ZEISS HISTORICA

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The Zeiss Historica Society of America is an educational, non-profit organization dedicated to the exchange of information on the history of the Carl Zeiss optical company and its affiliates, people and products from 1846 to the present.

Officers

Material for the journal can be sent to the Editor at 73 Winsor Place, Glen Ridge, NJ 07028 (e-mail: jscott@viconet.com) or to any Officer. Please send all other correspondence to Zeiss Historica Society, 24 Valley Drive, Randolph, NJ 07869, USA. Annual membership dues: $35 (USA), $45 elsewhere. Dues include subscription to Zeiss Historica, airmail postage overseas.

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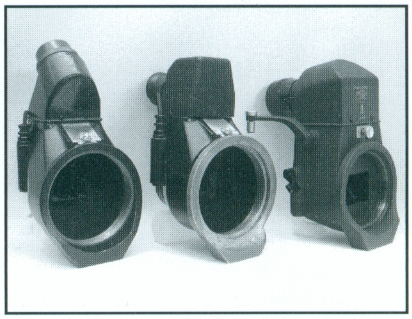


Front Cover: *In the article on page 10 Stefan Baumgartner discusses his transitional reflex viewer (center) in comparison with the Flektoskop (left) and the Flektometer (right).*

Back Cover: *This illustration advertising Zeiss field glasses appeared in 1912. It is one of the ads designed for Zeiss by Ludwig Hohlwein of Munich.*

(From the collection of Larry Gubas)

President's Letter

In the last six months, I have yet again been given the opportunity to explore the world of Zeiss collecting. I have been blessed to meet more than a few of you and to talk to others about the things that I have discovered.

The February binocular meeting in San Diego was a wonderful occasion to miss the snows of the Northeast and meet a few old friends and make quite a few more, thanks to the efforts of members Peter Abrahams and Mike Rivkin of Deutsche Optik. I went to Vienna to dive into a large unsorted collection that was collected by Peter Coeln of Leicashop and the Westlicht Museum. I found nice pockets of information in them as I sorted them down and cataloged them. However, to visit the shop, its storeroom and the auction premises was beyond any expectations that I had. No one has the selection of wonderful items that I have seen there. Unfortunately, I was not able to stay for the auction in late May since I had other projects and a spouse and home to return to. I also traveled to Toronto and Rochester to talk about Zeiss history to photo enthusiasts there. In Rochester, a visit to the George Eastman House brought a nice collection of Hubert Nerwin's patents to my files and two days at the rare-book department of the University of Rochester brought many early and rare Carl Zeiss Jena catalogs to my attention. I promise to share this information in the coming months

I trust that the materials in this issue will bring much information to your attention and enhance the knowledge of the instruments that we all love and treasure. I have in my collection the book from Hartmut Thiele and while I was in Germany, I stopped in the Carl Zeiss Jena archives to visit the newly found files that defined for the first time what photographic lenses were manufactured by Carl Zeiss Jena from 1926 through 1990. I will work on summarizing the most pertinent information for our next issue. Mr Thiele will also be working on an updated version of his book for distribution in the near future.

Some bad news is that while I was traveling, my computer decided to self-destruct, and so the lateness of this issue is based on my efforts to reconstruct the lost records of the past few months. Some good news is that 14 of our members took advantage of our special offer to purchase the new Minox replica of the black Contax I, which makes me feel happy that we were able to aid these members. Nick Grossman told me that he was very pleased with the results from using this new camera.

I will be upgrading the website yet again this summer; please let me know what you would like to see there and in the Journal and don't be afraid to make a contribution through our editor or myself.

Annual Meeting: There will be an annual meeting in the New York/New Jersey area in November of this year. Information as to the specific date and location will be published in the coming months.

2004 European meeting: Bernd Otto and I would like to survey the interest in a Zeiss Ikon and Contax subject based meeting in the Frankfurt, Germany area on either April 4th or in October, 2004. These dates are in conjunction with an excellent and large-scale antique photographic show on April 4th, or, on the October date, at nearby Darmstadt. Let me know if you would like to attend and if you would like to travel as a group to places like Oberkochen, Jena and Dresden.

The October 2004 meeting could be managed in a way to be close to the meeting of the binocular group at that time in Germany. Contact me directly to express interest, either by e-mail at lngubas@optonline.net or by telephone at 973-366-2420.

Enjoy the summer.

The early postwar years at Carl Zeiss Jena

Werner Widder, Saalfeld, Germany

A former worker at the Saalfeld subsidiary of Carl Zeiss tells of his experiences there in 1946 and, later, in Jena, as the occupying USSR developed their ability to make Contax-like cameras and relocated production to Kiev.

In the spring of 1946, the firm of Carl Zeiss Jena received orders from the Soviet Military Administration. They were required to develop the technology and experience necessary for producing Contax II and III cameras in Kiev in the USSR. The cameras had not previously been made in Jena, but the order was given to the Carl Zeiss Jena operation for a number of reasons, the main one being that what remained of the main factory of Zeiss Ikon in Dresden had already been dismantled by the Russians for war reparations. Therefore, there were no immediate possibilities for any kind of camera production in Dresden.

The former Ica factory, located at 76 Schandauer Street, had sustained bomb damage so severe that there were no longer even any technical drawings for these cameras. With the production line ruined, all that was left were examples of the cameras and a few parts. While the Zeiss Ikon Ernemann plant, just a short walk away, was undamaged, it was mostly set up to produce large-scale moving-picture equipment and the Russians had already ordered all that could possibly be produced there. By requiring Jena to work on the Contax II and III, the USSR hoped to develop the technical ability to produce a second top German camera. They had already copied the Leica, with the Russian ФЕД (Fed), whose manufacture had begun a few years before the war.

Tools for the USSR and Saalfeld

So, Carl Zeiss Jena got the order and was instructed to build three complete sets of manufacturing tools and assembly materials for the Contax. Two sets were to go to the USSR and the other to Saalfeld, near Jena. The cost of each set was 3 million RM. While Carl Zeiss certainly needed such contracts for their economic survival, they had no real choice anyway but to accept the task under such a military order. Saalfeld, where I was working at the time, was chosen for the third set of tools because of the relatively good condition of the Saalfelder Apparatebau Gesellschaft (SAG) building there. It had been established as a war-effort factory, making military rangefinders. This operation at Saalfeld, a Carl Zeiss subsidiary, was in need of a new civilian production program. Also at Saalfeld, another Zeiss firm, Optische Anstalt Saalfeld (OAS), was being converted back to civilian production to produce the lower-priced photo lenses, such as the Novar, that it had made before the war.

All the photographs appearing with this article were provided by Werner Widder

At that time, Spring 1946, a number of technical specialists from Zeiss Ikon Dresden were temporarily transferred to Carl Zeiss. They were: Walter Horn (Group Leader), Mr Furkart (Specialist in Tool Design), Joachim Rohn (Specialist in Tool Testing and Assembly), Mr Bierbach (Tool and Die Expert), Mr Rex (Pressure Casting Specialist), Mr Kubitschek (Light Meter Production Specialist), and Mr Seeberger (Camera Designer).

From the beginning, the most critical work was to reconstruct a complete set of technical drawings from existing Contax camera parts. This activity was based on the collective experience of Horn, Rohn and Furkart. All of the design and production work for Zeiss Ikon 35 mm cameras had been concentrated at the now-destroyed Ica plant

The author in 1948 at work in Saalfeld at the "Kamera Montage" (camera assembly) department.

before (and, at a much lower rate, during) World War II. So every detail had to be either copied from old parts or was created as a result of new design work. While the external appearance of the camera was to conform to the prewar product, new techniques developed since the origins of the Contax II, eleven years earlier, enabled Zeiss Ikon to simplify or improve the manufacturing process. For example, better techniques for molded or stamped fabrication allowed these improvements:

- The camera logo was no longer engraved into the front bezel but rather pressed into it as part of the stamping process.
- A number of internal assemblies that were riveted in the original Contaxes were now accomplished by using more modern stamping processes.
- The pin that disconnects the film transport for rewinding was no longer made of two parts but of one that was held from the inside via a safety disk.
- Many parts that had originally been chromed were now painted black. (See Charles Barringer, Zeiss Historica, vol. 21, no. 1, pp. 9-13; Spring 1999.)
- The optical components of the rangefinder were also changed. They were no longer coated in expensive red and green gold to produce a clear image when in focus but rather coated with chromium, which resulted in a neutral gray viewfinder image.

