
Production changes in Zeiss binoculars from 1907 to 1917:

Collectors are mainly concerned with looking for rare and unique types of (Zeiss) binoculars and are not paying much attention to the commonly found mass production Porro I models like the 6 X 30 Marineglas/ Jagdglas (later Silvamar, DF 6 X 30), Telex 6 X 21 (later 6x24 or D.F. 6 X 24), Telact (8 X 24)/ (DF 8X / DF 95 n/A), Turact (8 X24)/ (DF 8X / DF 95 n/A), and Telefort (12 X 30)/ (DF 12 X). In these models, however, we can best see the evolution in design, and small production changes that took place until the end of World War I.

These changes can also be found on more rare Porro-I-models such as the 8 X 40, 12 X 40, 16X 40 and 7 X 50 (BINOCTAR). It is my goal, to help my fellow collectors to appreciate their collectors items, and be able to observe the different phases in production as far as I can distinguish them..

I appreciate that not everybody may be concerned with all the details of his particular binocular and he may be just happy to display it. In this context my notes will be yet another example of the gathering of information on a subject nobody is really interested in or cares about.

I have, however, found the recording of the subtle and not so subtle changes that took place, helpful in examining the binoculars of the World War I period and establishing whether they are genuine or mixed together with different parts from different binoculars (whether in the trenches or through the hands they have been passing through later on until they found their place in someone's collection). Binoculars have at all times been mixed with parts from other binoculars, and sometimes not even of the same kind of binocular or the same producer. Zeiss binoculars of the wartime period, especially from 1916 to 1918, often have parts from earlier Zeiss binoculars and seem to have been repaired in field repair units.

In addition to these field repairs we often see today at flea markets, in antique shops and naturally on ebay binoculars that are definitely tuned up by the dealer to look better – using parts of the same model, but from a different production phase. I have therefore tried to outline some general changes in the details of the binoculars within the mentioned time scale, starting with the new Zeiss models which were introduced after the era of the early "Feldstechers".

There are 3 or 4 parts on the binoculars where we can best see production changes over the passage of time. These are:

- 1.) Body plates and housing of the objectives (illustr. 1,4,5,6,9)
- 2.) Diameter and shape of the ocular lens (such as with the Silvamar) (illustr. 2,8)

- 3.) The shape of the knurling (part of the ocular unit) (illustr. 3,7)
- 4.) Number of the screws to fix the top (and bottom) prism plates (illustr. 2,8)

The changes did not occur with all types of binoculars at the same time, the introduction of a new design varies with the different types, however they all move along a certain main line.



Explanation of the binocular parts on a 1910 CARL ZEISS JENA – MARINEGLAS (ser. no. 189.016)

A: Compilation of changes

Time line: 1907 08 09 10 11 12 13 14 15 16 17 18

objective

- housing: a) Objective tubes are integrated with the the bottom plates :
 |-----|
- b) two unit objective housing : (* only Zeiss London)
 |-----|-----|-----|
- c) one unit objective housing:
 |-----|
- d) grooves to reduce reflections at the rim of the objectives
 |-----| (-----*)
 (* Zeiss Wien, Györ, London, (London)Ltd)

lens

- diameter: a) Silvarmar: ocular lens flat, diameter 13 mm:
 |-----|
- b) Silvarmar: ocular lens convex, diameter 11 mm:
 |-----|

- Knurling: a) knurling horizontal and vertical:
 -----| (-----|*)
 (* Zeiss Wien, Györ, (London)Ltd)
- b) knurling diagonal:
 (|-----|*) (* only Zeiss London)
 |---| |-----|

Screws:

- a) 3 screws on top and bottom prism plates: untill 1916 less frequent after late 1917
 -----|-----|-----|-----| (-----|*)
 (* Zeiss Wien, Györ, (London)Ltd)
- b) 1 screw on top and bottom prism plates:
 |-----|

Materials:

