

Unusual construction of optics in some binoculars

by
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Introduction

We have seen many unusual binoculars for the long period of our interest in the binocular fields. We have considered that we can introduce, to our readers, another two models which are remarkable in many ways.

One is very large and was produced in small quantities. It has unusual optics, as well. Because of its measurement, among binoculars enthusiasts, it was named –“King Kong”.

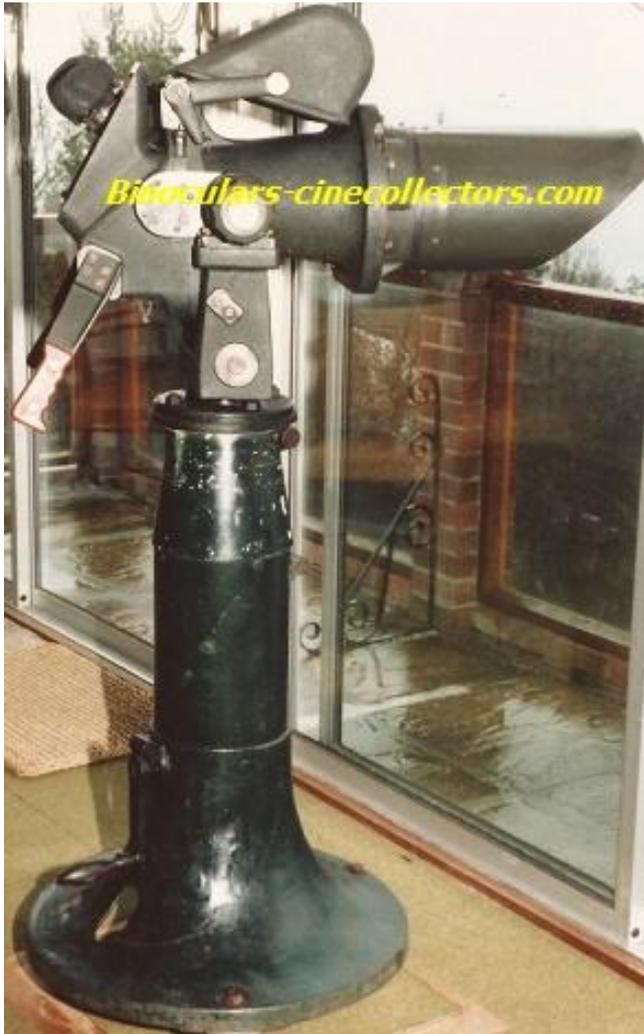
Next one is unusual because of its Bakelite body. It was a challenge for designers of the binocular how to mount the optics into the body.

The prisms are setting in an atypical way for the binoculars construction.

Introduction of the binocular 20 x 160 Ross London “King Kong”

We would like to introduce the largest binocular produced by Ross London, believed in 1945. This binocular is not in our collection; however this model has appeared twice in our house – in 1960s and in recent time.

The first binocular arrived complete; it had a very large mount.



Pict 1; 20 x 160 Ross London "King Kong"; © picture's Terry Vacani

As we can see the mount is in a leg shape. It was fixed firmly to the ship floor or to another base, with 4 large screws.

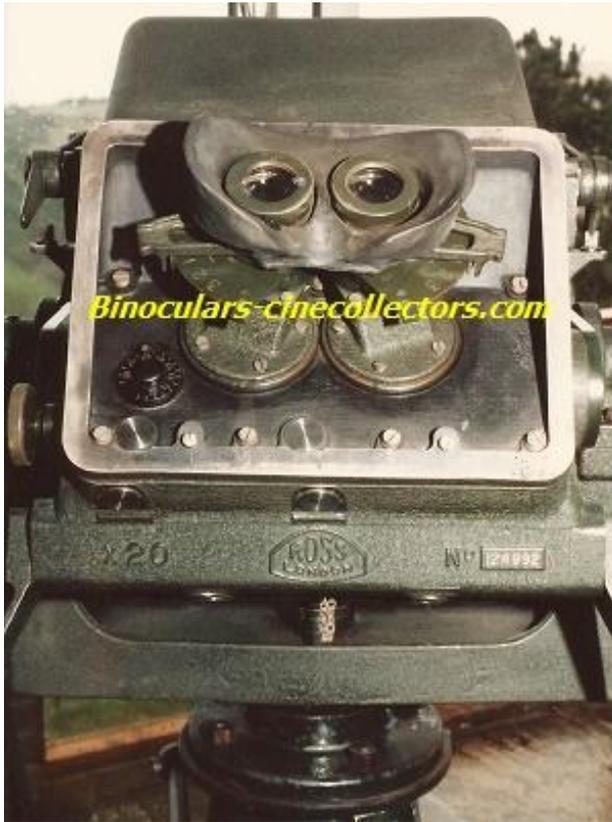
We think that this model could be of interest to collectors and enthusiasts of binoculars, because of its unusual elements.

