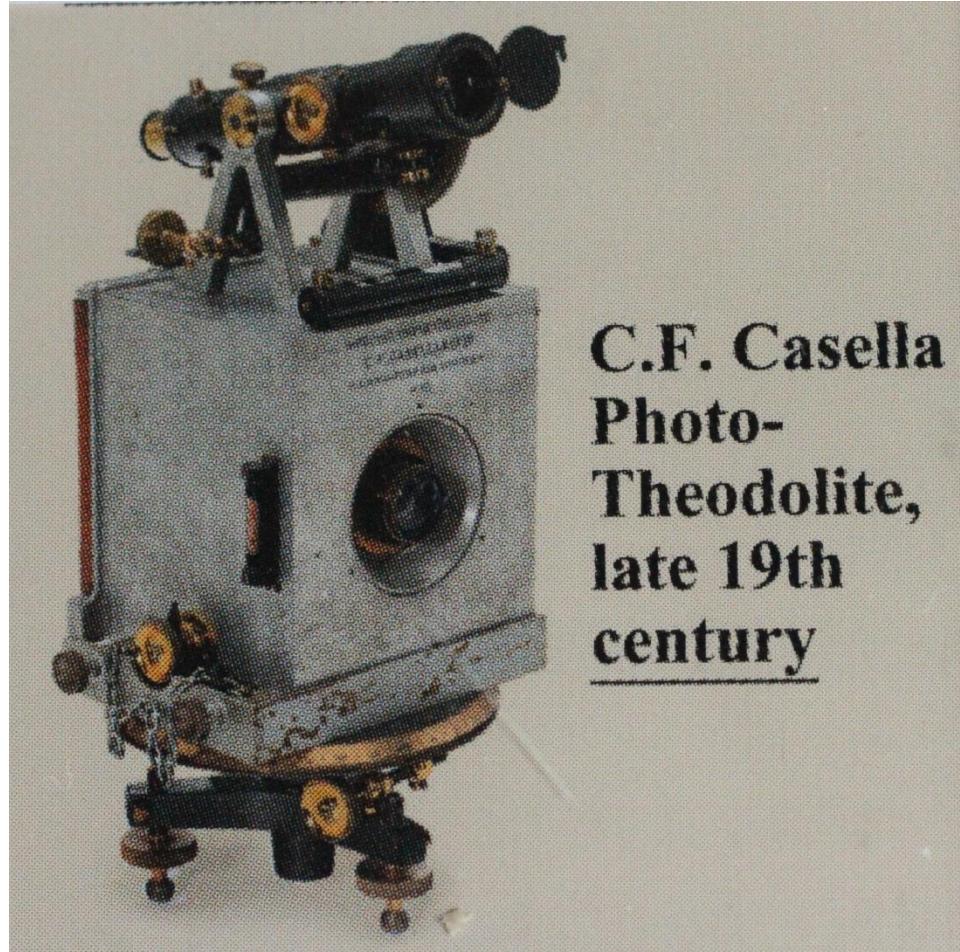
## BINOCULARS AS A TOOL FOR NAVIGATION

SHOWN IS A CHEAP “FUJINON” 7x50 PORRO WITH DIGITAL COMPASS MADE IN CHINA



## BINOCULARS AS A TOOL FOR MEASURING INSTRUMENTS

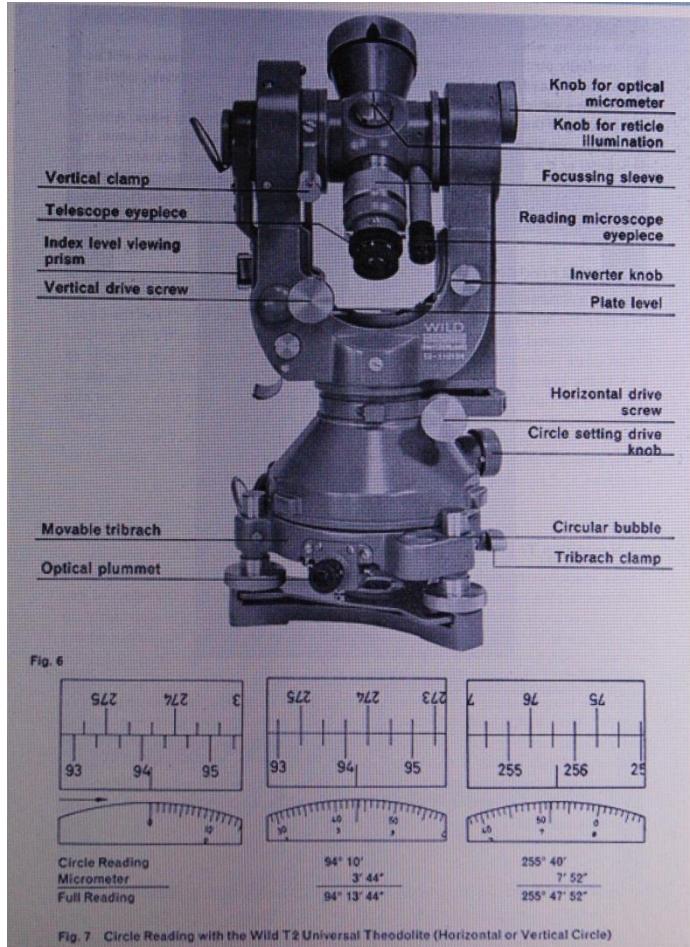
BINOCULARS/MONOCULARS IN THEODOLITES AS OBSERVATION TOOLS FOR LAND SURVEYING



## BINOCULARS AS A TOOL FOR MEASURING INSTRUMENTS: THEODOLITES

### LEFT: WORKING MECHANISM

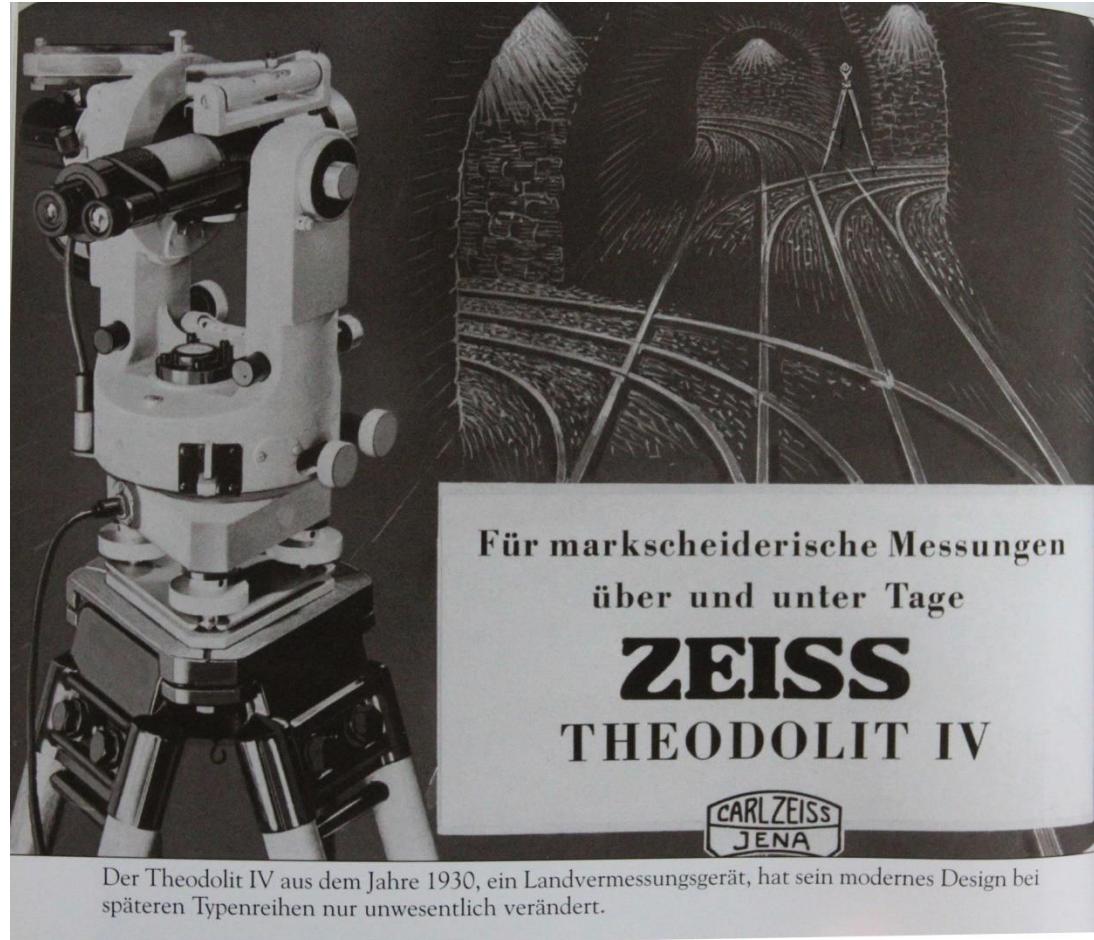
### RIGHT: THEODOLITE WITH TELESCOPIC VIEW FINDER 1890



(61)

## BINOCULARS AS A TOOL FOR MEASURING INSTRUMENTS

### ZEISS THEODOLIT 4 : A DESIGN FROM 1930



(62)

## BINOCULARS AS A TOOL FOR MEASURING INSTRUMENTS

Left: theodolite with porro monocular viewfinder

Right: MOM (= Hungarian Optical Company) theodolite with optical telescope viewfinder



(63)

## VIEW FINDER BINOCULARS

**PORRO MONOCULARS (ZEISS) AS PHOTOGRAPHIC VIEW FINDERS FOR ROBOT CAMERA'S.  
THREE DIFFERENT ONES CORRESPONDING WITH THE FOCAL LENGTH OF THE  
TELEPHOTOLENSSES (*EXTREMELY RARE*).**



Abb.43 Tele-Xenar 5,5-200mm mit Monokularsucher

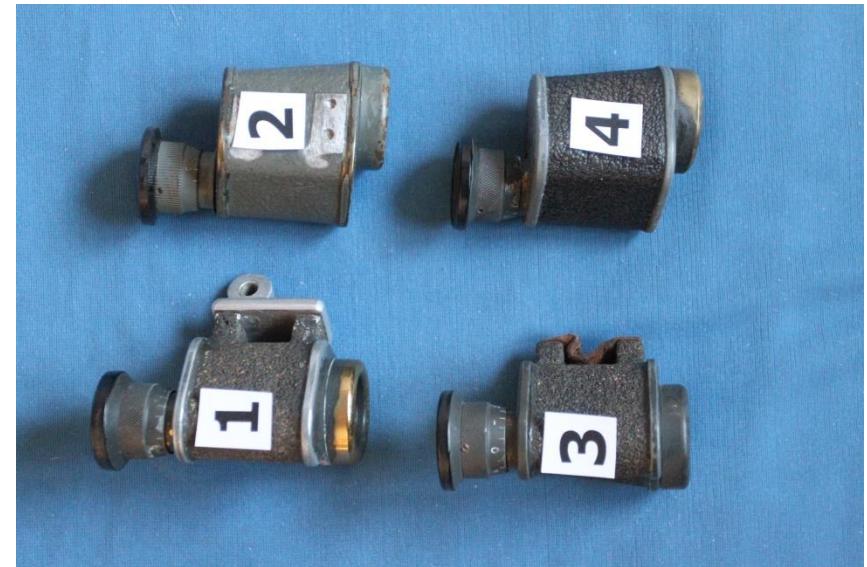
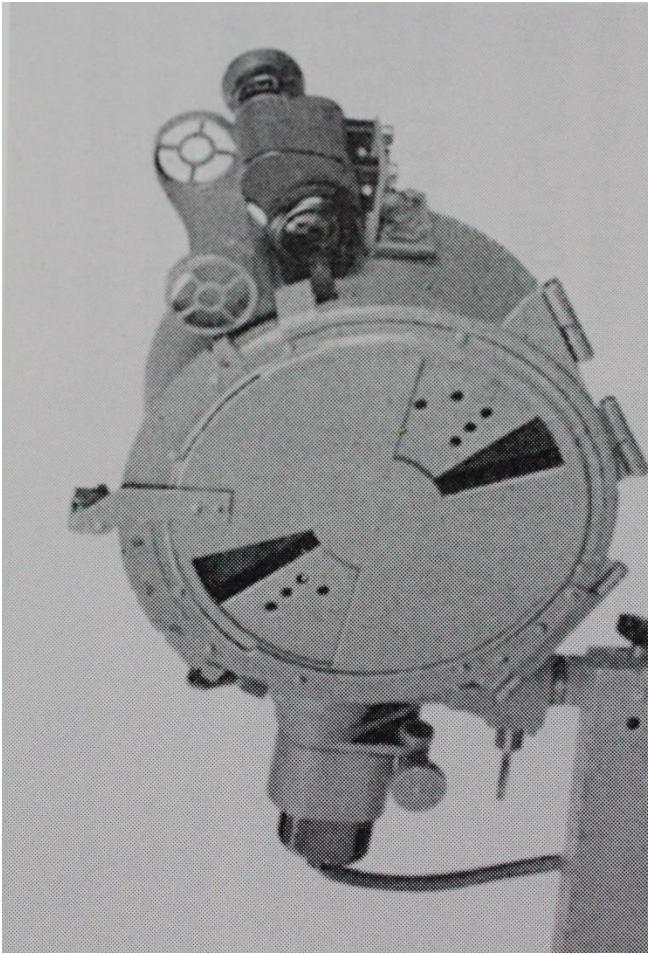