- a) zink parts: first plates, objective housings, ocular housings :
 (Jena, Wien, Györ, not London !) |-----|
- b) natural leather replacing synthetic leatherette covers:
 (Jena, Wien, Györ, not London !) |-----|

Time line: 1907 08 09 10 11 12 13 14 15 16 17 18

B) Description:

1907: Phase I (starting with serial number about 120.000)

- a) Objective tubes are integrated with the the bottom plates. –
- Up to 1909 for SILVAMAR - serial number 170.000*/ (*for the 6 X 30 Binocular Prismatic, Mark II, Mag.6x dated 1909).
 - Up to 1908 for TELACT – serial number around 160.000
 - Up to 1909 for the TELEX (ser. number 163.000)

Thus the change happened slightly earlier with the TELACT and with the TELEX/DF 6 x (21) than the SILVAMAR.

- b) The rim of the objective tube is flat, there are grooves inside to reduce reflections on the objectives (grooves are used in Jena up to 1915, in other production sites untill end of WWI)

(Also found on the DF 6X (21), Telex, and on the 8 X 24 Telact)

- (up to 1908/1909)



illustr. 1 solid union of bottom plate and objective housing (ex: DF 6 X (21) # 135.772)

- c) The diameter of the ocular lens measures 13 mm (Silvamar, Telact).
The lens is flat. (Up to the middle of 1913 for the Silvamar, until 1915 for the TELACT: the TELACT lens diameter apparently never changed.



illustr. 2 large ocular lens (ex. 6 X (30) Marineglas, # 150.833)

- d) The grooves (knurling) on the eyepieces (where you turn for focusing the binocular) are vertical and horizontal. (Still using the old model of 1903/1904
- until 1913 with Zeiss Jena, however different long periods of use with the

other production sites.)



illustr. 3 horizontal/vertikal knurling

e) 3 screws on the top and lower prism plates (until perhaps the autumn 1917?)
(compare illustr. 11)

f) The (ocular) tube inside the prism housing is still present, going from the lower prism up to the top plate – as it was inside the early Feldstechers.
(Up to perhaps 1909?)

(Examples: 6X 30 Imperial Marine markings serial number 146.424 / “Marineglas” serial number 150.833)

According to Hans Seeger, the last serial numbers for this phase with the solid bottom plates and integral with the objective tubes are found on the 1909 dated Silvamars supplied to the British Army (Binocular Prismatic MkII), where the Zeiss logo is found on the bottom plates - going up to serial number 169.000 (serial number 167.000 according to information from Thomas Antoniadis).

1909: Phase II: starting about serial number 170.000*

a) Bottom plates and objective tubes are now separate units.
Objective tube and objective rim are also two separate units.
(- up to 345. 568 CZ J Silvarem)

The objective rim has a square and flat cross- section about 3,5mm on the outside, 3,8mm at the bottom, about 3,1mm on the inside, the inside has grooves. There is a very small screw on the flat rim edge to keep it in place. On early civilian and military binoculars the tubes just have plain black paint on aluminium/ zinc tubes and only the rims are made out of brass. (later examples also have the tubes covered with a brass ring)

In the case of civilian models: tubes and rims sometimes, as it seems on later models, are made out of brass.

It seems that at about the same time or shortly after the appearance of the 2-unit objective tubes, Zeiss introduced the Marineglas/ Silvamar with the short body and the long objective tubes. This type was built until late 1910.