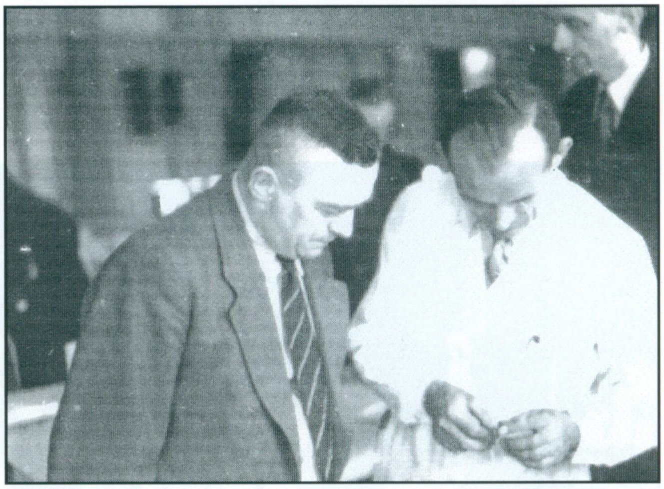
In short, while the camera looked the same on the outside, almost every part had been modified. The original intent for film transport was designed for a special cassette with the film running into another cassette. The device for closing the cassette when removing the back of the camera was redesigned, but not offered to prospective users. The back of the new camera retained the necessary functionality, but these cassettes were very expensive to make. As a result, only a few were made. The tools for the cassette were available and most probably sold to the USSR, but were not used there either.

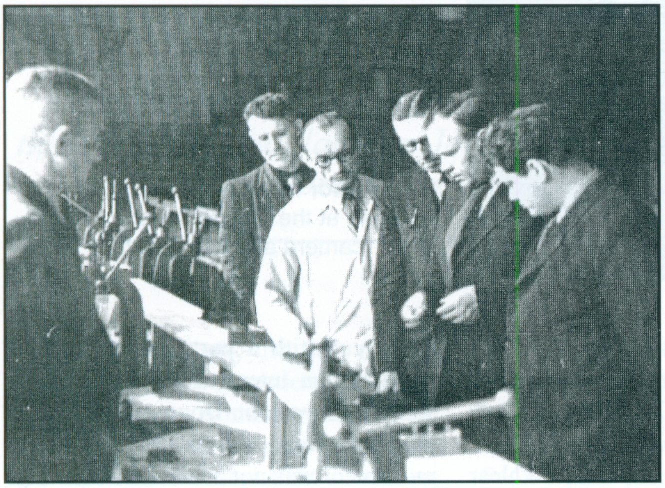
Gears and springs

Additionally, significant problems arose in the manufacture of the many gears and springs. The gear wheels were specially cut with a particularly complex tooth design intended to produce very smooth movement. However, even with this new design, the anticipated smooth movement was not achieved. The original cut at Zeiss Ikon had been different, with the height of the teeth being significantly larger. This caused long deliberations between the Carl Zeiss and Zeiss Ikon specialists, with no totally satisfactory result achieved.

Each of the Contax's springs were hand made with a simple tool. The most difficult to construct were the rotary springs for the shutter, each one made from a single piece of special wire. On the left side of the shutter there was a right-turning spring and, a small distance above it, a different left-turning spring. A similar pair was mounted on the right side. These springs were then given a tension of six rotations and the shutter timing adjusted.

It took a long time for the training to yield individual springs of the correct form, and the tools were continually being modified. Some springs required four different tools, and so there were 12 tools for the three sets that had been ordered.





A Soviet delegation inspects a display of Contax-assembly tools at Zeiss Jena in 1945.

Top left, left to right: an interpreter, General Ivan Sosonovich Kolesnitschenko (chief of the Soviet administration in Thuringen, and later an honorary freeman of the city of Jena), and Walter Horn, group leader transferred to Zeiss Jena from Dresden.

Above: Dr. H. Schrade, a manager at Jena (left) and Walter Horn.

Left, left to right: Dr Schrade, Walter Horn in the white coat, and the interpreter (standing on Horn's left). The other three are Soviet engineers.

When almost all the tools were ready and the production of the parts were started, the Saalfeld factory was ordered to send mechanics to Jena, to test the assembly tools with typical construction staff and to train them in the camera-assembly process. All were kept in Jena until the project was complete.

I was one of nine rangefinder workers sent to Jena from the Saalfeld SAG. Erich Grzeskowiak (formerly the leader of military rangefinder adjustment) became the Leader of Camera Construction, and Paul Oswald (formerly a member of the German army's product acceptance staff) was in charge of Camera Quality Control. Artur Bernhardt (Precision Mechanic), Hugo Kleinert (Precision Mechanic), Erich Kümmelschuh (Constructor), Erich Berk (Foreman), Luciw Barkowski (Constructor), Helma Gitter (Constructor) and I (Precision Mechanic), became the builders of the Jena Contax. The duties of the workers in camera assembly, except for the leader and the quality controller, were quite extensive, encompassing all phases of camera assembly. Each of us could assemble a complete camera with the exception of the exposure-meter system. Later, the meters would be produced in the electro-lab of Mr Reinsch. The Saalfeld staff did not learn exposure-meter assembly until much later in 1948.

The length of our training assignment had not been stated in writing. We were told that we were to work in Jena for two two-week periods, but not four weeks in a row. After a few days we realized that this was totally wrong. We stayed until September 1946, at which time three men remained in Jena while the others were sent back to Saalfeld.

As we were testing the assembly tools (which was our main task), inevitably sub-systems, systems and complete cameras were built to prove that the operation was effective. These cameras were taken by the "factory" to be sold or traded for various special goods. When we finished a camera, it had no trademark and no serial number. At this time, the black market in cameras and photographic products was very active. Special parts and systems, such as the rangefinder-prism assembly, the complete shutter system, and the clockwork delayed-action shutter release could also be traded or sold, as were complete cameras, with or without objectives. At this time, those who bought the lenses had to be careful, because some of them were incomplete having only the front and rear optical elements. The price was paid in cash or bartered goods. The highest payments that I know of were, for a Contax II with a T-coated 5 cm f/2 Sonnar lens, either 35,000 Reichsmarks or goods such as 50 kilograms of potatoes, flour, peas or other foodstuffs. The profit mar-

The Camera-Assembly Team in 1949. Left to right, standing: Werner Widder, Kurt Urban, Kurt Franke, Hilmar Eichler, Otto Steinman, and Fritz Franke. Left to right, seated: Rudolf Planer, Karl Glatzel, August Coutandin, and Hans Schrickel.

gin was about 10,000 RM, or 40% over the RM 25,000 manufacturing cost.

We had no involvement with the redesign or manufacture of the objectives for the Jena Contax, which were totally handled by the Photo Department of Carl Zeiss Jena. I know that these products were also being transferred to Russian manufacture.

Deportation

In the early morning of 22 October 1946, between 3.00 and 5.00 am, 246 Zeiss Jena employees were deported. Some days before, Soviet troops had brought passenger and freight cars to the Jena main railway station. No one had paid much attention, because everyone was preoccupied with his or her own concerns. Besides, Otto Grotewohl (a top German communist leader and later the head of the East German government) had announced that the "demontage" (dismantling) was already finished in the Soviet Occupied Zone. He did this in a speech inside the courtyard of the Zeiss factory in spring 1946.

We knew nothing of all this until 8 o'clock. Although people had been curious after seeing trucks with Soviet soldiers in front of some houses, no one expected what occured. At the beginning of the day's work we noticed that some managers and employees were missing. It was only later that we found out what had happened. Not one person working in the Jena Contax program was been taken. On the contrary, all the mechanics of the Jena Contax assembly-tools testing program (about 15 workers by then) were ordered to continue their work, and our work location was excluded from the actual dismantling that started the next day.