We believe that there were only 4 of this model produced. The binoculars' historians told us that this model was used by the British Admiralty on the rock of Gibraltar.

This information was given to Dr Hans Seeger, which is published in his "gray" book, page 279.

We have not heard that it was used on Madagascar.

Looking at the production numbers of these two binoculars, it looks that we can confirm 3 of them were manufactured. The first one showed in the picture below, seen in 1960s, had the production number – 124992, and next one seen recently, number 124990.



Pict 2; 20 x 160 Ross London "King Kong"; Prod No 124992; ©Terry Vacani



Pict 3; 20 x 160 Ross London "King Kong"; Prod No 124990; ©Anna Vacani

The binocular contains very exceptional prisms. It is known as 45 degree Schmidt roof prism. We will make a comparison to the other prisms.

External features of the binocular

It is extremely large and heavy binocular. The picture below shows how big it is comparing to the flower (geranium) beside the binocular.

As the binocular is very heavy, the mechanism of the position adjustment contains two parts;

- The operating handle, made from ebonite, in red colour,
- The security system can lock the vertical adjustment.



Pict4; 20 x 160 Ross London "King Kong"; No 124992; ©Terry Vacani

The binoculars' body consists 3 (4) parts;



Pict 5; 3 parts of the binocular; ©Anna Vacani

From left side:

- 1. The oculars are protected by a large alloy cover shielding the lenses from water.



Pict 6; the cover of the 20 x 160 Ross London "King Kong"; © Anna Vacani, ©Terry Vacani

- 2. Optical house with oculars and prisms



Pict 7; the optical house of the 20 x 160 Ross London "King Kong"; © Anna Vacani



Pict 8; the body of optical house of the 20 x 160 Ross London "King Kong"; © Anna Vacani

-3. The objectives mount, large and long hoods, and the body casting.



Pict 9; the objectives with hoods and body casting of the 20 x 160 Ross London "King Kong"; © Anna Vacani

We can say that this element consists of two parts;

- the objectives in the mount and hoods,
- A metal body casting, which is long of 225 mm and 400 mm width. There are not any optical parts installed in this element.

The binoculars' body is manufactured from some kind of alloy. The walls of the body are 10 mm of thickness.



Pict 10; 20 x 160 Ross London "King Kong"; No 124990; ©Anna Vacani

Some parts, such as prism and eyepiece mounting plates, are from brass or gun metal. The hoods are produced from much thinner material. Diameter of the hood is 190 mm. The length of them in the highest side is 300mm.

The weight of the binocular is approximately 50 kg (110.231 pounds);

- The heaviest part is the optical house – 21, 9 kg (48.281235 pounds).
- The cover of the oculars – 3, 5 kg (7.71618),
- The objective mounts with hoods and the metal body casting– 21, 2 kg (46.738 pounds)
- 1 prism – 1, 5 kg (!) (3.30693 pounds)

On the front of the prism house is a description of the binocular – the magnification x20; the producer – Ross London and production number - *Pict 2 & 3*.

[The construction of the optical house](#)

The optical house is constructed in a peculiar technique. Let's see the process of unfolding the optical house into parts.

Uplifting the cover we can see large eyepieces.



Pict 11; the optical house of 20 x 160 Ross London "King Kong"; No 124990; ©Anna Vacani

The body of the oculars are made from brass.

The oculars can be focused from -3 to + 3 dioptr. The scale is marked in big numbers in white colour. It is easy to see them. The adjustment mechanism is designed in a comparable way similar to the Carl Zeiss deck mounted binocular.

http://www.binoculars-cinecollectors.com/8_x_60_Carl_Zeiss_Deck_Mounted_encr_.pdf-> Page 3.

Focusing mechanism in this binocular is similar to the Ross Gun sites; 10x70 and 7 x50.