(first examples with long objective tubes in TM collection : serial number 189.016 CARL ZEISS JENA – MARINEGLAS - last serial number 232.246 CARL ZEISS JENA - SILVAMAR 232246 6 X)

The objective tubes are made out of plain aluminium?/zinc (painted black in the case of the military models). The civilian models (mainly) have the leatherette covering on the longer tubes. Later models have brass rings instead of zinc rings (illustr. 5)

Zeiss subsequently returned (late 1910) to the first design with the long body and the short objective tubes, but kept the 2-unit objective tubes for the following model (until 1913 and perhaps later).



illustr. 4 early : zinc/brass



illustr. 5 late: brass/brass

Two-unit-objective housing: first recorded serial number 160.797, with a TELACT (information: Thomas Antoniadis)- last (so far known) serial number : 389.346 CARL ZEISS LONDON 1914(r) - Binocular Prismatic No 3 (I) , that means that in London this 2-unit-housing was produced at least 1 year longer than in Jena .

Summer 1913: Phase III (around serial number 350.000).

In the summer of 1913 came major changes:

- a) Tubes and rim of the objective housing are now one unit, made out of brass,
with some models made out of aluminium- (the whole binocular still could be ordered in aluminium).
 The rim is now rounded, and still has the grooves inside for reducing reflexions.

(first example in TM coll.: serial. number 358.469 CARL ZEISS JENA - DF 6 X 358469, another example being a Telactem 8x serial number 365.235)



illustr. 6 single unit objective housing with grooves

- b) At about the same time the knurling on the oculars is now worked **diagonal** instead of vertical and horizontal ,so that it forms small diamonds instead of the former squares .

- first use of diagonal knurling (so far known) was as early as 1912 on a very rare 6 X 20 (DF 6 x) ser. nr. 258795, which seems to belong to a small series of DF 4 X and DF 6 X with small prism housing and 20mm objectives. (first other example: CARL ZEISS JENA - MARINEGLAS 6 X, ser. No 326157 - coll. W. Puchbauer, then widely found with ser.nrs. higher than 340.000)



illustr. 7 diagonal knurling

(There is an exception to this in the collection of. T.M.: Zeiss **London** Silvarmar serial number 299.390 - but it is uncertain, - the lens diameter is still 13mm, and perhaps the ocular housing was replaced on this particular binocular since a nearby Zeiss London Silvarmar with serial number 299.022 has the proper horizontal/ vertical knurling)

However the vertical knurling most likely was first introduced with the 6 X 24 Zeiss **London** - Binocular Prismatic No 3 (Mk I and II) as early as 1912 (Ex.: # 303.857 BINOCULAR PRISMATIC No3 (MARK I) MAGNIFICATION 6 No. 2148 - CARL ZEISS LONDON 1912)

Untill the British takeover of the Zeiss plant in Summer 1914 all 6 x 24 had the vertical knurling, – the civilian models however seem to have the vertical and horizontal until 1914. Then all Zeiss (London) Ltd. Binoculars later on take the vertical and horizontal knurling – even after being renamed Ross London (Mill Hill) and Ross London.

- c) The optical unit of the oculars must have been redesigned with the diameter of the last, visible ocular lens being reduced to 11 mm (on the Silvarmar), and now mildly convex (instead of plane).



Illustr. 8 small ocular lens (compare to illustr.2)
 (first - so far known- serial number : Carl Zeiss Jena (l)– Marineglas 354825 (r))

Attention: from now on there are differences in the different optical sites:
 Zeiss Györ, Zeiss London ?? , Zeiss Wien changed the diameter of the ocular lens to 11 mm (Silvamar), but did not change the knurling on the oculars. These remained horizontal/vertical until 1918 in GYÖR and WIEN.

It is uncertain if Zeiss London Silvamar binoculars in the range of serial numbers L357000 to L357999 (after 1914) were produced and if it was the case, I would think that the lens diameter was not changed.

All Zeiss (London) Ltd *, Ross Mill Hill and even the later Ross (Zeiss pattern) I have seen (TM), all have the horizontal/ vertical knurling. The same applies to all Zeiss Györ and Zeiss Wien, I have seen so far.
 (ex: Zeiss Györ ÜK 4.4.18 – M 9/13 Z (= 6X 30) Nr. 851.119)

After the change – perhaps after all German personnel left the factory in August 1915 with the production being subsequently run by British personnel from then on - the production of horizontal/ vertical knurling (instead of diagonal knurling) was reestablished .