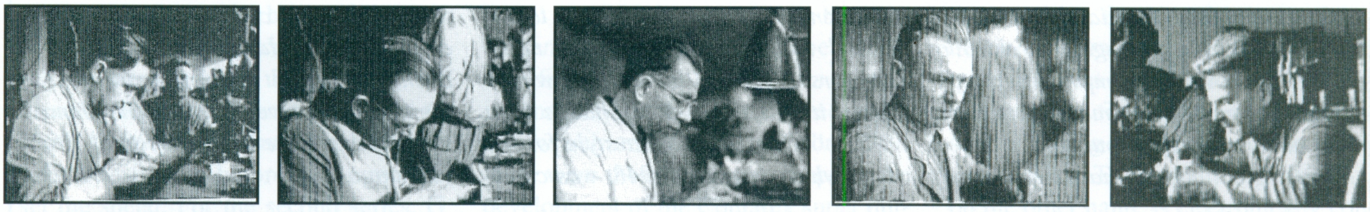
Removal to Kiev

I would estimate that, between June 1946 and October 1947, parts for about 2000 cameras were produced. Through the spring of 1947, all tools were tested to meet the required performance by actual application. In October 1947, the number of mechanics was reduced and the rest of us were given a general vacation. No one knew why. We were told it was some kind of a special award for our work. When our group of seven mechanics returned two weeks later, we found out why we had been kept out of the way. During those two weeks, the Contax production line had been dismantled. All three assembly lines were taken to Kiev. The promise of a Saalfeld Contax plant was not to be. Only the empty production halls with their wooden floor remained. All other equipment and furniture, electric apparatus and wiring, toilets, heating systems, and even the wooden walls had been dismantled and taken.

Soon afterwards, the managers of what would have been the Saalfeld production line, Mr Steinmetz and Mr Pinne, his deputy, had quietly left for West Germany, and we were confronted with a dark future. Hearing of this, Paul Oswald contacted Rudolf Müller, who was then the head of the Fine Measuring Products Division of Carl Zeiss Jena. As a result Oswald was appointed head of the camera assembly, or KaM, department. He was asked to establish a workshop for the assembly of Contax cameras out of existing parts and to repair all cameras that were sent to Zeiss, regardless of type and origin. Oswald took over this job and executed it with all the thoroughness of a trained Zeiss man. Our staff was enlarged to ten employees and I became his deputy, being responsible for the repairs.

On 7 March 1950 I left the camera department to attend the Engineering College in Jena. Until then we assembled Contax cameras and I specialized in the exposure-meter system.

After graduating, I returned to Saalfeld in January 1955. I still think about that order in 1946 for me to go to Jena for "a few weeks of training" and about the years I actually spent there. ❐



Camera assembly in 1948. Left to right: Herbert Fiedler, Karl Franzke, Karl Glatzel, Paul Oswald, Georg Fischer.

Commentary by Larry Gubas on the preceding article by Werner Widder

I was able to contact Werner Widder through the efforts of Hans Beck. Hans, now retired, was the long-time leader of the Astronomical Department of Carl Zeiss Jena in the years after the war. He made the initial translation of this memoir into English.

I was able to visit both Widder and Beck on my visit to Jena in 2001 and discussed further questions with them. The following points came from this discussion:

The Saalfeld plant was also completely dismantled with nothing but the bare walls remaining. The Jena locations suffered 94% losses with the Jena Contax department being part of the 6% not taken immediately.

Jena was not immediately able to manufacture exposure meters for the Contax III cameras and an order for 50,000 such meters was placed with the Stuttgart factory of Zeiss Ikon. This order was seemingly never filled. Another meter was designed, different from the selenium-cell type that had been made in Dresden, but it was not ready until very late in the process. It was designed to fit into the same physical space as the earlier Contax meter. By that time, the Russians decided that the exposure meter was not a big priority, and the manufacturing and testing process was largely of the Contax II model. Paul Görlich, who had been hired by Emanuel Goldberg at Zeiss Ikon in Dresden for his specialty in electronic instruments many years before, was first offered a position at Carl Zeiss Jena and then was among the 246 taken to Russia.

With the war damage, the rebirth of Carl Zeiss was accomplished by taking machinery from smaller enterprises in locations about the state of Thuringia. Some had been newly made during the war, but others had been around since the beginning of the century, so the state of these machines varied from brand new to almost scrap. They were all repaired and adapted for use by mechanical staff in Jena.

The Russians did not take any of the Saalfeld or Zeiss Ikon staff to Russia to manufacture what would become the Kiev camera. Instead, Russian staff had come to Jena to observe the operation and would become the leaders of the efforts in Kiev with the parts and tools taken from Jena.

Paul Oswald, who was actually a qualified locksmith, had not trained at Zeiss. He was a member of the military-acceptance program for the rangefinders made in Saalfeld. He quickly became an integral member of the Zeiss staff in 1945. After starting the KaM department in Jena, he became the leader of the new camera program in Eisfeld, where the Werra camera was made starting in 1954. About 1964 he became the head of the Zeiss "P" department that produced projection instruments, planetaria, astronomical instruments, electron microscopes and various vacuum products.

The camera department under Oswald made some prototype cameras for Hans Harting (see the Fall 1992 Zeiss Historica article on the Wica by J. Arnz). Werner Widder collected and documented examples of imaging errors for Ernst Wandersleb, so that they could be studied and corrected.

Originally the Russian version of the Jena Contax was going to be called the "Volga," and this name appears in most of the early drawings. Later it was decided to change it to "Kiev." The block-letter style for the logo,which began in 1948, was created in Jena, although some early models of the camera had been made in 1947 with a more script-oriented style that must have originated in Russia. This style can be seen in the photographs of the 1947 version in my article in Zeiss Historica, Spring 2001, pp. 16-21. Because these cameras were made from materials taken from Jena, the inner side of the stamped bezel shows the rear of the Contax trademark and the front was filled in with new metal and the new Kiev mark was then engraved into the front of the bezel. When Widder stated that there were no trademarks or serial numbers on the camera, he was talking about the Zeiss logo. The Contax logo was part of the stamped part for the front bezel.

Widder provided me with two of the original detailed drawings for the Jena Contax that he had kept all of these years. The paper has turned brown with age but the characteristics are both similar to and different from those of the Contax II. In the Carl Zeiss archives in Jena, there are additional drawings and photographs of the short-lived Jena Contax. There are photocopies of each and every part of this camera collected into a small book.

I would like to thank Dr. Wolfgang Wimmer, who is the archivist for Carl Zeiss Jena, for helping me navigate through his impressive collection and bringing to my attention many interesting matters that I missed in my prior trips. The collection of these data would have been impossible without the kind cooperation of Werner Widder and Hans Beck. Thanks to them, I think that we now know all of the major answers about the Jena Contax that were a mystery until two years ago. ❒

The Contarex super and super electronic

Bernd K. Otto, Frankfurt, Germany

In this third and last part of his series on Contarex cameras and their prototypes, the author discusses the arrival of the through-the-lens exposure meter with the super and super electronic, and shows some rare lenses for these cameras.

A version of this article first appeared in PhotoDeal in 1996, and this adaptation is published here with permission. The original has been revised and updated by the author, and this translation of the German-language text was prepared by John T. Scott.

Zeiss-Ikon first manufactured the Contarex special as a series of 3000 pieces, with serial numbers in the range U 24001 to 27000, in the period September 1960 to November 1963. These cameras have interchangeable viewfinders and focussing screens, but no exposure meter. A later model, called the Contarex P (for "professional"), was built from June 1966 to March 1967. In common with later Contarex bodies, this series of 1500 cameras, numbers K 45001 to 46500, has provision for the "Blitz" lenses (which link the aperture setting to the focussing distance according to the flash guide number), the data-strip slot (an arrangement for written data recording on the film frame), and interchangeable focussing screens; but there was still no exposure meter. (In this article we write "special," "super," and "super electronic" with lower-case initials, as Zeiss-Ikon always did.)

The Contarex super

The through-the-lens exposure meter made its first appearance in a new version of the Contarex, the super, manufactured in a series beginning April 1967, and then in a second series starting in January 1968. For the first of these two series, cameras numbered G 33501 to 36000, the shutter-speed knob must be lifted up before it is turned to set the speed. For the second series, G 37501 to 40000, the knob can be turned without lifting. A CdS exposure meter is turned on and off in the earlier version by a simple switch on the front plate, while later versions have a switch on the top plate that lies underneath the film-advance lever when in the "parked" position.