The focus is adjustable by the levellers at the bottom of the eye lenses. On the focus lever is cut out a small window, which shows the number of focusing on the scale. When the adjustment lever is moved it has a click indentation on the next dioptr marking.



Pict 12; the lever of the adjustment of 20 x 160 Ross London "King Kong"; No 124990; ©Anna Vacani

When the oculars were dismantled we can see the round holes to the prism house.



Pict 13; Eye tubes after dismantled; ©Anna Vacani

Under the plate which is taken apart, visible in the above right picture, we can see other metal plates which hold the prisms in place.



Pict14; the metal plates over the prisms; ©Anna Vacani

Removing these covering plates we can see enormously large prisms.



Pict 15; the Schmidt roof prism of the 20 x 160 Ross London "King Kong"; No 124990 ; ©Anna Vacani



Pict 15; the Schmidt roof prism & a cigarettes' box; ©Anna Vacani

Internal features of the binocular

The binocular is fitted with a roof prism system. The optics in the binocular are fully coated.

First let's look at the eyepieces structure.

The optical system in the eyepieces is unusual. It is in some way different from other constructions of the eyepieces.

The eye tube is fitted with 4 or 5 lenses.



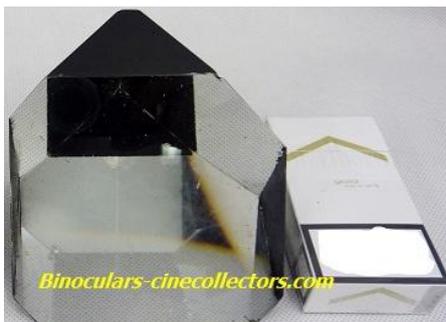
Pict 16; Eye tubes and the relay prism of the 20 x 160 Ross London "King Kong"; No 124990; ©Anna Vacani

At the end of the eye tube it is built-in the relay prism.



Pict 17; the eye tube with the relay prism of the 20 x 160 Ross London "King Kong"; No 124990; ©Anna Vacani

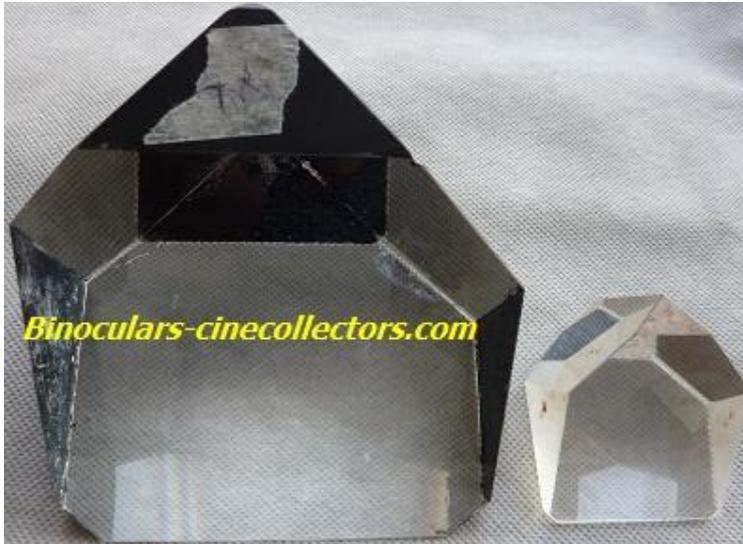
The most unusual aspects of this binocular are roof prisms built into the prism housing. It has a similar design like the 10 x 80 flak glass, but much bigger. It is known as 45 degree Schmidt roof prism.



Pict 18; the Schmidt roof prism & cigarettes' box; ©Anna Vacani

In the above picture we can see the size of the prism comparing with a packet of cigarettes'. The prism is 130 mm tall.

The best comparison of the prism size is on these pictures, where by Schmidt prism is placed the prism of the 10x80 binocular;



Pict 19; the Schmidt roof prism & 10x80 prism; ©Anna Vacani

A few final words about the binocular

The binocular is impressive for its size and its dimensions.

But we have to say that it has a limited focusing adjustment to such big binocular.

The optical construction should be better executed; it was built very cheaply, most probably of the production time.

The binocular was never fitted with a reticule, when it is unusual for a military binocular.

This instrument being made by Ross was not built to the same high standard as a Carl Zeiss binocular.

If the enthusiasts of the binocular possess this model, please let us know. We will be happy to hear and publish your information.