(64)

## VIEW FINDER BINOCULARS

LEFT: FOR SEARCH LIGHTS

RIGHT: FOR GUN SIGHTS (4x20 BLINK) MADE BY:GOERZ (NR 4) AND ZEISS (1-3)



(65)

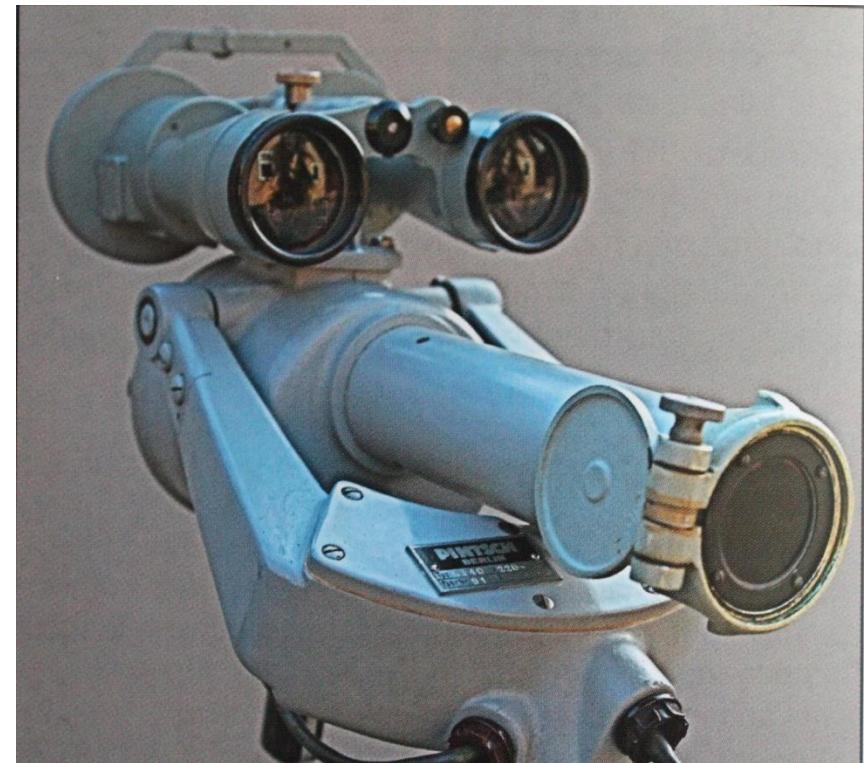
## VIEW FINDER BINOCULARS



**LEFT: NEDINSCO 4x40 BLINK MONOCULAR AS GUN SIGHT FOR FINNISH ARMY  
RIGHT: BINOCULAR AS VIEW FINDER FOR SEARCH LIGHT**



Nedinsco richtkijker voor geschut. Met verlichte graticule. Voor finse leger.



(66)

## SPECTACLE BINOCULARS



PAINTING "DE LANDLOPER" (=THE VAGABOND) C.Q "DE VERLOREN ZOON" (= THE LOST SON), (JEROEN BOSCH 1450-1516). COMPLICATED COMPOSITION. EVERY DETAIL HAS A SPECIFIC MEANING. A PUZZLE



## SPECTACLE BINOCULARS

**TO STUDY DETAILS: EITHER VERY CLOSE TO THE PAINTING , OR USE SPECTACLE BINOCULARS. FIRST PRODUCED IN 1807 BY CHEVALLIER IN FRANCE.**



### THE BREAKTHROUGH OF THE BINOCULAR IN THE NINETEENTH CENTURY

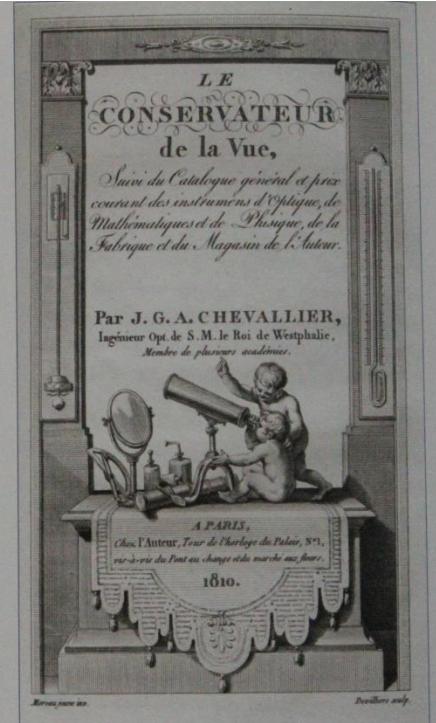
Only in the nineteenth century the binocular telescope reached the stadium in which the instrument, in a simple form, could be produced in large numbers. Especially the use of the binocular opera glass or *jumelle* became very popular in the theatres. This flourishing of the binocular spyglass was largely due to the French instrument maker Jean Gabriel Augustin Chevallier (1778-1848). In 1807 he patented a simple binocular, which design resembled the earlier Scarlett-spectacles with ear-springs made in the eighteenth century.



265 | Binocular opera glass with 'ear springs'.

Length 5 cm, width 10 cm. With its original wooden case, signed: 'Chevallier, Paris'. Made according to the model patented in 1807, which design was produced until ca. 1820 (Cf. the engraving in Chevallier's 1810 sale catalogue).

Jean Gabriel Augustin Chevallier (1778-1848) worked in Paris between 1796 and 1840.



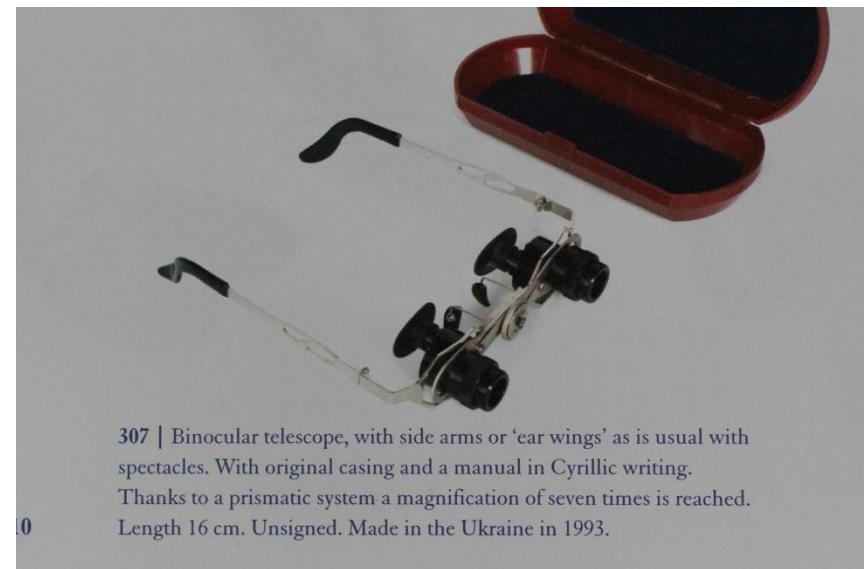
266 | Catalogue, dated 1810, of the optical instruments made and sold by Jean Gabriel Augustin Chevallier (1778-1848), at the time 'Ingénieur Opticien de Son Majesté le Roi de Westphalie'. This king was Jérôme Bonaparte, the brother of the French emperor, who ruled as King of Westfalen from 1807 until 1813. Westfalen was a merge of parts of Braunschweig, Hessen-Kassel, Hannover and Prussia).

(68)

## MODERN SPECTACLE BINOCULARS

LEFT: A LIPPERHEIJ TYPE

RIGHT: PORROPRISM BASED DESIGN FROM 1993 MADE IN UKRAINE



(69)

## SPECTACLE BINOCULARS WITH PORRO PRISMS

LEFT: 4x20 SPECTACLE BINOCULARS

RIGHT: 7x30 WIDE-ANGLE SPECTACLE MONOCULAR FOR ONE EYE HANDICAPPED



(70)

## SPECTACLE BINOCULARS

### 7x30 WIDE ANGLE PORRO PRISM SPECTACLE MONOCULAR



(71)

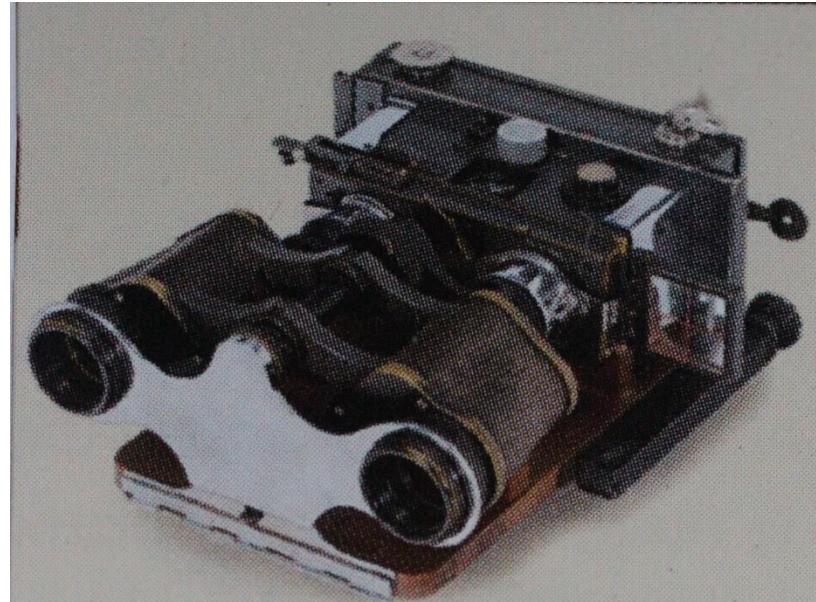
## SPECTACLE-BINOCULARS OBSERVATION OF HORSE RACES



(72)