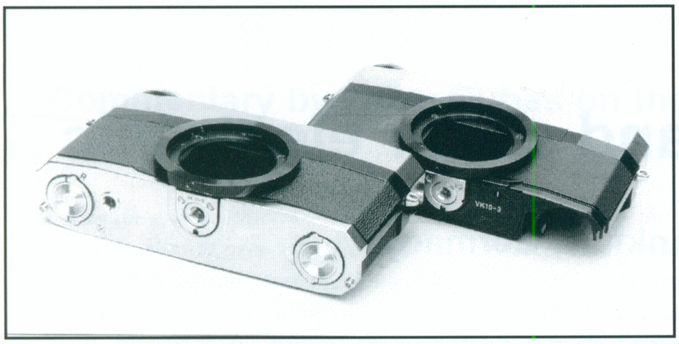
The series of cameras numbered P 53001 to 55500 was built between September 1968 and September 1969. Within this series, from number P 54700 onwards, a new rapid-loading system appeared. Cameras numbered P 97001 to 98500 were made between September 1969 and December 1971, and from P 98250 there was a new internal cam on the shutter-speed selection wheel, and a coated mirror. Thus there were these three new steps in the development of the Contarex super during that period.

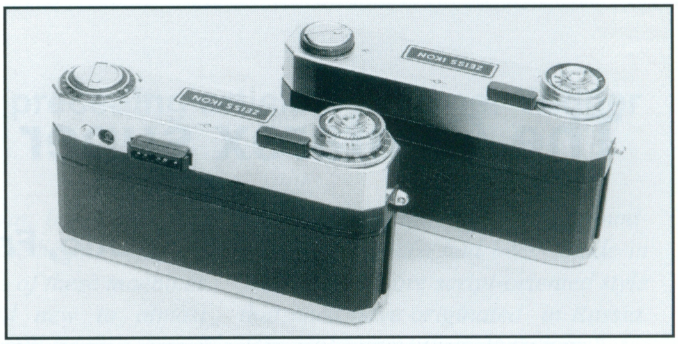
Altogether these yield 9000 examples of the Contarex super. Later, from December 1971 to March 1972, another 600 examples of the latest type were made, carrying the Carl Zeiss Contarex label, to make up a total count of 9600 Contarex super bodies. These late Contarex supers, much sought after by collectors, lie in the serial-number range R 52001 to 52600, and were sold up to the end of 1974 by the Carl Zeiss Contarex Vertrieb.

Microscope Contarexes

Before we come to the Contarex super electronic, we should say something about the prototypes of microscope cameras. These specialized cameras closely resemble the prototypes VK 001–VK 005 described in the previous part of this series (*Zeiss Historica*, vol. 24, no. 2; Fall 2002) although the bodies are not identical. The Hologon Ultrawide cameras have basically the same body as the normal microscope cameras, although the Hologon Ultrawide was black with a big viewfinder.

Two prototypes (figure 1) illustrate the transition from mechanical to electronic shutters. Prototype VK 10-3 is quite different from prototype VK10-5. VK 10-3 is fitted with a mechanical shutter having a range from 1s to 1/500 s, plus B and T. The shutter of VK 10-5, on the other hand, is electronically controlled, and has a range from 30 s to





Two prototypes derived from the Contarex super electronic, shown from below (left photograph) and from the back (right photograph). VK 10-5, on the left in both views, has an electronically controlled shutter with a range of 30 s to 1/500 s, powered via the plug in the back, whereas VK 10-3, on the right, has a mechanical shutter with a 1 s to 1/500 s range. Figure 1

1/500 s, with a B setting but no T. The shutter is powered through a connection made through a plug at the back; without battery power only the 1/500 s speed works.

We know of many more prototypes of this "microscope" type, but there are ten experimental versions of the Hologon Ultrawide mentioned above, made in September 1968 and carrying numbers P 98501 to 98510. The commercially marketed version, made from March 1969 to May 1970, bears numbers in the range P 75501 to 76500. These 1000 units were followed by 400 others of a planned batch of another 1000 that would have had numbers in the R 97001 to 98000 range.

Variants of the Contarex SE

There are two series of Contarex SE cameras. In the first, made from September 1968 to March 1970 with serial numbers G 36001 to 37500, a CdS exposure meter is powered by the same two 1.5 v batteries that power the shutter. For the later version (after February 1970, serial numbers R 55001 to 57000), there was a separate button-cell for the exposure-meter circuit. The three-volt shutter circuit was linked also to the mirror operation in such a way that the circuit was switched off when the mirror came down after an exposure. It would then be switched on with the same switch that controlled the meter circuit. Cameras from number R 55900 onwards have a coated mirror. One hundred out of a projected 500 examples were marked with the Zeiss Contarex Vertrieb logo; serial numbers R 64501 to 65000 had been reserved for this group.

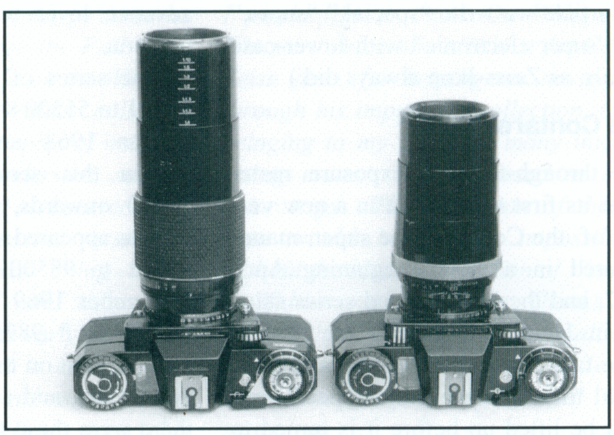
No black-finished bodies have yet appeared or been reported for either the Contarex special or the Contarex P (professional). For both the super and super electronic, on the other hand, black examples exist, although they are quite rare (figure 2).

Rare lenses

Some rare lenses were made in small numbers to fit on the cameras described above (see figure 3). The 85 mm f/4 S-Triotar (catalogue number 11.2437) was developed as a close-up lens, and it focusses in the macro 1:1 range. Only three examples were made, as prototypes, by Carl Zeiss Oberkochen. For the 60 mm f/5.6 S-Planar (no. 11.2435) we have but two examples. Both these lenses, and the quite rare 50 mm f/4 S-Planars (200 each in chrome and in black), were replaced by the Luminars.

We should also mention the black

Four black Contarexes: A super electronic (top left) and three supers. Figure 2



Two rare lenses: The 85 mm f/4 S-Triotar (left) and the 60 mm f/5.6 S-Planar (right). Figure 3 versions of both 35 mm f/4 Distagons and the 50 mm f/2 Planars (figure 4), not to be confused with the black Blitz Distagon and the Blitz Planar. While these lenses have serial numbers that are not in the normal range for black-finished blitz lenses, they are not exactly prototypes but were offered for sale through normal market channels. The serious Zeiss collector treats them as objects of equal rarity value to prototypes, however.

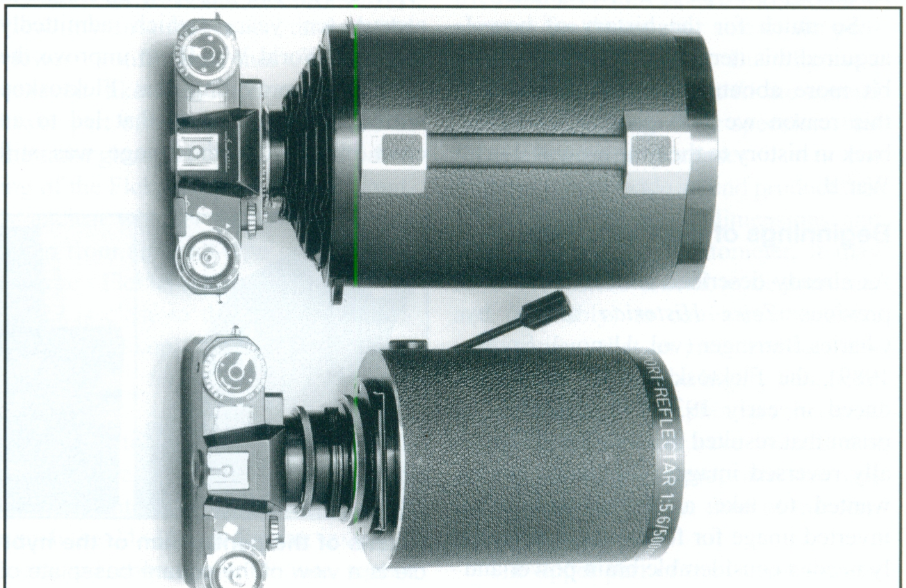
Let us also mention two Kilfitt lenses equipped with Contarex mount. The 90 mm f/2.8 Makro-Kilar (figure 5) fits almost in the same niche as the 85 mm f/4 S-Triotar, and both lenses focus in the 1:1 macro range. While the Makro-Kilar, a Tessar-type lens, has the larger aperture, f/2.8, it must be set wide open for focussing and then stopped down by hand for the exposure, whereas the smaller-aperture S-Triotar opens up for focussing and then stops down automatically in the usual Contarex manner.