- I do not have knowledge about Zeiss St. Petersburg, because I have not see binoculars from there with a serial number higher than 350.000 to compare (T.M.).

Middle? of 1915: Phase IV (around serial number 450.000/ 500.000)

- minor changes:
 - a) Now the grooves at the rim of the objective housing disappear, the rim from now on is rounded and smooth (- until 1945)
 (first examples in TM collection: serial number 498.514 CARL ZEISS JENA - DF 8X 498514 ; serial number 515.827 CARL ZEISS JENA - MARINEGLAS 515827) TURACTEM 8 X, serial number 439.625 (coll. W. Puchbauer)
 (DF 8 X (24 = Turact) ser. nr. 471.271)



illustr. 9 - round housing without grooves (ex.:CARL ZEISS JENA - DF 8X (= Telact), # 498514)

Zeiss Wien, Györ, and(London)Ltd. continued to produce the objective housing with grooves inside.

The Zeiss (London)Ltd. 6 X 24 binoculars have the one-unit-objective housing after 1914, yet I have no hint as when the change from the two-unit-objective housing occurred.

Around Serial number 610.000 (Summer 1916) many parts that formerly were made out of brass are now made from a zinc alloy: top and bottom plates, washer, objective tubes, ocular unit.

(The first recorded example being a DF6X24 serial number 620.756, first examples (T.M. collection) with no parts in brass: sr.no.662.336 CARL ZEISS JENA - DF 8 X 662336 ;ser.no. 694.425 CARL ZEISS JENA - MARINEGLAS 694425 6 X).

It seems that with civilian models zinc plates were introduced even earlier, presumably around serial number 600.000:

(ex: Carl zeiss Jena – BINOCTAR 610.745 7 X), this would date to summer 1916.

The number range between 610.000 and 650.000 includes examples made from brass, examples made from zinc and examples made from zinc and brass the latter presumably to use up the last stocks of brass parts.

Some zinc parts are regularly found on earlier binoculars, It is not clear, however, if they were produced in the way they show up today. But we can assume that during wartime binoculars were produced with mixed materials.

Since we will never know at what time parts of a binocular were changed with parts of other binoculars – later or earlier ones -, it is difficult to say, when exactly the first zinc parts were produced to replace the more expensive and - during the ongoing war - rare and restricted brass, which was essential for the military production of all types of equipment and ordnance and badly needed by the imperial army and navy.

On the other hand, brass was used by other companies like Goerz and Rodenstock for their binoculars all through the war. (Richard Faltermair informed me, that the units that ordered binoculars had to declare their demand of restricted materials like brass to the War Material Department, which then portioned the raw materials to the producing company.)

At the same time, in late 1916, the leatherette covering was replaced by natural leather starting at about the same serial number 650.000 (= Nov./Dec. 1916).

After the end of the war (1918) leather was used for covering the binocular body for some time, then again it was replaced by a synthetic leatherette cover.

(ex. zinc plates and leather cover: T.M. coll. : serial. No. 1.050.375 CARL ZEISS JENA - BINOCTAR 1.050.375 7 X)

The thick textured paint that covered the body of the Galilean “Fernglas 08”, also found on the 4 X 20 monocular (“Blink 16”) can also be found on some Zeiss binoculars of the late wartime period.

So far there is at least one proof of the use of this body cover on a military 8 X 24 monocular (Turact- type) with the above mentioned painting and an olive finish.

(T.M. coll.: ser. no. 1.038.376 : CARL ZEISS JENA (achromat) 1.038.376 8X 0466)
 There is a second proof with a C.Zeiss Wien – M9/13 Z (without serial number),
 which seems have to been produced shortly after WWI (coll. Peter Schmoll).