## BINOCULARS AS TELEPHOTOLENSES

Verascope from 1927



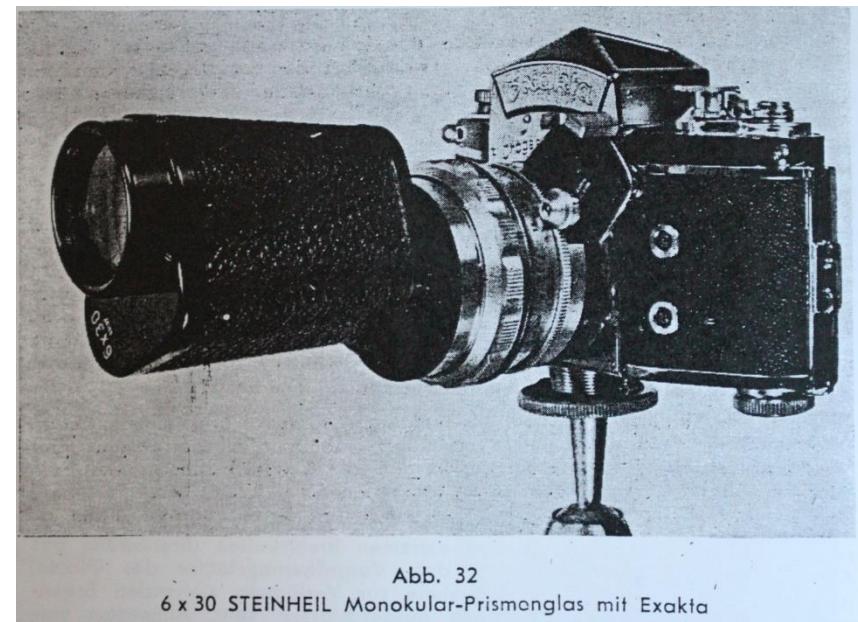
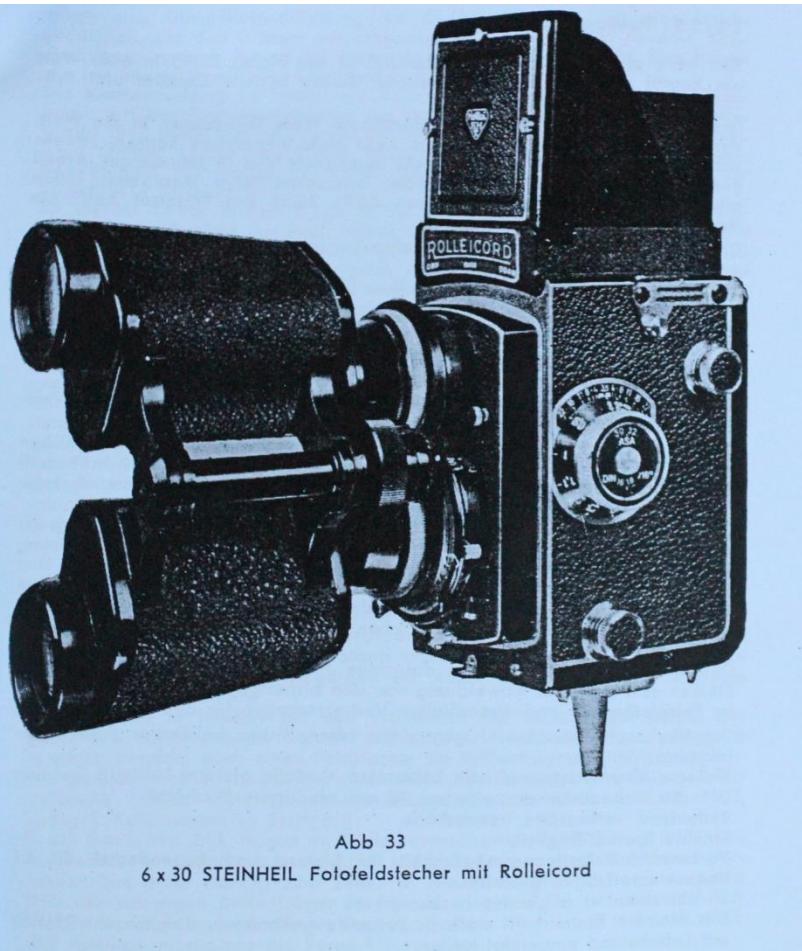
Verascope Telephotography  
(45 x 107 mm), c. 1927

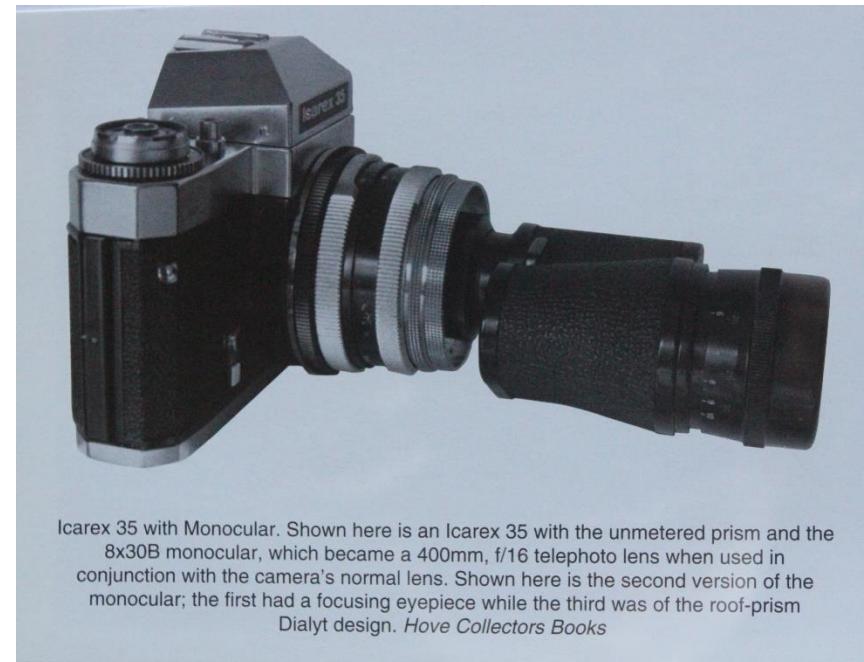
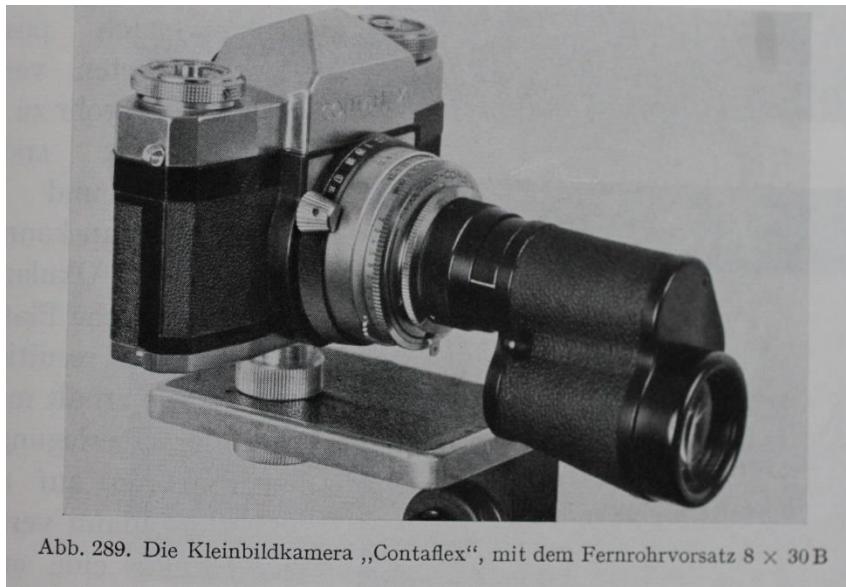
By Jules Richard, Paris. –  
(2,000–4,000 €)

## Steinheil binoculars and monocular as telephotolenses.

**LEFT: BINOCULAR ON ROLLEICORD CAMERA**

**RIGHT: MONOCULAR ON EXACTA CAMERA**



**BINOCULARS AS TELEPHOTOLENSSES****ZEISS 8x30 PORRO PRISM MONOCULAR ON:****ZEISS CONTAFLEX (LEFT) AND ZEISS ICAREX (RIGHT)****8X MONOCULAR FUNCTIONED AS A 400 MM TELEPHOTOLENS FOR 35 MM  
CAMERA'S**

## BINOCULARS AS TELEPHOTOLENSSES



**Left:** Zeiss 8x21 Turmon (top) and Zeiss 8x30B porro prism photomonocular (below).  
**Right:** Zeiss 8x30B on Zeiss Contaflex camera (top) and on Zeiss Contaflex super camera (below)



79. „Turmon 8×21“ (aus Jena) an der Contaflex.  
*“Turmon 8×21” (made in Jena) mounted on Contaflex.*

80. Fernrohrvorsatz 8×30 B, erste Ausführung.  
 Oben mit Contaflex super, unteres Bild mit Contarex I. –

*Prism monocular 8×30 B, first version.  
 Above with Contaflex super, below with Contarex I.*

81. „8×30 B“, zweite Ausführung / second version.

(76)

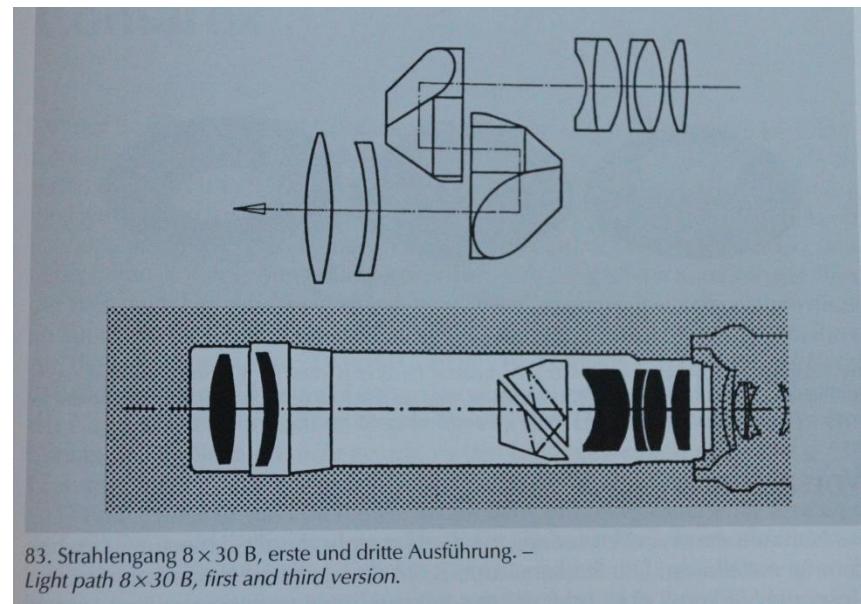
## BINOCULARS AS TELEPHOTOLENSES



**8x30 ZEISS ROOF PRISM MONOCULAR AS 400 MM TELEPHOTOLENS for 35 mm  
camera's**



82. „8×30 B“, dritte Version mit Adapterrинг für Contarex. –  
“8×30 B”, third version, with adapter ring for Contarex.