As many Zeiss collectors know, only 23 examples of the 1000 mm f/5.6 Mirotar and 200 examples of the 500 mm f/4.5 Mirotar were produced by Carl Zeiss in the Contarex mount. But perhaps they do not know that Kilfitt sold their 500 mm f/5.6 Sport-Reflectar under the Zoomar name with a Contarex-adapter mount, through the end of the 1960s (figure 6). The Zoomar had internal focussing, with no change in outside dimensions when the focus ring is turned, unlike the Mirotar which has bellows focussing. At 3.9 kg this lens, the Zoomar, was much lighter than the 6.7 kg of the Zeiss Mirotar.

Other firms supplied interesting Contarex-mount lenses. We cannot go into further detail here except to mention the products of Schneider-Kreuznach; the 35 mm f/4 PA-Curtagon, of which 546 were made, the rare 45–100 mm Variogon, and the 80–240 mm Tele-Variogon. ❐

Two rare black anodized lenses: The 35 mm f/4 Distagon (left) and the 50 mm f/2 Planar (right). Figure 4

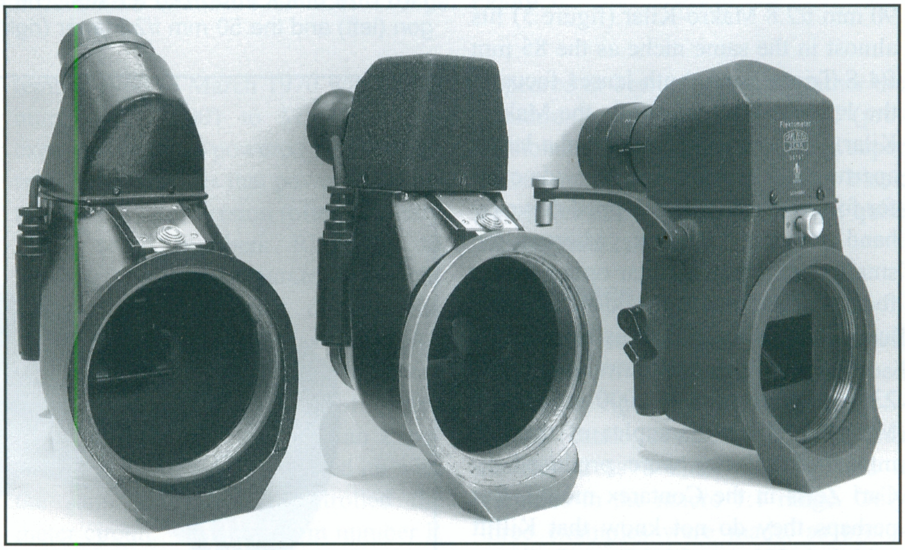
The 90 mm f/2.8 Makro-Kilar from Kilfitt of Munich, which focusses from infinity down to the 1:1 macro range. Figure 5



Two mirror lenses for the Contarex. The Carl Zeiss (Oberkochen) 500 mm f/4.5 Mirotar is shown at the top, and beneath it is the Kilfitt 500 mm f/5.6 Zoomar Sport-Reflectar. Figure 6 ▶

The transition from the Flektoskop to the Flektometer

Stefan Baumgartner, Lund, Sweden



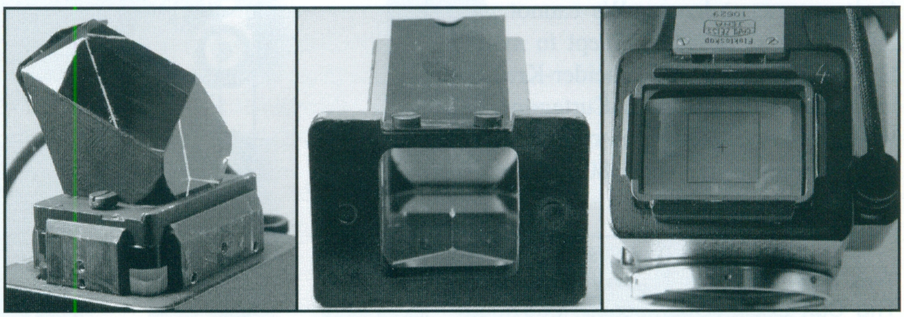
The transition from the late Flektoskop (left) via the hybrid (in the middle) to the Flektometer (right). (See also the cover of this issue.) Figure 1

Strange things can happen nowadays when you buy items on eBay, the world's largest flea market. Recently, I detected an item that at first sight looked peculiar. It showed some resemblance to the Flektoskop, but what definitely didn't match was the bulky upper part, which much more resembled that of the Flektometer. This item is shown on the cover and in figure 1, in the middle in each case. The low-resolution picture on eBay did not permit a close inspection, so I took the decision to contact the seller (who was in Thüringen, Germany—the state in which Jena is located) to agree on a premature termination of the deal. I was not sure whether the investment was worth the money. When I received the item, I inspected it carefully and found some evidence that this item most likely represents a prototype of a Flektometer.

So much for the history of how I acquired this item, but let's learn a little bit more about Flektometers, and for this reason we will go first one step back in history to the time around World War II.

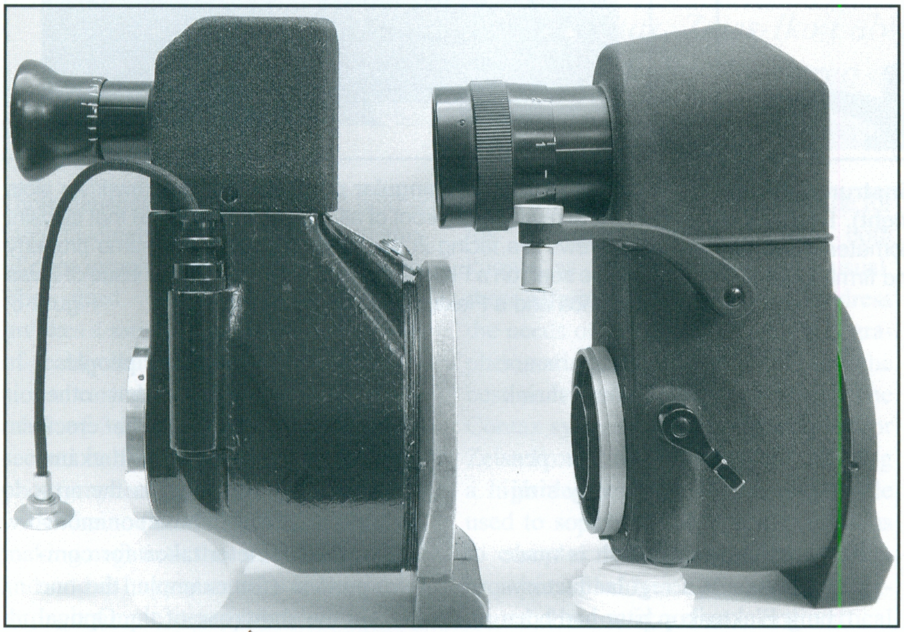
Beginnings of the Flektoskop

As already described meticulously in a previous *Zeiss Historica* article by Charles Barringer (vol. 11 no. 1, Spring 1989), the Flektoskop was first introduced in early 1938. It contained a prism that resulted in an inverted, laterally reversed image. If photographers wanted to take a picture using the inverted image for focussing, it certainly needed considerable brain power and a thorough adaptation. However, it became clear that this system did not represent the best solution. It took Zeiss almost ten years (which admittedly included World War II) to improve the system by providing that Flektoskop with a reversing prism that led to an erect image. But the image was still reversed left-to-right. Production of this type started just after the war. Such a Flektoskop, numbered 11956 and claimed to exist in about 30 examples today, is shown on the left side of the cover and figure 1. In contrast to most



Details of the pentaprism of the hybrid. On the left is a general view. In the middle is a view of the square baseplate of the pentaprism mount, and on the right we see the modified screen of the hybrid, necessary to adapt the smaller size of view due to the nonstandard baseplate size and shape. Figure 2

This interesting prototype may represent a step towards the development of the erect, laterally correct, image Flektometer from earlier Flektoskops that showed the view reversed left-to-right.



Comparison of the hybrid (left) and the Flektometer (right) in side views.
Figure 3

reports, which state that these rare erect-image Flektoskops were made with a fine-grained crackle-black appearance, this one is of the glossy textured type.