The knob under the lower bridge on military binoculars that was used to fix the interocular distance by fixing the bridge between the two parts of the binoculars was made out of brass (design of 1903/1904) until late 1916 and seems to have been worked out of steel from then on.

First serial numbers with steel knob:

(T.M.coll.: 639.043 CARL ZEISS JENA (l) - DF 6 X 639.043 (r) – uncertain, the binocular does not look sound - and ser. no. 657.491 CARL ZEISS JENA (l) - DF 8 X 657491 (r))

We can thus assume that the use of steel to produce the fixing / tightening knob happened at about the same time as the introduction of zinc plates (between serial numbers 620.000 and 660.000).

As far as I can see there is no system in the working on the engravings after 1907.

From 1907 until 1916 the inscriptions inside the achromatic lens cell and next to them were inlayed with silver (or some similar metal). With the introduction of the zinc plates, the inscriptions were inlayed in general but not always with a white colour.

A slightly unusual DF 12 x 40 , serial number 450.313 , CARL ZEISS JENA (l) - D.F. 12 X 40 450.313 (r), just has engravings without the silver inlay – this could be due to the use of aluminium plates, these apparently were never inlayed with silver.

Instead of silver from now on a white colour was used to fill the engravings. Silver inlay in the script disappears with the zinc top plates – around serial number 650.000, yet it seems to reappear for a short time in spring 1917:

(ex. T.M- coll: ser. no. 735.821 CARL ZEISS JENA (l) - DF 6 x 30 735821 (r))

This binocular has silver script inlays although the plates are made out of zinc.

Note: Zeiss London and (London) Ltd. Binoculars , which never used zinc parts have silver inlays until 1918 – with so far one exemption: in late 1917 the 6 X 24 seem to have had just a greenish- white color inlay

(ex.: # L459.467 BINOCULAR PRISMATIC No3 MK II MAGNIFICATION 6

No.3800 - CARL ZEISS (LONDON) LTD 1917)

then the subsequent 6 X 24 Ross (Mill Hill) start again with silver inlay in 1917.

(ex.: # L460.243 BINOCULAR PRISMATIC No3 (Mark II) MAGNIFICATION 6

No.4467 - ROSS, LONDON (MILL HILL) 1917)

Zeiss Jena as well as Nedinsco Zeiss went back to silver inlay for some time after the war, when using brass prism plates.

Autumn 1917: Phase V (uncertain)

There seems to be a general change from 3 screws to 1 screw on top plates of military binoculars in summer 1917,

however with civilian models the 1- screw plates seem to appear even earlier- in early 1916: (ex: ser. no. 590.237 SILVAMAR 6 X , and serial no. 610.745 BINOCTAR 7 X) the first one having one screw on top and bottom plates, the later one having 1 screw on top and 3 screws on the bottom plates.

a) Military binoculars: the upper prism plates are now fixed by just 1 screw. (I (T.M.) so far cannot track it down exactly; this change was done between serial number 818.348. and serial number. 840.400, that would mean between Oct. and Dec. 1917)

last example with 3 screws in T.M. coll.:

- CARL ZEISS JENA - DF 6 x 24 777.288 - (3 screws)
- CARL ZEISS JENA - DF 6 x 24 818.348 – IX/ 1917 (3 screws) (Coll.: P.Schmoll)



illustr. 10 - 1 screw on top plate -
(- CARL ZEISS JENA - DF 6 x 30
844.274, Dienstglas XII 1917 -)



illustr.11 - 3 screws on top plate -
(- Carl Zeiss London – TELACT 351.616 -)

first example with 1 screw in T.M. coll.:

- CARL ZEISS JENA - DF 6 x 24 840.400 (1 screw),
- CARL ZEISS JENA - DF 6 x 30 844.274, Dienstglas XII 1917 (1 screw)

Later on and in the case of some binoculars, Zeiss apparently went back to have the bottom plates fixed with 3 screws, while the top plates only had 1 screw. (Richard Faltermair told TM that the body still has 3 holes – even when there was just 1 screw used) and with some binoculars the use of 3 screws on top plates was reintroduced in 1918:

ex: ser. no. 952.944 CARL ZEISS JENA (I.) – D.F. 6 X 30 952944 (r) - This binocular having 3 screws on top and 1 on the bottom plates. More frequently are found binoculars with 1 screw on top and 3 screws on bottom plates.