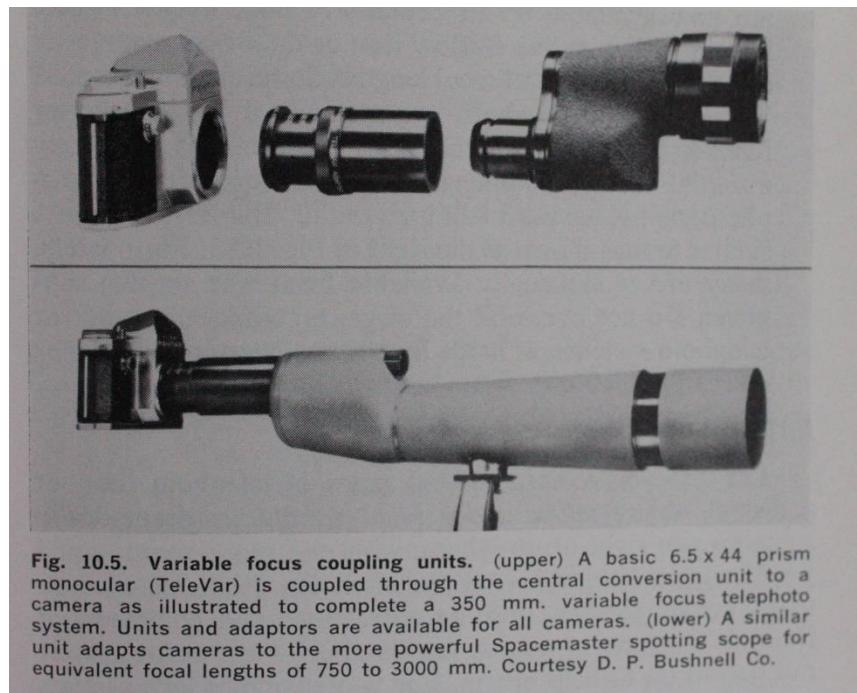
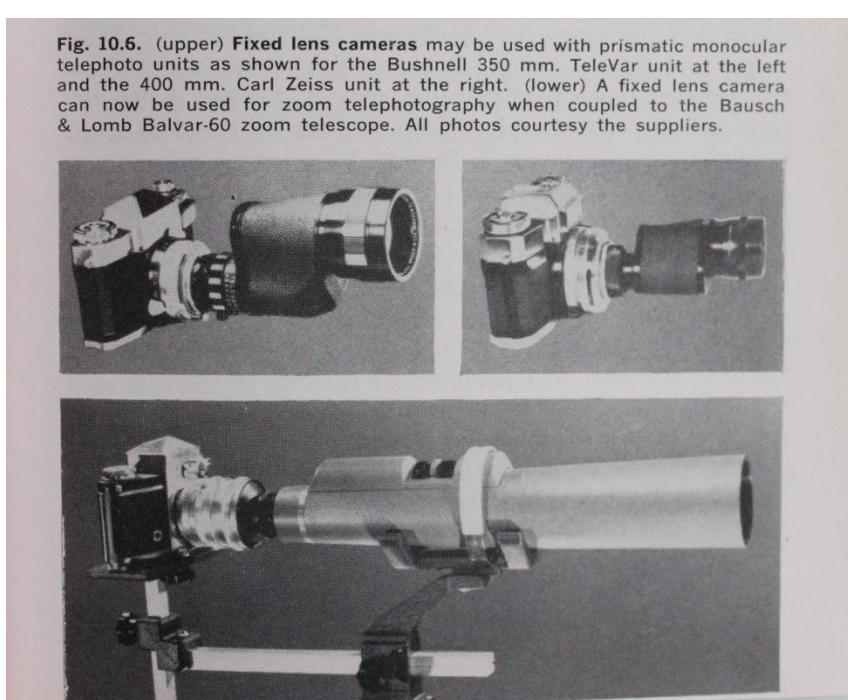


83. Strahlengang 8×30 B, erste und dritte Ausführung. –  
Light path 8×30 B, first and third version.

**BINOCULARS AS TELEPHOTOLENSSES****MONOCULARS AND TELESCOPES AS TELEPHOTOLENSSES**

**SHOWN ARE INSTRUMENTS MADE BY BAUSCH AND LOMB, BUSHNELL AND CARL ZEISS**

**Fig. 10.6.** (upper) **Fixed lens cameras** may be used with prismatic monocular telephoto units as shown for the Bushnell 350 mm. TeleVar unit at the left and the 400 mm. Carl Zeiss unit at the right. (lower) A fixed lens camera can now be used for zoom telephotography when coupled to the Bausch & Lomb Balvar-60 zoom telescope. All photos courtesy the suppliers.



**Fig. 10.5.** **Variable focus coupling units.** (upper) A basic 6.5 x 44 prism monocular (TeleVar) is coupled through the central conversion unit to a camera as illustrated to complete a 350 mm. variable focus telephoto system. Units and adaptors are available for all cameras. (lower) A similar unit adapts cameras to the more powerful Spacemaster spotting scope for equivalent focal lengths of 750 to 3000 mm. Courtesy D. P. Bushnell Co.

## BINOCULARS AS TELEPHOTOLENSES

### EXAMPLE OF 8 DIFFERENT PHOTO MONOCULARS USED AS TELEPHOTOLENSES

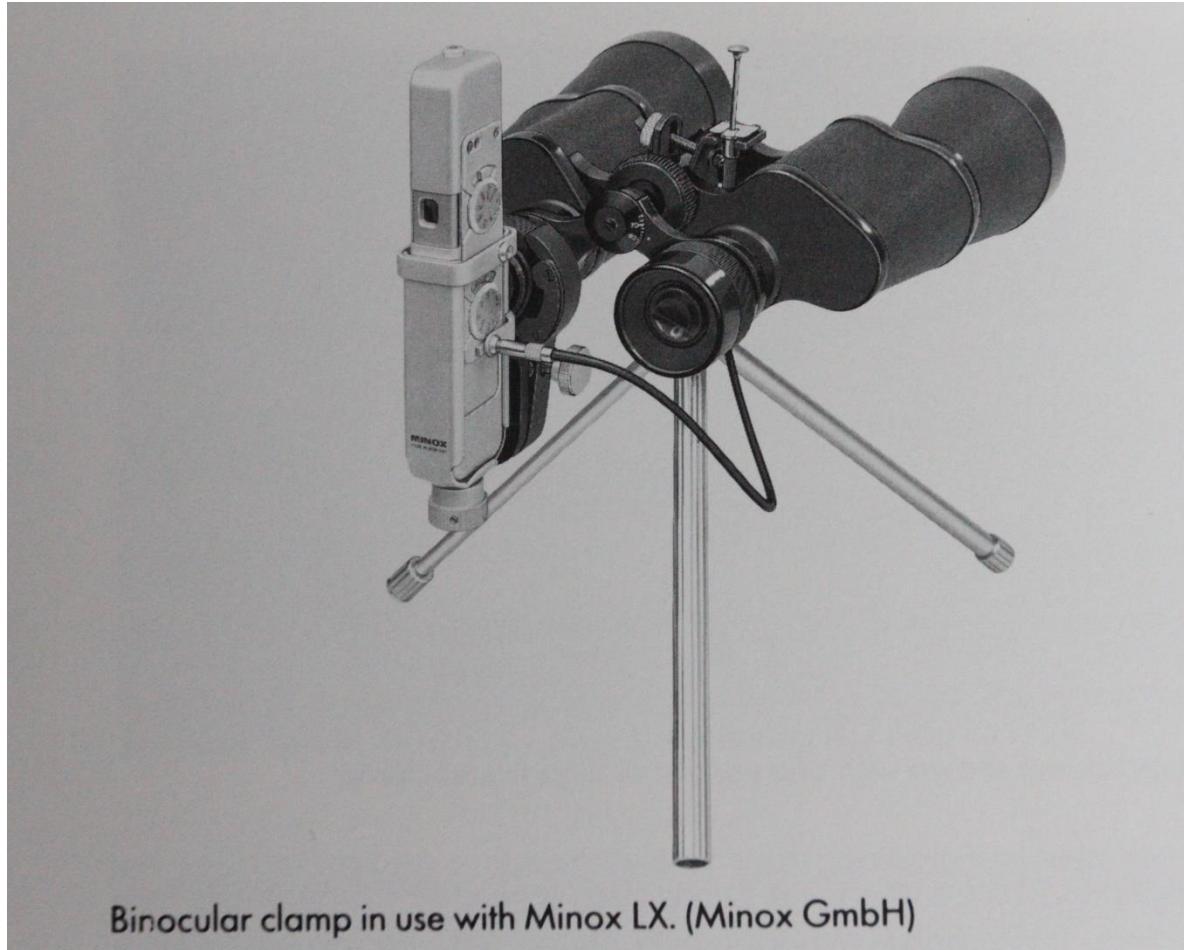


- **1= STEINHEIL 6X30 PORRO**
- **2 = AGFA TELE CONTON 8X30 PORRO FOR AGFA MOVEX REFLEX**
- **3= CARL ZEISS 8X30 ROOF PRISM**
- **4= CARL ZEISS 8X30 PORRO**
- **5= VIXEN 7X35 PORRO**
- **6= SANKYO 7X35 PORRO (1:2,8/90 MM SUPERTELE)**
- **7= ACCURA 7X50 PORRO**
- **8= BUSHNELL TELEVAR 6,5X44 PORRO. FUNCTIONS AS: F8/350 TO F16/650 MM TELEPHOTOLENS BY USING DRAW TUBE**

(79)

## BINOCULARS AS TELEPHOTOLENSES

### BINOCULAR USED AS TELEPHOTOLENS ON MINOX MINIATURE CAMERA



Binocular clamp in use with Minox LX. (Minox GmbH)

(80)

## BINOCULARS AS TELEPHOTOLENSSES

**LEFT: WALTER ZAPP: INVENTOR FROM MINOX MINIATURE CAMERA  
(ESPIONAGE !!)**

**RIGHT: UR-MINOX MADE IN RIGA IN 1938**



### MINOX – DIE GESCHICHTE



Walter Zapp, der Erfinder und Konstrukteur der Minox, im Alter von ca. 38 Jahren. Das Foto entstand 1942 und wurde von Walter Zapps Freund Nikolai „Nixi“ Nylander aufgenommen.



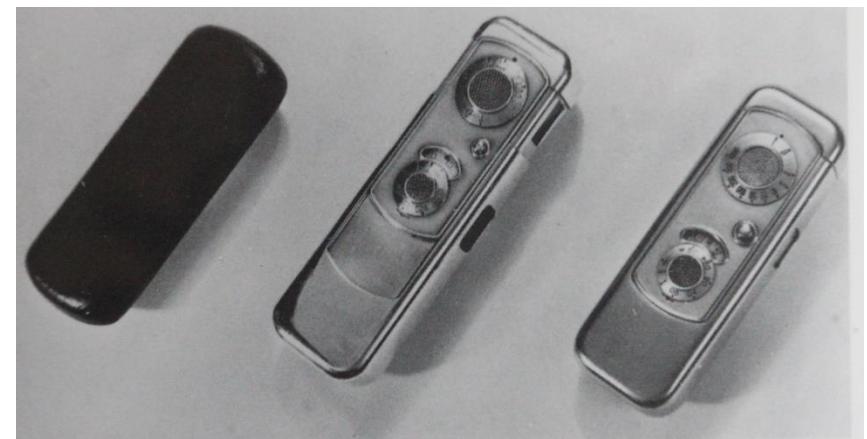
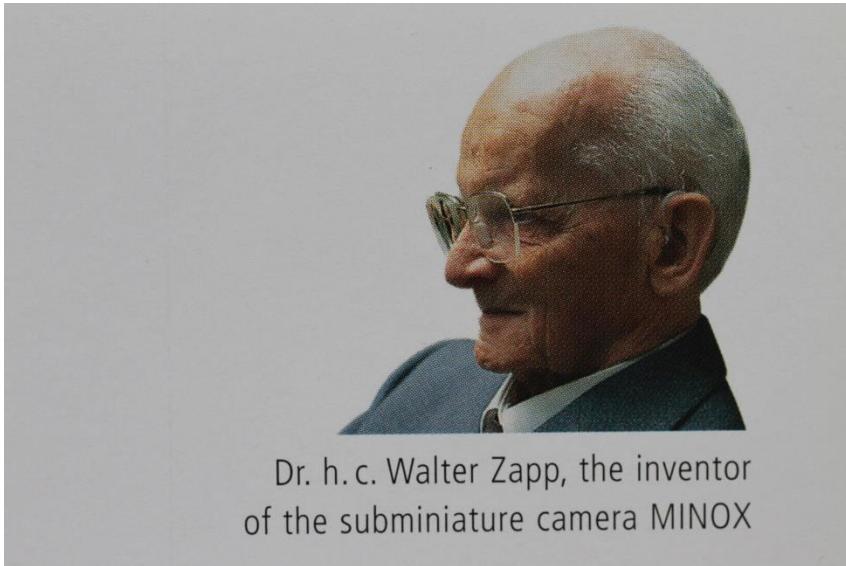
Die Rigaer Minox von 1938, ein technisches Meisterwerk, gefertigt bei VEF im lettischen Riga