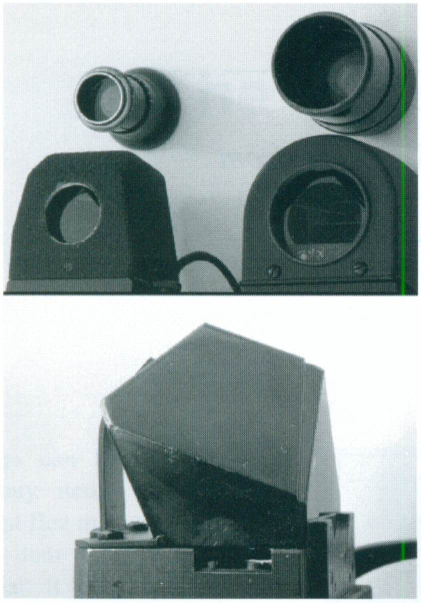
The Flektometer

In 1951 Carl Zeiss Jena introduced the Flektometer, which showed for the first time in the history of Zeiss Ikon reflex housings an erect and laterally correct view. A comparison to a Zeiss number list reveals that most likely only about 200 Flektometers were produced (the lowest number in the list is 30101, the highest is 30303). An example of one of these, numbered 30191, is shown on the right side of the cover and figure 1.

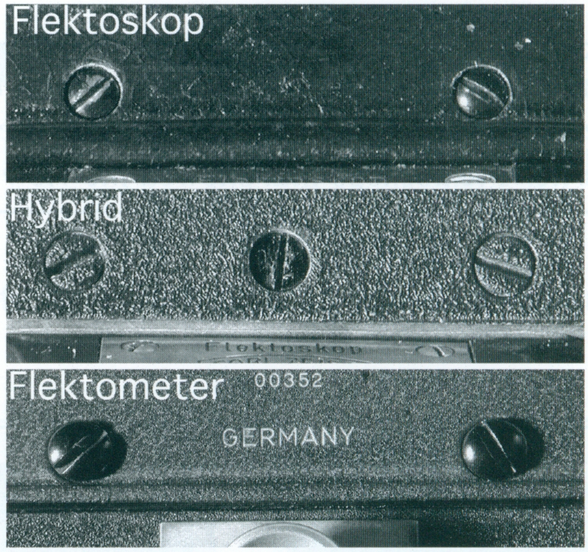
The pentaprism

Having had some expectations when I first saw this hybrid that it could possibly show an erect and laterally correct view, my first inspection through the viewer confirmed that indeed it behaved like the Flektometer. The lower part of the hybrid was made of the same glossy, textured-type of painting of the Flektoskop, and it is currently unclear whether the lower part was taken from an erect-type or an inverted-type Flektoskop. The number 10629 is close to that of an inverted-type Flektoskop (10623), described in the *Zeiss Historica* article mentioned above, suggesting an inverted type. I opened the top and found a pentaprism (figure 2, left). However, the size of the base plate of the pentaprism did not match the 24×36 mm format; instead it measured only about 19 mm square (figure 2, center). Next, I found that the screen of the Flektoskop was modified and a 19 mm square was drawn to account for the smaller size of the pentaprism (figure 2, right). But why use a pentaprism that does not fit the normal 24×36 mm? I can only speculate that for experimental purposes it was not important to provide an end product that would have the same dimensions and appearance of the Flektometer. It may have been more crucial to demonstrate and (probably) to convince the Zeiss management that an erect and laterally correct view would be highly beneficial and desirable for all photographers. A further reason could have been that a pentaprism of the appropriate size was not at hand during the time of the construction.

The upper part of the hybrid closely resembles that of the Flektometer, both in shape and layout (figure 3). Particu-



Comparison of the ocular region of two instruments, the hybrid (top left) and the Flektometer (top right). Below is a photograph of the pentaprism of the Flektometer. Note the metal clamp on the left-hand side holding and firmly pressing the pentaprism onto the base plate. Figure 4



Comparison of the angular positions of the screwdriver slots in the screws on the front of all three devices. Note that all pairs of screws are facing in the same direction. The same property can be seen on a Flektoskop recorded in an earlier issue of Zeiss Historica and a Flektometer in a museum. Figure 5

larly strong similarity is shown in the ocular part, where both constructions show the ocular mounted horizontally via a screw mount (figure 4, top). Moreover, the oculars themselves look very similar, apart from being of different size. I finally convinced myself to dismantle the Flektometer also and found a pentaprism (figure 4, bottom). However, this one is considerably bigger and bulkier than the one in the hybrid. Obviously, the increased size accounts for the bigger size of field, which covers the full 24×36 mm frame size. However, the pentaprism of the Flektometer shows the same type of fastening using a metal device (as seen on the left side of figure 4, bottom) as was used for the hybrid (compare figure 2, left and center), suggesting a common origin.

Is it genuine?

How can we be sure that this hybrid is not the product of a handy craftsman and is therefore not a Zeiss prototype at all? Several pieces of evidence speak against the "craftsman theory":

- the similarity of the shape of the head part of the two meters.
- the finish: both upper parts are made of fine-grain shrink enamel.
- the construction of the pentaprism fastening is very similar.
- the tripod ring, which is made of brass. If a regular factory-built Flektoskop base had been used, it would most likely have shown black painting similar to the one of the Flektoskop on the left of figure 1.
- finally, I detected a detail that is easy to overlook: The position of the screwdriver slots in the screws of the Flektoskop/meter are all facing each other at an angle of about 45° (figure 5). At first sight, this may sound fortuitous. However, the likelihood that during the assembly of these three items, the position of the screws would end up in almost identical positions is close to zero. Therefore, it can be argued either that the same person was always responsible for the assembly, or that there was a special instruction by Zeiss to all assembly people.

I also noticed that other examples, such as the erect-image Flektoskop (for example, the one shown in the article mentioned above) or another Flektometer taken for comparison (for example, the one in the showcase of the Optical Museum in Jena, numbered 30131) show the same angle of the screws.

It is also noteworthy that the angle of the screw does not seem to have a function, as all screws can be turned past this position, albeit half a turn at most. Note that the pictures of the screws were taken before I dismantled the respective top parts, and I acquired all three items from different sources and at different times.

Taking all these facts into consideration, it can be argued that this hybrid has been produced in the Zeiss factory, and thus can be considered a true prototype. It remains to be hoped that some light has been shed on the construction of the Flektometer. ❐

Stereoscopic attachments — First of two articles

Prewar and postwar stereo devices from Zeiss-Ikon

Charles Barringer, Haddonfield, New Jersey

From the prewar designs introduced in 1940, to models to fit the postwar Contax, Zeiss-Ikon always had sophisticated accessories available for the stereo enthusiast.

Three-dimensional images have held a huge fascination throughout the history of photography, from Niepce to Nimslo. The third dimension incontestably invokes a satisfaction and an impression of reality that no image in two dimensions can generate. The high-water mark of 3-D photography came in the second half of the 19th century, when photographers criss-crossed the globe with their elaborate stereo cameras, making negatives that were then printed and sold in huge quantities to be viewed through simple stereoptikons.

This vogue passed into relative obscurity with the advent of the motion picture, and was never widespread as a participatory sport; the number of enthusiasts actively making 3-D images for their own use has always been small because the satisfaction of 3-D comes at a high price, as measured by the complexity of the material needed to produce and recreate convincing 3-D images. But if there is a photographic challenge and the possibility of a market, Zeiss Ikon is there with a product answering a perceived need. So during the late prewar period, and again in the heady days after the war when Zeiss Ikon was at the top of its game, it was also a major player in the arcane world of stereo photography, producing a wide variety of taking and viewing systems for its 35 mm camera systems.

This article will cover the top of the line, twin-optical-path systems made for the successful Contax system, both known as the Stereotar-C. As usual, these offerings were designed to address the needs of the most exigent photographer, and they rank with some of the best such stereo devices ever made. The Contax system was the logical basis for Zeiss Ikon[1]s stereo equipment, offering a high degree of precision, a clientele used to sophisticated, elegant solutions to complex technical problems, and a broad installed base. This choice determined the configuration using vertical side-by-side pairs on the 24×36 mm frame.

The next decision—between a (relatively) simple, somewhat limited beam-splitter attachment to be placed in front of the existing lenses (the system later known as the “O” configuration), versus the more complex, elegant and versatile approach involving an interchangeable twin-optical-path “lens” (“OO”)—was probably easy. Versatility and complexity always seemed to win over the alternatives at Zeiss Ikon in the 1930s.