In the 1920's, in general, there was only 1 screw used to fix the plates to the body, using the ocular tubes to hold them in place at the other end. But there are still binoculars with 3 screws on the bottom plates.

Thus within a long range of numbers (590.000 and 1.000.000) we find both types – and there is no clear system as far as can be ascertained.

Could the binocular specially ordered – was it dependent on material supplies or was there no clear order on how to produce the binoculars?

Since the change from 3 to 1 screw was earlier with civilian binoculars I would assume, that in this sector the saving of material was more enforced as in the sector of military binoculars. We do not know why in 1918 there was more material at hand,

but there is at least one binocular left that proves that the line was not strictly followed- which makes it difficult to figure out patterns that can describe definite production changes.

With some hesitation I would suggest the serial number around 830.000 for the more general change from 3 to 1 screw with the mentioned models (Porro I – binoculars with the standard Zeiss shape)

b) With the military binoculars of the same period, between roughly serial numbers 700.000 and 800.000 - most likely around 750.000 and the time of about June to August 1917, the inscription "Dienstglas" appears on the left prism plate above or besides the Zeiss achromat cell. This seems to be connected with the discontinuing of the rim numbers.

I have not examined enough binoculars of that time to determine this with any accuracy (T.M.), the first ones seem to be DF 10 X 50 Abbe König type binoculars
First known example: ser. no. 741.300, DF10x50 Abbe König type, dated IV 1917
(Information by Thomas Antoniades)

First example in T.M. coll.:

747.741 CARL ZEISS JENA VIII 1917 (li) - DF 10 X 50 747741 Dienstglas (re)

However there are (military) Zeiss binoculars with higher serial numbers that do not use the inscription "Dienstglas".

Some of them might have been private purchases, others were supplies to other customers like the Swiss army (for example: serial number 847.552 CARL ZEISS JENA (l) - DF 6 x 24 847.552 (r), having the same serial number in big numerals again on the right bottom plate – a sign that it was in Swiss duty,
another DF 8 X 24, ser. no 801.111, seems to be made for the Turkish army in WWI: CARL ZEISS JENA (l) - DF 8 x 24 801111 (r), with arabic inscriptions on the right bottom plate)

Exception:

As with the other changes, Zeiss Györ, Zeiss Wien and Zeiss London did not introduce the 1- screw plate but still produced their binoculars with the 3- screw-plates until the end of WWI.

Ex: 6 X 30 , ser.no. 851.119 : CARL ZEISS GYÖR Ü.K.4.4.18 (l) – M 9/13 Z
Feldstecher mit Scala 6 fach Nr. 851119 (r)

ser.no. 848.553 : CARL ZEISS WIEN KuK K.M. (= *KuK-Kriegsmarine* ?) Nr.43 (l) -
M 9/13 Z Feldstecher mit Skala 6 fach Nr. 848553 (r)

This seems logical for Zeiss London, because they were under Ross Management at that time. But it is interesting that Zeiss Györ and Zeiss Wien which had somewhat independent production facilities still hung to older fashion and production methods compared with the models from Jena.

Of course I am aware that in future there will be new findings in this area of concern which will precise or repel some or all of my conclusions.

I am very grateful for the help of my collector friends that showed me their binoculars and explained their ideas and theories (not all of them are mentioned in the text). My special thanks do I want to express to Thomas Antoniades, who helped me with many informations and with the English which is not my native language.

Thomas Mix, Nov. 2005