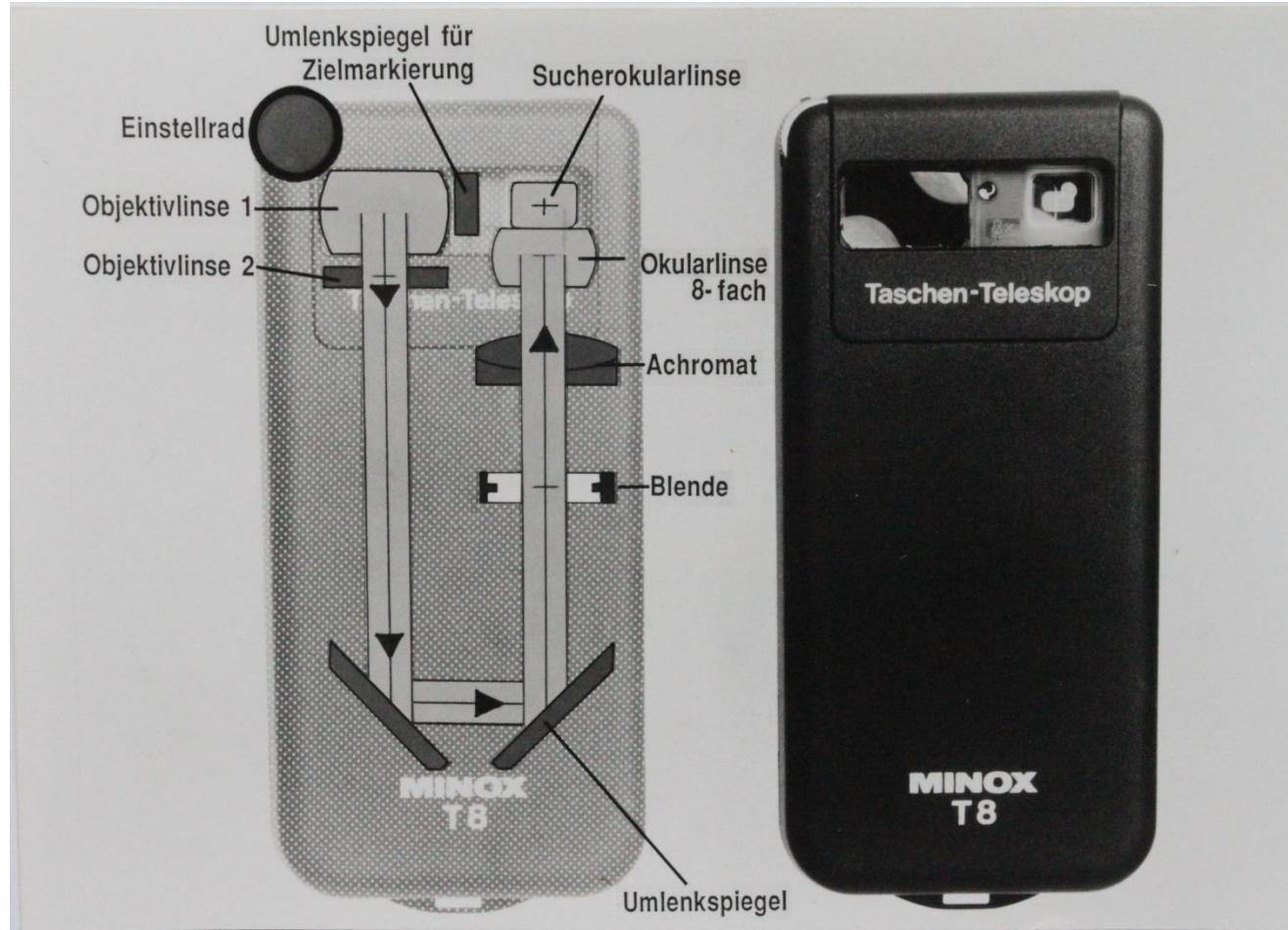
(81)

## BINOCULARS AS TELEPHOTOLENSES

LEFT: DR. WALTER ZAPP

RIGHT: EXAMPLES OF THE FIRST MINOX DESIGNS



**INTERMEZZO****DR. ZAPP ALSO DEVELOPED THE REMARKABLE T8=8X POCKET TELESCOPE**

(83)

## MUSICAL BINOCULARS

### 7x35 BINOCULAR FROM THE 1960'S WITH A RADIO IN ITS CASE



An unusual collectable binocular from the 1960s incorporating a radio in its case. The binocular is a Japanese-made 7x35 instrument of impressive optical quality, made by Sunscope

(84)

## MUSICAL BINOCULARS



LEFT: TRIPLON RADIO-CAMERA BINOCULAR (1991). MAGNIFICATION 2,5X  
RIGHT: SONY RADIO + 8X20 MONOCULAR (2000)



(85)

## MUSICAL BINOCULARS

LEFT: CORONA 3,5x BINOCULAR WIITH RADIO (new 699 US dollars)  
RIGHT: EMPIRE BIOTONE BINOCULAR (3,5x) RADIO 129 US DOLLARS  
(SOURCE: EBAY)



(86)

## BINOCULARS AS MICROSCOPE

### ZEISS MONOCULAR USED AS A MICROSCOPE (1937)

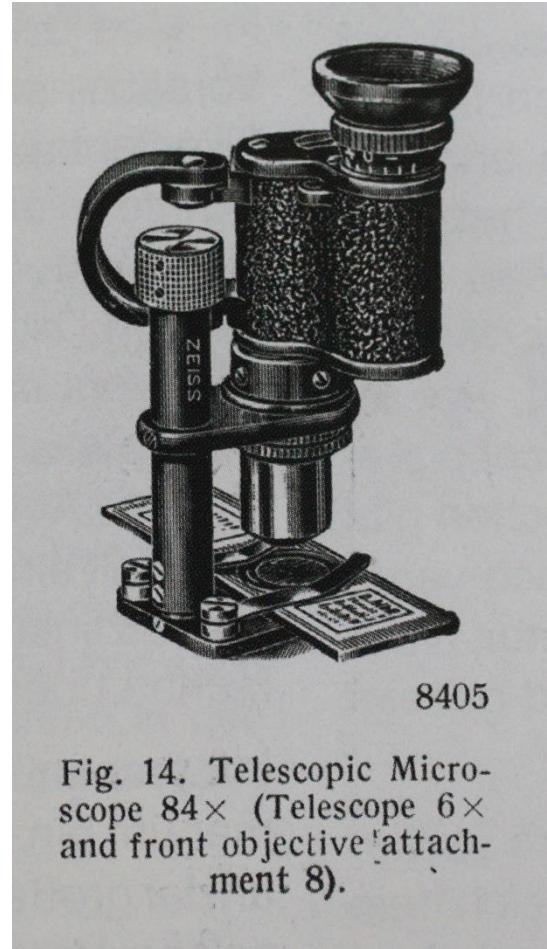


Fig. 14. Telescopic Microscope 84 $\times$  (Telescope 6 $\times$  and front objective attachment 8).

## BINOCULARS AS MICROSCOPE

**ZEISS TURMON 8x21 MONOCULAR WITH "VORSATZ"LENSES AS A MICROSCOPE.  
ALSO MADE BY DDR-ZEISS "AUS JENA" AND BY DOCTER OPTIC.**



**Qualitäts-Taschenfernglas TURMON 8x21**



**Qualitäts-Taschenfernglas  
TURMON 8x21**

Das **Turmon 8x21** ist ein superkleines Prismenfernglas mit überraschend großer Leistung. Kleiner als eine Packung Zigaretten paßt es in buchstäblich jede Westentasche.

Das **Turmon 8x21** wird damit zum idealen und unverlässlichen Begleiter für jede Gelegenheit. Egal wobei - mit dem **Turmon 8x21** können Sie noch näher am Geschehen sein.

Mit dem Sonderzubehör Tischstativ, Leuchttisch, Zusatztrafo und verschiedene Vorsatzlinsen wird das Turmon zu einem leistungsstarken Kleinmikroskop.

Vergrößerungswerte beim Einsatz des Turmon 8 x 21 als Kleinmikroskop						
Feldstecher	Bezeichnung dpt	Beobachtungs- abstand mm	Vorsatzver- größerung	Gesamtver- größerung	Sehfelddurch- messer 3)	
8 x 21	+1 +2	1000 500	1) { 1 x 1 x}	8 x 8 x	110 54	
	+4	250	1) x	8 x	27	
	+5	200	1 x	10 x	22	
	+6,25	160	1,25 x	12,5 x	17	
	+8,35	120	2,1 x	17 x	13	
	+10	100	2,5 x	20 x	11	
	+12	83	3 x	24 x	9	
	+16	62	4 x	32 x	7	

1) Vergrößerung im Vergleich zur Bildgröße, die das unbewaffnete Auge aus dem angegebenen Abstand erhält.  
2) Lupenvergrößerung im Vergleich zur Bildgröße, die das unbewaffnete Auge aus 250 mm Abstand erhält.  
3) Sehfelddurchmesser, bezogen auf den jeweiligen Beobachtungsabstand.

Fernglasmodell	Vergütung	Objektiv- durchmesser	Austrittspalte	gemeinsche Lichtlinie	Dämmerungs- leistung	Sehfeld auf 1000 m	Erteilung	Masse
Turmon 8 x 21	fach	mm	mm		m	Gramm		

**aus JENA**

Änderungen im Sinne des technischen Fortschritts vorbehalten.

**DOCTER OPTICS EISENFELD** Feinwerktechnik, Postfach 9, D-6120 Eisfeld, Tel. 2173, Telefax 67792/2167

**ZUBEHÖR / ACCESSORIES**

Tischstativ / Table Tripod	58 910		
macht Ihr DOCTER 8 x 21 C mono in Verbindung mit Vorsatzlinsen zu einem Mini-Mikroskop. (Abb. 4)			
Turns your DOC TER 8x21 C mono into a miniature microscope in combination with accessory lenses.			
 <b>Vorsatzlinsen / Accessory Lenses</b>			
Dioptr.	Abstand Distance	Vergrößerung Enlargement	Bestell-Nr. Order No.
+ 1	1,0 m	8 x	58 811
+ 2	0,5 m	8 x	58 812
+ 4	0,25 m	8 x	58 813
+ 5	0,20 m	10 x	58 814
+ 6,25	0,16 m	12,5 x	58 815
+ 8,35	0,12 m	17 x	58 816
+ 10	0,10 m	20 x	58 817
+ 12	0,083 m	24 x	58 818
+ 16	0,062 m	32 x	58 819
 <b>DOCTER 8x21 mono /DOCTER 8x21 C mono mit Etui / with bag</b>			58 328
 <b>Leuchttisch mit Trafo / Light Table with Transformer zum Betrachten im Durchlicht</b>			58 911
 <b>Etui (als Ersatz) / Pocket (replacement)</b>			58 112

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## BINOCULARS AS MICROSCOPE

ZEISS MICROSCOPE BASIS TO CONVERT POCKET BINOCULARS INTO A MICROSCOPE



### Zeiss Mikroskop-Basis Stereo

Diese neue Mikroskop-Basis für Zeiss Taschenferngläser erschließt eine weitere Dimension:  
Die Welt der Mikroskopie. In Stereo.  
Ein Zeiss Taschenfernglas wird mit zwei Handgriffen zum handlichen Stereo-Mikroskop.  
Es ist überall und jederzeit einsatzbereit.  
Erleben Sie die ganze Welt des Sehens – von der Fernbeobachtung bis zur mikroskopischen Betrachtung.  
Mit Zeiss.