Prewar Stereotar C

The Stereotar-C (Catalogue number 543) presented at the 1940 Leipzig Spring Fair was a compact “lens” mounted on the outer Contax bayonet, with a septum extending deep into the

The Prewar Stereo-C outfit, complete with “OO” lens, special viewfinder, distance prism and cover. (Photo: Pierpaolo Ghisetti.) Figure 1

Prewar closeup arrangement, set up to photograph the viewfinder at bottom right. Other stereo Proxars are in the foreground. Figure 2

The two versions compared. Postwar (left) and prewar (right) Stereotar-Cs mounted on contemporary Contax cameras, with the appropriate pre- and postwar issues of *Photographie und Forschung* ("Photography and Research") as reprinted by Hans-Jürgen Kuc. Figure 3

camera's throat to ensure separation of the two images on film. The non-rangefinder-coupled cylindrical housing held twin 3.5 cm f/4 lenses with linked diaphragms and tandem focussing from infinity to 0.8 m. Basic accessories included a special viewfinder (543/30), a removable distance prism (543/70) that gives 65 mm interocular separation similar to an average adult's interpupillary distance, and a small leatherette case (see figure 1).

The unit could successfully be used without the distance prism, although the reduced interocular distance gave a reduced sense of depth to the image pair. On the other hand, the closeness of the optical paths made close-up work possible, and for this application a set of special Stereo-Proxar lenses (995/20, 30, 40) and a mask fitting on the existing Contameter 1343 close-up device were offered (see figure 2).

Projectors and viewers

Viewing the images was accomplished by attachments allowing use of the Stereotar on the Magniphot enlarger, with appropriate stereo enlarging frames, to create positives that could be viewed through conventional 6×13 cm viewers, and at least two attachments for use with 35 mm projectors for slide projection in stereo. Appropriate polarized stereo glasses let the audience enjoy the 3-D projected images. A sales brochure describing all these fascinating bits and pieces exists in German, French and English (and perhaps Swedish?) but given its publication date of June, 1942 (!) its distribution was extremely limited. The system and the justification of all the technical sophistication inherent in the system were described in deep detail in the November, 1940 issue of *Photographie und Forschung* (see figure 3). This article and the corresponding postwar article, with full diagrammatic explanation of the "OO" and "O" systems, were reprinted (in German) by ZHS member Hans-Jürgen Kuc.

A military application?

The timing of the Stereotar's introduction suggests that the civilian market may not have been the only, or even the primary, target for Stereotar sales. Stereo imaging had long been the basis of cartography and photogrammetry, and it is possible that someone in a position of authority in the Wehrmacht might have seen a utility for a land-based, hand-held analogue. In any case, the development costs, which must have been substantial, could not have been recovered commercially, based on the total production estimated at 500 (possibly 1000) units, with serial numbers starting "W-26001" marked on the top of the prism and below the lenses on the base unit. Obviously the prewar Stereotar-C is very hard to find; accessories other than the basic distance prism, as well as the sales brochure, are even rarer on the collector's market. And the slide-projecting equipment, given the newness of transparency films at the time, is essentially unknown "in the flesh." The Sterikon-II illustrated, for example (figure 4), has no known Catalogue number, nor is the author aware of any descriptive literature about it.

The postwar model

Fast forward a decade to a time when 3-D was again in demand and the major

A prewar stereo-projection lens, the Sterikon K. Figure 4

Two postwar Stereotar-Cs, one with the distance prism attached (top) and one without. Figure 5

players in the 35 mm market, including Leitz and (very briefly) Nippon Kogaku, were offering stereo systems. With its primary development work already in hand, it was a short step for Zeiss Ikon to redesign the Stereotar-C to fit the newly introduced, smaller, Stuttgart-made IIa/IIIa Contax. Lens speed was increased 1/3 stop to f/3.5, one suspects in response to competitive pressure than for any technical reason, and the lenses were coated. The major distinction, however, was the incorporation of rangefinder coupling, allowed by the shorter-base rangefinder mechanism on the redesigned Contax (see figure 5). So now the user could simply bayonet the unit in place and proceed as with any other lens, setting distance with the beloved knurled wheel in front of the secondary rangefinder window. The new Catalogue system prefix was 810, with serial numbers now bearing the distinctive "St-" prefix before a 5-digit number. Production was in two batches, each between 500 and 1000 units, the first starting at St-12201 and the second at St-15001. The finder was baptized #420, staying within the finder numbering series. The postwar prism was smaller and lighter than the prewar unit.

Choices for picture-taking

The photographer now had four options for using the Stereotar:

1) with the distance prism beyond 2.5 m;

2) without the prism for distances between 2.5 m and 80 cm;

3) at discrete distances of 50, 30, and 20 cm with the appropriate special Stereo-Proxar lenses, and

4) at 16, 9, and 6 cm using the close-up focussing frames, each incorporating its own Proxar lens (figure 6).

The dedicated 3-D microscopist could even attach the Contax to a special sliding device that was mounted on the stereo microscopes of the time, and I have no doubt that someone, somewhere within the Zeiss organization, is still trying to bridge the gap between the limits of conventional stereomicroscopy (20–25×) and the beginning of scanning electron microscopy.

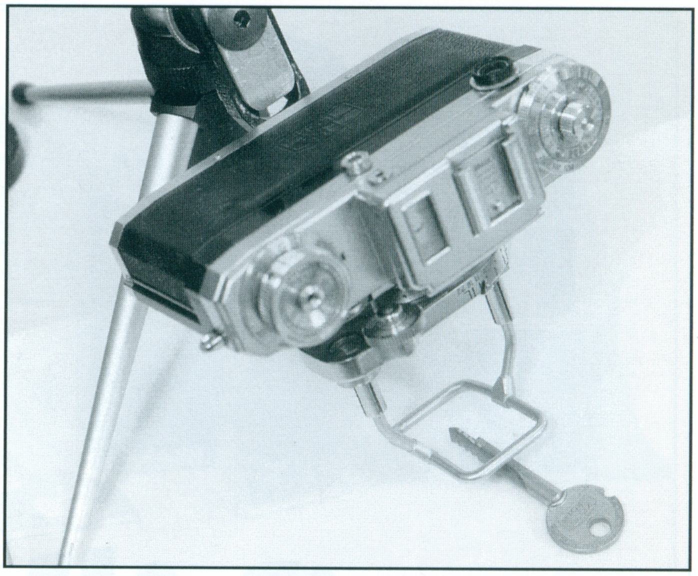
Projection choices

By the time of the introduction of the postwar unit, slide film had become the norm, explaining the absence of devices for printing stereo pairs and the relative plethora of devices for viewing slides. Most convenient and portable is the black and cream-colored #1428 "OO" stereo viewer, with its optional (and extremely rare) accessory for bypassing the two "D" size batteries and connecting to the domestic AC supply. (This is not to be confused with the similar 1427 viewer for "O" slides made with a beamsplitter.)

But the Stereotar was conceived with projection in mind, and several options were available depending on budget and the number of friends one wanted to impress. At the simple end of the scale, the Sterikon 10 attachment could be placed in front of the lens on your Ikolux 250/300 series projector. Using wedge prisms and prepolarisers to fuse the two images, the Sterikon is effective for small-screen projection at a fixed projection distance. The real enthusiast however, would spend hours setting up his or her Ikolux 500 (the nomenclature reflecting the 500 w bulb used) with the twin-lens stereo head attachment. Every parameter on this system was adjustable to accommodate a very broad range of room and screen sizes, projector inclinations, circumstances, you name it. It was the *ne plus ultra* in this arcane realm of photography, and, judging by the relative rarity of the two competitive units, was the favored unit in the marketplace. In either case, very few Stereo projection units were made and it is a collector's prize to locate one, even if the owner is unlikely to go through the setup routine more than once to see how it is done.

As often happens with complicated, expensive fads, the Stereotar soon ceased to pay its way (if it ever had) and during the later days of the Contax system one could find kits remaindered at incredibly cheap prices. The Stereotar-C remains however, the holy grail of Contax collectors as well as 3-D enthusiasts, embodying as it does the virtues of technical perfection, relative ease of use, and substantial rarity. ❐

All photographs appearing with this article are by Charles Barringer, with the exception of figure 1.