These "King Kong" binoculars were manufactured ca 1945.

We would like to discuss a problem of replacement of the optics in old binoculars.

Looking at the binoculars built decades ago, it is disappointment that currently on the market there is no company which could replace any damaged prisms with similar quality glass.

Presumably, this situation was caused by a new production system of the optics, as we had seen in Wetzlar factories. The prisms and eye lenses are produce in a number at one time.

- II. Bakelite Emil Bush Rathenow - cxn

This model is not in our collection.

The company - Emil Bush, at a time of production of this model, was a part of Carl Zeiss Jena, as CZJ was a major share holder of Emil Bush Company.

It is not the first model, produced by Emil Bush, which surprised us in some way, you can see one on page 9 10x50 Dienstglas cxn - http://www.binoculars-cinecollectors.com/html/body_germ_p9_10x.html#10x50cxnNo397898 .

The body was made from Bakelite. At this moment we can consider that it was the time between 1943-1945 and the materials of which the binoculars were usually built were in deficiency. Presumably, Emil Bush was directed to use a different material to construct their binoculars bodies. Bakelite has different constituency, but the availability and speed of moulding, probably helped to lower the cost of the production.



Pict 1; 6x30 cxn Emil Bush Rathenow – 1943/1945; Prod No 382234; ©Anna Vacani

The field of view of the binocular is 8 50' at 150 meters at 1000 meters.

External features of the binocular

The body was made mainly from reddish brown Bakelite including eyecups, bridges (hinges), and objectives rings. The parts made from metal are: eye tubes, objectives tubes and washers.

In this model the hinge bar is absent, probably due to the savings of the metal.

On the binocular was applied a kind of grease (triangle sign) which was able to protect the binoculars from damages from - 40 C to a temperature up to + 50C.



Pict 2; 6x30 cxn Emil Bush Rathenow – 1943/1945; Prod No 382234; ©Anna Vacani – grease symbol

As we can see in above picture, on the left plate is a description of the producer - war code of Emil Bush, on the right side is Dienstglas (service glass) and magnification – 6 x 30. All the markings are created of Bakelite. The hooks for the binocular straps are formed from Bakelite as well.



Pict 3; 6x30 cxn Emil Bush Rathenow – 1943/1945; Prod No 382234; ©Anna Vacani

The pictures were taken with a flash, and you can observe “ingredients” of the Bakelite.
On the bottom washer is placed production number – 382234.

The binocular is fitted with a rubber rain cover.

Each eyepiece can be focused independently; from -5 to +5 dioptre (Pict1).

Internal features of the binocular

Presumably, the material of the binoculars’ body was the reason for developing a new internal structure of binoculars.

The binoculars 6x30 produced by German Companies in period of the end of 1939 and to November 1940, for instant - in Warsaw –model OPW (‘Optische Präzisions-Werke GmbH’) were built with the internal optic construction like in this picture;



6 x 30 OPW produced in Warsaw 1939

The cxn 6x30 model is Porro I optical construction. Both prisms – top and bottom - have the same shape, but they are in different measurements:

- Top prism is 19 mm width, 40 mm long;

- Bottom prism is 17 mm width and 37 mm long.



Pict 4; 6x30 cxn Emil Bush Rathenow – 1943/1945; Prod No 382234; prisms; ©Anna Vacani

The positioning of the prisms was determined by Bakelite body. The prisms were fixed by stainless still clips.



Pict 5; 6x30 cxn Emil Bush Rathenow – 1943/1945; Prod No 382234; prism and objective metal tube; ©Anna Vacani

The bottoms of the prisms are held in place by four Bakelite tiny pads.



Pict 6; 6x30 cxn Emil Bush Rathenow – 1943/1945; Prod No 382234; prisms settlements; ©Anna Vacani

Making a short comparison of the OPW binocular internal construction with the cxn we can say that Looking at the internal construction of OPW we can notice that the prisms are maintained by the metal straps.

The application of this design for CXN is impossible, because of the construction of Bakelite body.

The binocular dimensions

The weight of the binocular is 544 grams (1.2 pounds). The width is – 164 mm (6.46 in), the height – 82 mm (3.23 in).

III. Summary

We hope this short article, broadened your knowledge in this extraordinary field of optics, which still surprise us.

If do you have any experience with introduce above binoculars, we would be very happy to hear from you, and publish the most interesting information and pictures.