(89)

## BINOCULARS AS MICROSCOPE

**BINOCULARS AS MICROSCOPE USING THE “MIKROSKOP-BASIS STEREO” MADE BY ZEISS**



**Die Mikroskop-Basis Stereo macht aus einem Zeiss Taschenfernglas ein Stereo-Mikroskop.**

**Das Taschenfernglas. Das Taschenfernglas von Zeiss sind hervorragendes Auge und leistungsfähiger Fernrohr. Aber auch besondere Leistungsfähigkeit. Sie passen in die kleinste Tasche und sind gleichzeitig leicht und robust im Hande.**

**Sie sind beliebte Begleiter. Für den Urlaub, für die Jagd, für die Arbeit oder in den Bergen. Alles über für verwenden.**

**Mit einem Taschenfernglas von Zeiss kann man nicht nur fernsehen, sondern auch mit Stereo-Mikroskop. Leicht und kompakt. So können Sie kleine Dinge, die Sie unterwegs gesammelt haben, zu Hause in ungeheure Dimensionen und Farbe und Größe nachschauen.**

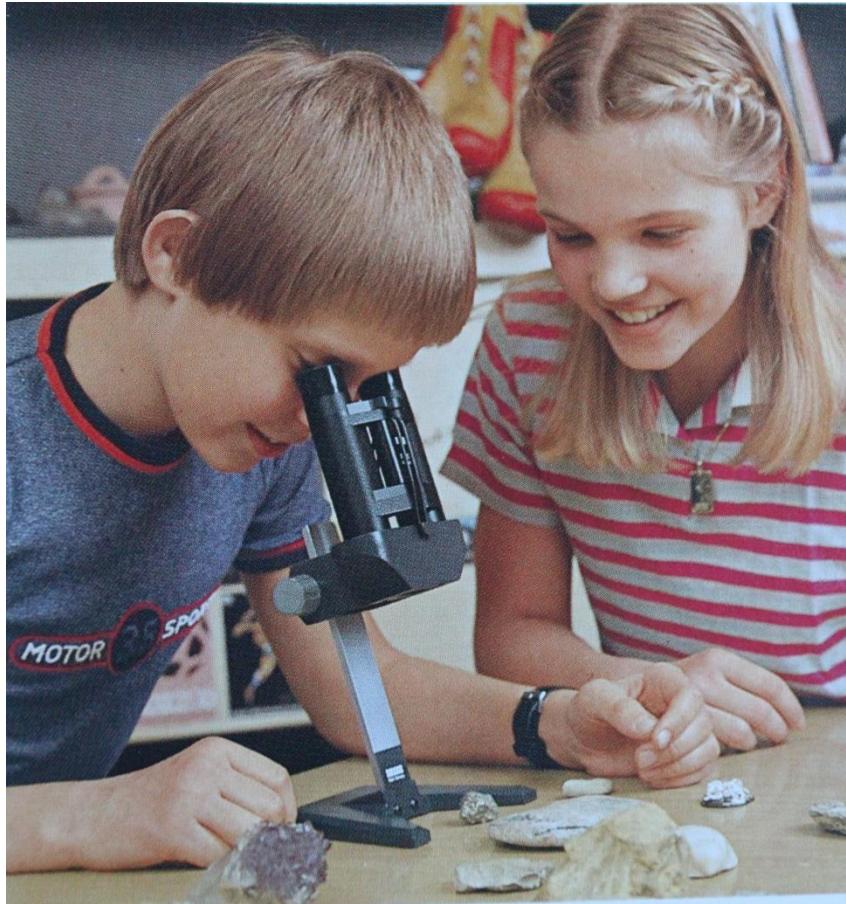
**Das Stereo-Mikroskop. Taschenfernglas\***  
Die besondere Zeiss-Basis Stereo ist das einzige Gerät, das Ihnen die Möglichkeit zum Gebrauch, zum Wechseln, zu Obersetzen und zu vielem anderen Gelegenheiten.

**Schenken Sie zumindest das Zeiss Taschenfernglas als Geschenk. Es ist ein wundervolles Geschenk, das die Mikroskop-Basis Stereo. Mit 30 Jahren Garantie.**

**\*8×20B, 8×20, 8×20B, 10×25B.**

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## BINOCULARS AS MICROSCOPE USING THE “MIKROSKOP-BASIS STEREO” MADE BY ZEISS



Technische Daten				
Zeiss Taschenferngläser	Bestell-Nummer	Gesamt-Vergrößerung mit der Zeiss Mikroskop-Basis Stereo	Sehfeld Ø in mm	Arbeitsabstand in mm
6×20B	522006	12×	15,0	116
8×20	522002	16×	15,0	116
8×20B	522024	16×	14,5	116
10×25B	522025	20×	12,0	116

Gewicht der Mikroskop-Basis: 490 g

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## MONOCULARS AS MAGNIFYING INSTRUMENTS

LEFT: LEICA MONOVID 8x21, BYNOLYT 7x20 AND ASAHI PENTAX 8X30  
RIGHT: ASAHI PENTAX ON PLASTIC STAND FOR USE AS A MICROSCOPE



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## MONOCULARS (MADE IN JAPAN) AS MAGNIFIER/MICROSCOPE

### Monokijkers

#### Golf 5 x 20 en 7 x 20

De Golf is een wel heel aparte kijker. De ergonomische gevormde monokijker is slechts met een hand scherp te stellen via een kantel mechanisme. Zo blijft de andere hand vrij voor andere dingen. Een zeer handige kijker die je gemakkelijk bij je steekt! De Golf biedt u een haarscherp en helder beeld vanaf 2 meter. Maar hij biedt meer... Bij de 5 x 20 kan een standaard met 3x vergrotende loep geleverd worden. Er ontstaat zodoende een 15x vergrotende zakmikroscoop welke ideaal is voor veldwerk en onderzoek van o.a. munten, postzegels, mineralen, enz. Ook voor low-vision biedt deze kijker tal van mogelijkheden.



**Bynolyt 5x20 monocular with 3x enlarging magnifier.  
Placed on a stand it is a 15x magnifying microscope.**

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**MONOCULARS (MADE IN USSR) AS MAGNIFIER/MICROSCOPE. MAGNIFICATION CAN BE CHANGED USING DIFFERENT LENSES CONNECTED TO THE OBJECTIVE**



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**MONOCULARS (MADE IN USSR) AS MAGNIFIER/MICROSCOPE  
BOX CONTAINS DIFFERENT LENSES WITH DIFFERENT MAGINIFICATIONS**



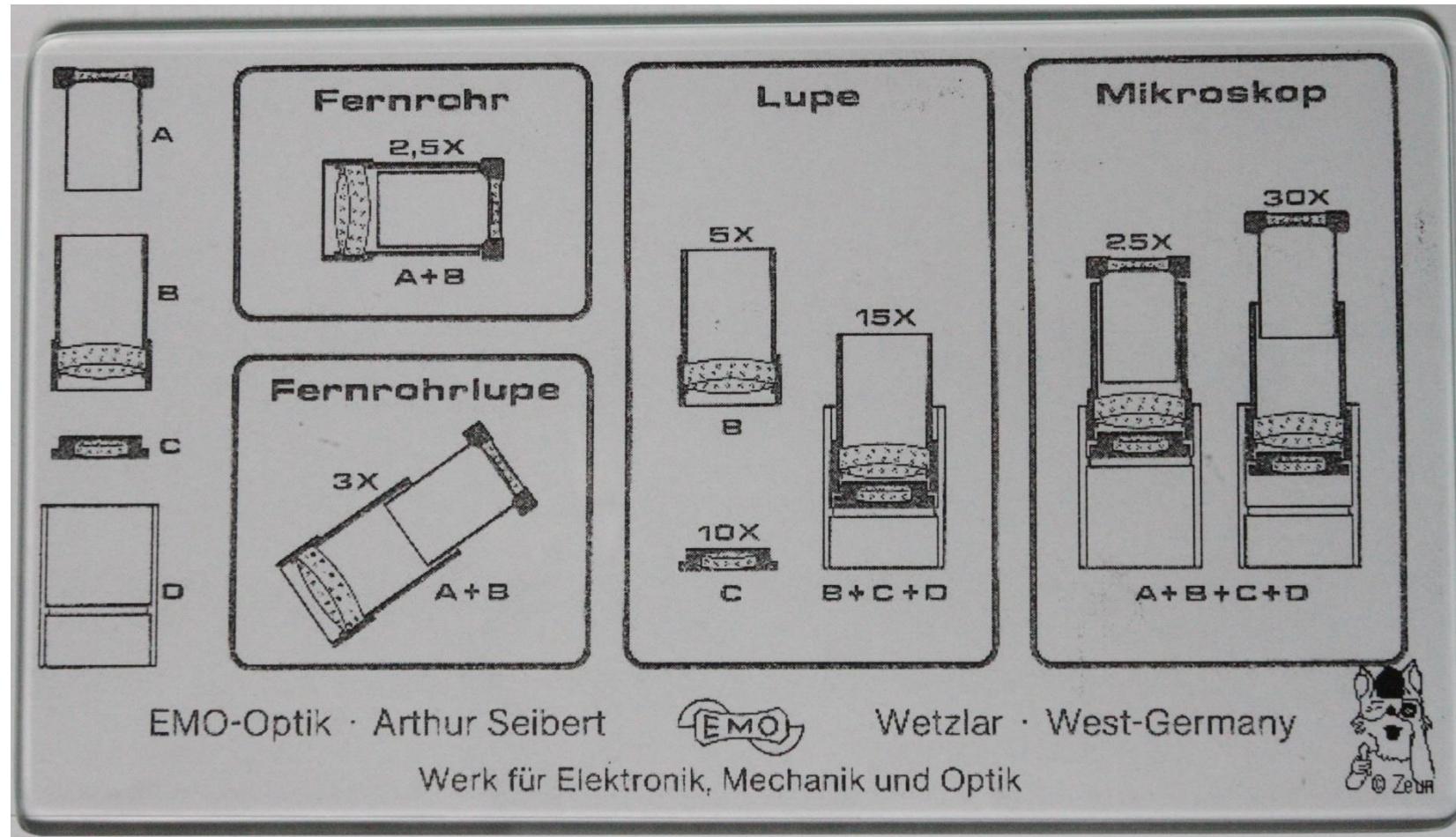
(95)

## SEIBERT EMOSKOP: MULTIFUNCTIONAL OPTICAL INSTRUMENT: MICROSCOPE AS WELL AS A TELESCOPE, SEE NEXT SLIDE



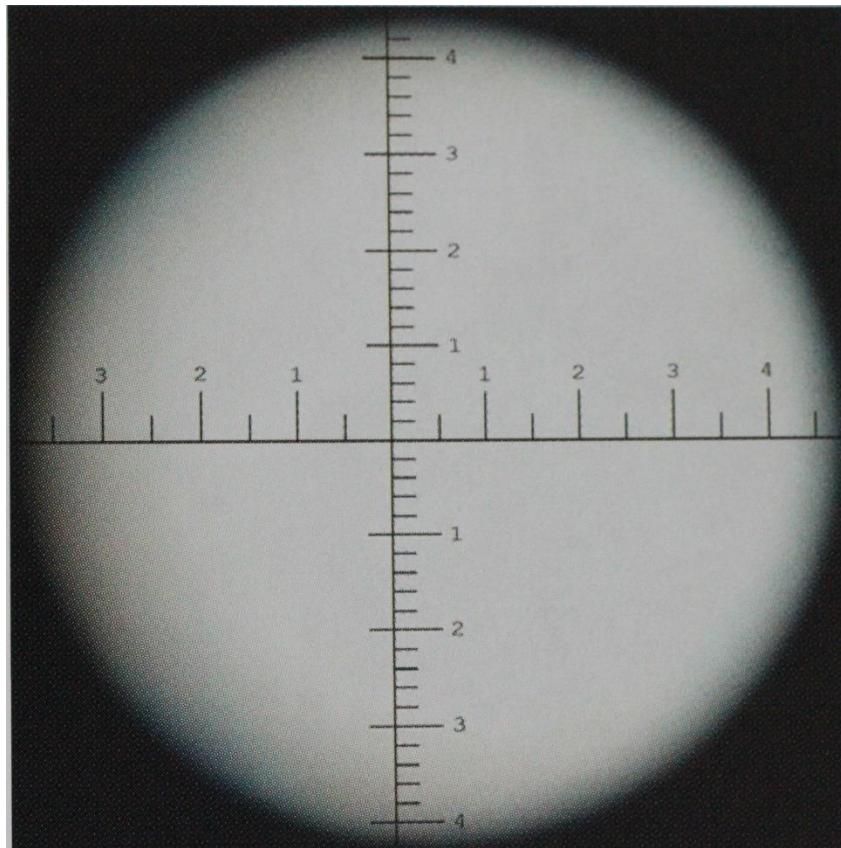
(96)

## ARTHUR SEIBERT EMOSKOP: MONOCULAR, MAGNIFYING GLASS AND MICROSCOPE



## RANGE FINDING AND BINOCULARS

**SIMPLE SYSTEM: RETICLES: RANGEFINDING IS ONLY POSSIBLE BY COMPARING WITH OBJECT WITH KNOWN SIZE/DIMENSIONS**



### Rechner mit Strichplatte

#### Beispiele:

**Bestimmen der Entfernung (E)** eines Hauses, dessen Breite mit 20 m bekannt ist.

Angenommen, das Haus nimmt, durch den Feldstecher beobachtet, 3 Teilungen = 15/1000 m ein, so ist

$$E = \frac{20 \times 1000}{15} = 1333 \text{ m.}$$

**Bestimmen der Breite (B)** eines Geländestückes, dessen Entfernung mit 1800 m bekannt ist.

Angenommen, die Breite des Geländestückes wird, durch den Feldstecher betrachtet, mit 5 Teilungen = 25/1000 m abgelesen, so ist

$$B = \frac{25 \times 1800}{1000} = 45 \text{ m.}$$

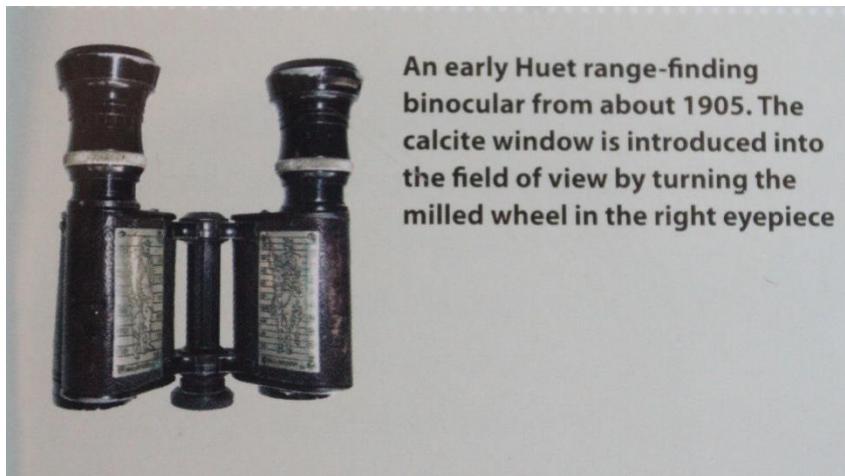
Soll bei gegebener **Höhe** eines Objektes die Entfernung oder bei bekannter **Entfernung** die Höhe desselben bestimmt werden, so wird ebenso verfahren wie in den Beispielen 1 und 2 beschrieben, nur daß anstatt der horizontalen Teilung mit der vertikalen Teilung von Ausführung 2 und 3 gearbeitet wird. Falls diese nicht ausreichen sollte, wird der Feldstecher um 90° gedreht und einäugig abgelesen.

Um einem Kunden den Wert der Strichplatte überzeugend nachweisen zu können, ist es am besten, ein Zeissglas mit Strichplatte auf Lager zu halten. Wir empfehlen dazu das Silvamar. Bestellungen richte man an unsere Abteilung Telez oder an die zuständige Zweigstelle.

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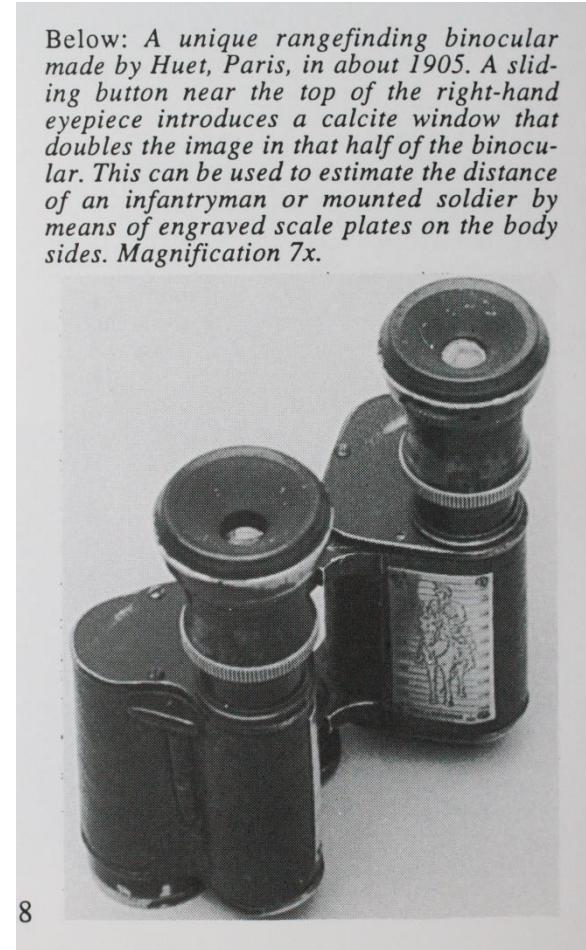
## BINOCULARS WITH BUILT-IN RANGEFINDERS

### EARLY RANGE FINDING BINOCULAR MADE BY HUET IN 1905



An early Huet range-finding binocular from about 1905. The calcite window is introduced into the field of view by turning the milled wheel in the right eyepiece

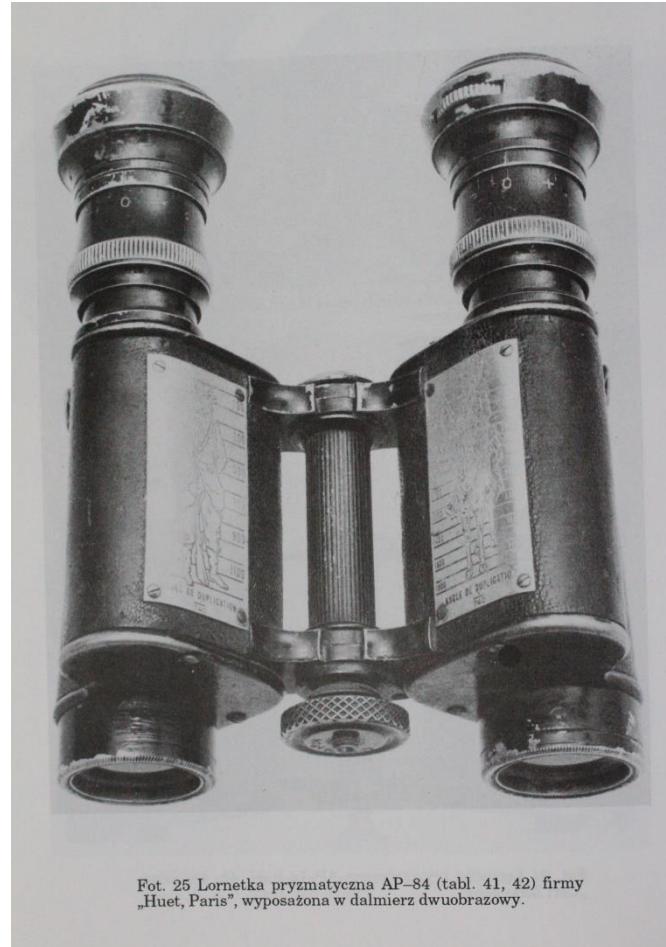
*Below: A unique rangefinding binocular made by Huet, Paris, in about 1905. A sliding button near the top of the right-hand eyepiece introduces a calcite window that doubles the image in that half of the binocular. This can be used to estimate the distance of an infantryman or mounted soldier by means of engraved scale plates on the body sides. Magnification 7x.*



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## BINOCULARS WITH BUILT-IN RANGEFINDERS

THE SAME RANGE FINDER BINOCULAR PRODUCED BY HUET IN 1905 IS SHOWN  
IN A POLISH BOOK ON BINOCULARS, SO IT SEEMS RATHER SPECIAL



Fot. 25 Lornetka pryzmatyczna AP-84 (tabl. 41, 42) firmy  
„Huet, Paris”, wyposażona w dalmierz dwuobrazowy.

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## BINOCULARS WITH BUILT-IN RANGEFINDERS



LEICA GEOVID 7X42 BDA RANGEFINDER BINOCULAR, WITH INCORPORATED INFRARED LASER AND AN ELECTRONIC COMPASS. INTRODUCED IN 1992



*Leica Geovid 7 x 42 BDA binocular. This instrument incorporates an infrared laser rangefinder and an electronic compass.*

### Catalogue numbers

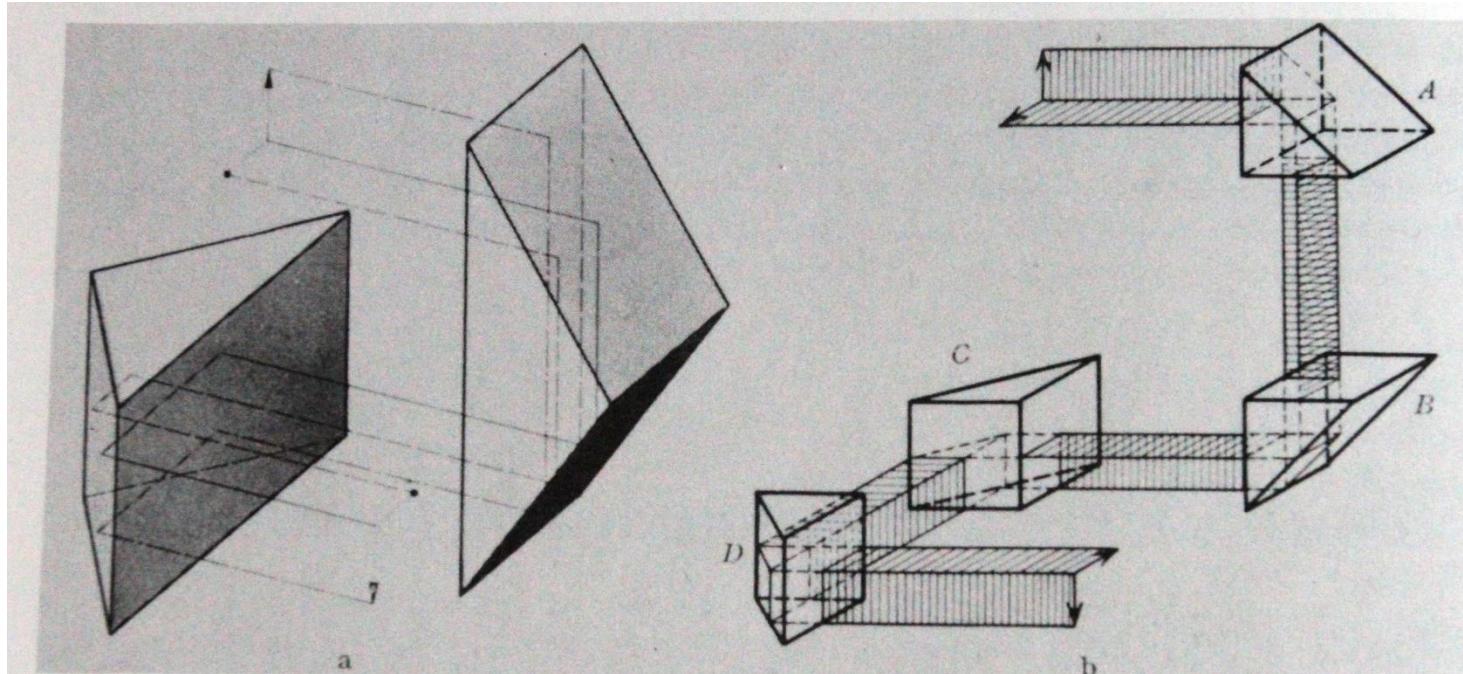
40022 — Geovid 7 x 42 BDA.

40023 — Geovid 7 x 42 BD.

40024 — Geovid 7 x 42 BD (yard) measurements in yards.

# BINOCULARS WITH BUILT-IN RANGEFINDERS

FIRST LEICA GEOVID 7X42 RANGEFINDING BINOCULAR (1992) USED  
PORRO PRIMS SEE FIGURE



*Ein Porro'sches Umkehrprisma erster Art*

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\* ) Die Patentschrift trägt den Titel „Gewisse Anwendung von totaler oder gewöhnlicher Reflexion des Lichtes an durchsichtigen Flächen allein oder in Verbindung mit Brechung“.

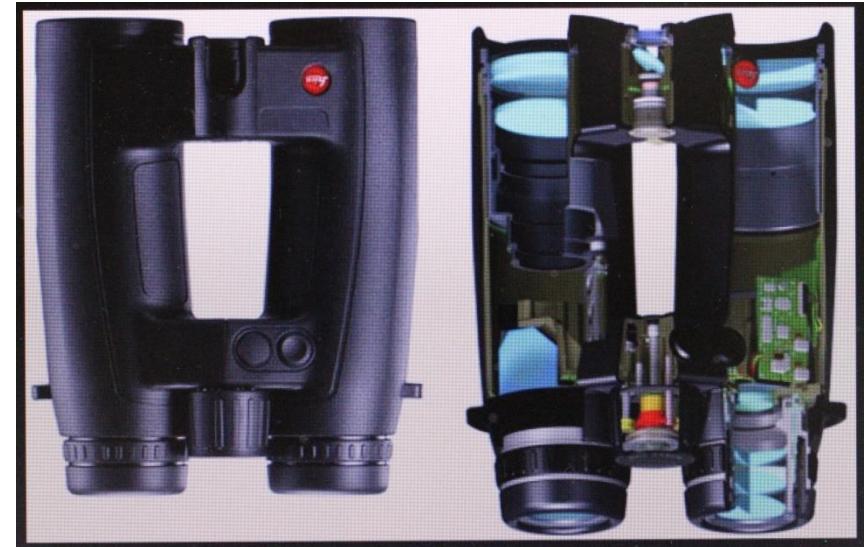
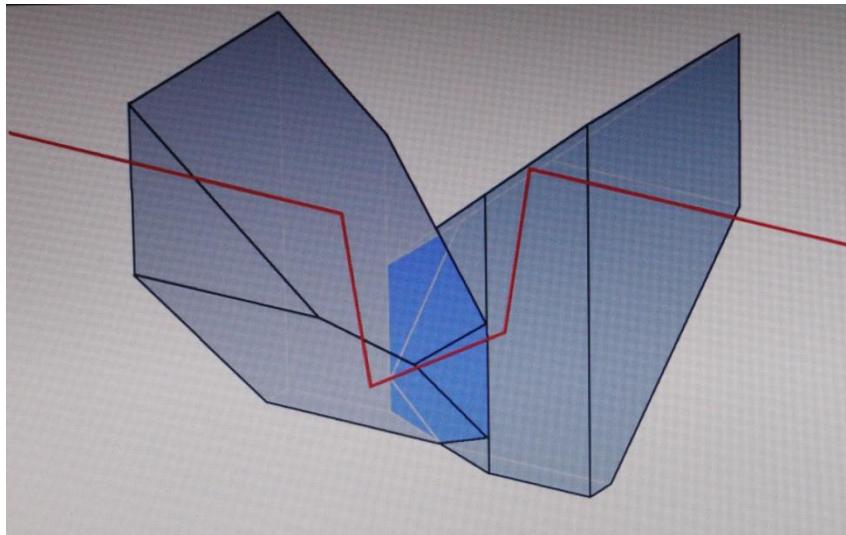
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## BINOCULARS WITH BUILT-IN RANGEFINDERS



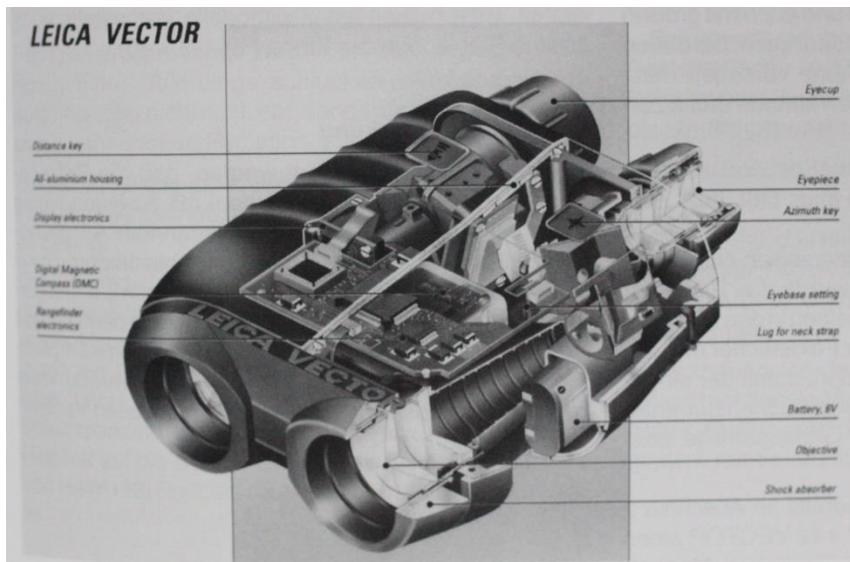
LEFT: PORRO PRISM SYSTEM MODIFIED BY PROF. PERGER IN 2013 (PATENT)

RIGHT: PORRO-PERGER SYSTEM IN A NEW LEICA GEOVID RANGE FINDING BINOCULAR:  
VERY ELEGANT SHAPE AND VERY GOOD OPTICAL PERFORMANCE (2012).



**BINOCULARS WITH BUILT-IN RANGEFINDERS****LEFT: LEICA VECTOR RANGEFINDER BINOCULAR**

**RIGHT: VECTOR RANGEFINDER BINOCULAR FOR MILITARY USE. 25.000 US. DOLLARS,  
MEASURES DISTANCES UP TO 25 KM USING A 1550 NM INFRARED LASER.  
INVISIBLE FOR EYE AND FOR NIGHT VISION EQUIPMENT**



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## BINOCULARS WITH BUILT-IN RANGEFINDERS



MEOPTA MEORANGE 10X42 HD RANGEFINDER BINOCULAR (2016) WITH MANY OTHER FEATURES LIKE COMPASS, THERMOMETER, ATMOSPHERIC PRESSURE METER, TILT FUNCTION DETERMINATION ETC.



## BINOCULARS WITH BUILT-IN RANGEFINDERS

**MINOX 7x50 DCM/DC RANGEFINDER BINOCULAR WITH ADDITIONAL:  
DIGITAL COMPASS, TILT FUNCTION, DIGITAL BAROMETER, HEIGHT MEASUREMENT,  
DIGITAL THERMOMETER, TIMER AND STOPWATCH**



<p><b>BN 7x50 DCM / DC</b> REVOLUTIONÄR. INNOVATIV. DIGITAL.</p>  <p>BN 7x50 DC</p> <p>Das BN 7x50 DCM ist das Flaggschiff der MINOX Nautik Linie und überzeugt mit seiner innovativen Ausstattung. Auf Knopfdruck liefert ein zentrales Multifunktionsdisplay alle wichtigen Informationen, die auf hoher See benötigt werden. Vorteil: Beobachtetes Objekt sowie Kompassanzeige bleiben immer im Mittelpunkt der Aufmerksamkeit.</p> <ul style="list-style-type: none"> <li>- Herausragende Optik für ein Höchstmaß an Brillanz, Klarheit und Kontrast</li> <li>- Digitale Kompassanzeige im Zentrum des Sehfeldes</li> <li>- Tilt-Funktion zur Bestimmung der Höhe oder Entfernung beobachteter Objekte</li> <li>- Barometeranzeige/Luftdruckverlauf der letzten 8 Stunden</li> <li>- Temperaturanzeige und -verlauf der letzten 8 Stunden</li> <li>- Digitale Uhr und Stoppuhr mit Zwischenzeit-Funktion</li> <li>- Wasserdicht bis 5 m und dank Stickstoff-Füllung beschlagfrei</li> <li>- Griffiges, robustes Gehäuse - ideal für den rauen Einsatz</li> <li>- Durch Einzel-Okulareinstellung ab 12 m bis unendlich scharf</li> <li>- Hohe Plastizität für eine räumliche Abbildung</li> <li>- Gewicht: 1250 g</li> </ul> <p>Erhältlich als:</p> <p>BN 7x50 DCM, schwarz oder weiß BN 7x50 DC, schwarz oder weiß</p> <p style="text-align: right;">COMFORT SERVICE</p> <p>Ab € 559,- UVP</p>	<p><b>BN 7x50 DCM / DC</b> DAS MULTIFUNKTIONS-DISPLAY.</p> <p>Digitale Kompass-Anzeige im Zentrum des Sehfeldes (DCM und DC)</p> <p>CMP + SE 134°</p> <p>Tilt-Funktion: Anzeige des Neigungswinkels (DCM und DC)</p> <p>TLT + - 12°</p> <p>Digitales Barometer mit Aufzeichnungsfunktion (nur DCM)</p> <p>BAR inHg 2765</p> <p>Höhenmesser (Altimeter) (nur DCM)</p> <p>ALT m 1265</p> <p>Digitales Thermometer (nur DCM)</p> <p>TEMP 39°C</p> <p>Uhr und Stoppuhr (nur DCM)</p> <p>TIMER 34508</p>
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## BINOCULARS WITH BUILT-IN RANGEFINDERS

**8X56 RANGEFINDER BINOCULARS + ADDITIONAL WIRELESS OPTICAL COMMUNICATION SYSTEM.**

*LEFT: LEICA GEOLUX , RIGHT: TORREY PINES LOGIC B22*



**FOR THE OPTICAL COMMUNICATION TO WORK SENDER AND RECEIVER MUST BOTH HAVE A  
BINOCULAR. PRICE FOR TWO = 22.000 EUROS**

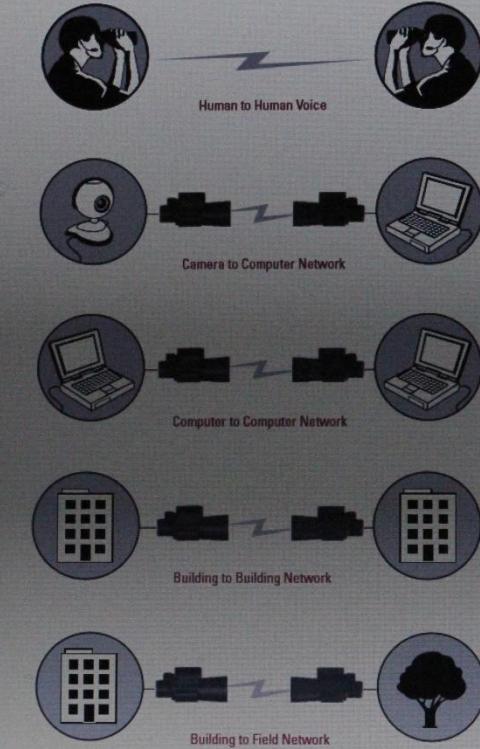


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## BINOCULARS WITH BUILT-IN RANGEFINDERS

### USER OPTIONS FOR THE 8x56 BINOCULARS WITH OPTICAL COMMUNICATION SYSTEM

Voice Communication	16 - 32 - 64Kbps
Data Communication	Up to 1Mbps
Data Interface	USB
Operating Distance	Up to 2miles (3.2km)
Transmitter	IR LED (no laser)
Optical Spectral Band	Custom from 300nm to 2000nm
Field-of-View	6.8°
Headset	Any COTS
Size	153mm x 80mm x 182mm
Weight	1,230 grams
Mounting	Handheld, tripod
Power Supply	3 AA batteries or 5V DC, 2.5W
Operating Temperature	-20°C to +60°C
Storage Temperature	-40°C to +80°C
Magnification	8X
Front Lens Diameter	56mm
Exit Pupil	7mm
Field-of-View	118 meters at 1,000 meters
Eye Relief	18.5mm
Close Focusing Distance	5.6 meters
Diopter Compensation	+3.5 diopters



Human to Human Voice

Camera to Computer Network

Computer to Computer Network

Building to Building Network

Building to Field Network

For more information email us at  
[info@tplogic.com](mailto:info@tplogic.com)



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THE "CARTRIDGE" IN THIS PICTURE IS AN 8X17 POCKET TELESCOPE



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