A postwar Contax IIIa and Stereotar-C with a closeup frame set up to photograph a Zeiss-Ikon key. Figure 6

Stereoscopic attachments — Second of two articles

Stereo devices from Kiev

Pierpaolo Ghisetti, Modena, Italy

The Ukrainian approach to designing stereoscopic attachments differed significantly from that followed in the West.

As is well known the development of Zeiss products, both cameras and lenses, continued after World War II along a separate track behind the Iron Curtain. Nevertheless, while Kiev lenses might have been clones of the Carl Zeiss lenses, stereo outfits for the Ukrainian cameras were completely different from those produced by Zeiss Ikon.

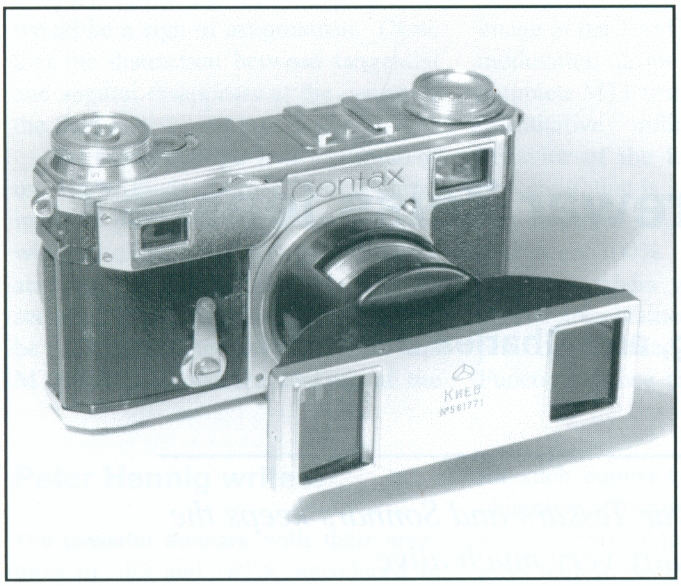
A simpler design

The stereo outfit produced in Kiev is much simpler than the Zeiss set, both in concept and in design. Imaging was via the standard 50 mm lens, with beam-splitting prisms placed in front. Thus the stereo images were produced directly, in the configuration called "O" by Charles Barringer in his article on the previous pages.

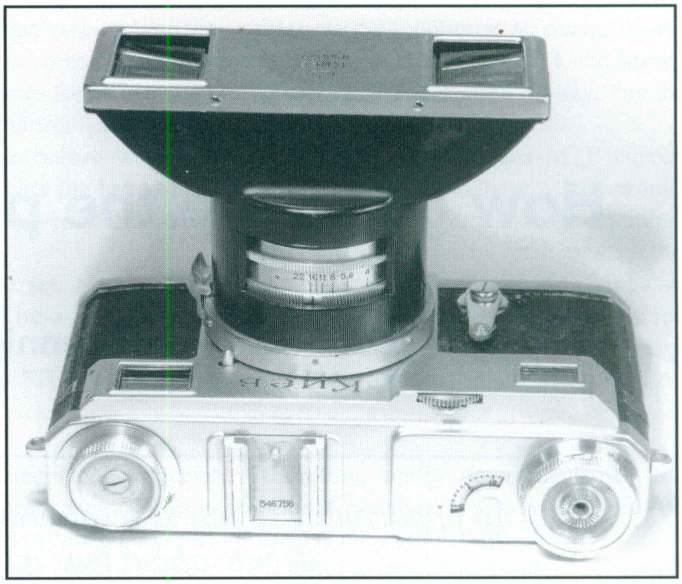
The Kiev stereo prism attaches directly to the camera body with the normal external Contax bayonet mount, and the device is therefore perfectly suited to the German Contaxes as well as the Kievs (see figure 1a). An opening in the barrel of the prism attachment allowed adjustment and confirmation of the diaphragm setting. (See figure 1b.)

The stereo package included an additional viewfinder, which is quite rare. The exterior finish of the beamsplitter is similar to that on the Soviet cameras, and together with the engraving is much cheaper-looking than on any of the German cameras.

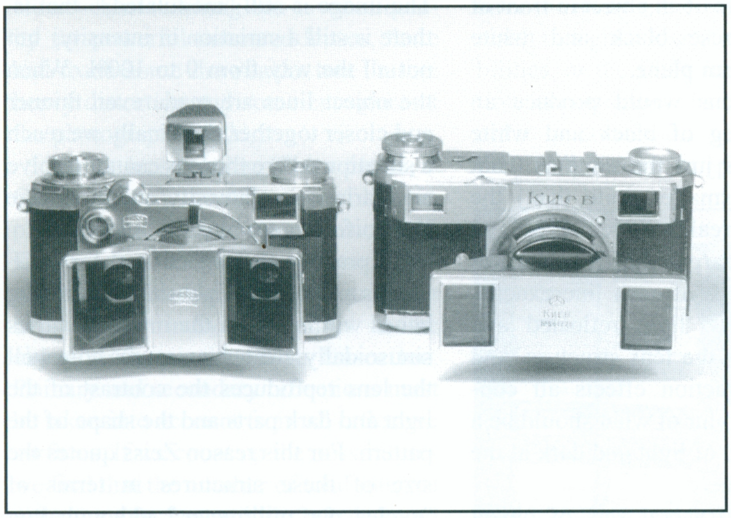
A difference between the two designs can be seen in the positioning of the front faces of the prisms. In the Kiev design they are parallel to each other and to the camera, while in the German version they are turned



The Kiev stereo attachment mounted on a Contax II. The prisms fit onto the standard outer bayonet of the Contax lens mount, and they are therefore equally suitable for both the Contax and the Kiev cameras. Figure 1a



The same stereo device fitted onto a Kiev II. Because the barrel of the prism holder fits completely around the standard camera lens, there is a cutout "window" that reveals the diaphragm-setting ring. Figure 1b



Contax (left) and Kiev (right) prisms compared, each mounted on its appropriate camera. Note that the front faces of the Contax model point slightly inwards, while the Kiev is flat. Figure 2

Stereo prisms and spectacle-type viewer in their original box. The lettering on the box means "complete stereo set for Kiev cameras." Figure 3

inwards slightly. (See figure 2 for a comparison.)

Presumably the design of the German stereos was discovered by a Russian involved in the Kiev project, who decided to produce something similar. It could have been no more than a prototype when the Contax equipment was moved from Dresden to Ukraine.

The model illustrated here bears serial number 561771, meaning that it was built in 1956. Kiev stereo sets are relatively common, because a large number of them were produced. They are available in Italy for as little as $200. But it is not so easy to find a complete set—prisms, viewfinder, and "spectacles" viewer—in its box (figure 3). ❐

This article is an adaptation of part of an article by Pierpaolo Cancarini Ghisetti that appeared, in Italian, in Classic Camera, *no. 16 (November 2000), pages 26–31, and appears here with permission.*

All photographs are by Pierpaolo Ghisetti.

How good are the prewar Zeiss lenses?

John Scott, Peter Hennig, and Charles Barringer

An opportunity to test several prewar Tessars and Sonnars keeps the debate about lens quality very much alive.

John Scott writes:

Whenever two or more Zeiss enthusiasts get together (which, these days, could well be in cyberspace) the talk soon turns to the "old" lenses—that is, the prewar ones. Were they really as good as we thought they were, when judged against today's computer-designed marvels? Are they still worth using, when most of us also have modern versions readily available for use instead?

Recently two regular contributors to these pages, Charles Barringer and Peter Hennig, fell to talking (via e-mail) on these topics. They kindly included me in their conversation, and have each provided a brief commentary in order to share it with you. Slightly adapted versions appear below.

Their discussion was sparked by an opportunity that arose to put some of the old lenses to a scientific test, as Barringer tells us. The results are presented in the form of MTF curves. Before getting to the conclusions, let us make sure we know what MTF curves are and what they tell us.

MTF curves

"MTF" stands for "Modulation Transfer Function." The "modulation" here means any variation in the visual intensity of an object in front of the lens; in the tests the object could be a set of regularly spaced parallel lines, making up a black-white-black-white alternation. The job of a photographic lens is to transfer an image of an object in front of it—such as these black and white lines— to the film plane.

A perfect lens would produce an image consisting of black and white alternating lines just the same as (but probably at a smaller scale than) the object lines. In reality no lens is able to reproduce the sharp cutoff from black to white at the edge of each line exactly. Lens aberrations, light reflected and scattered within the lens structure, and even edge-diffraction effects all conspire to make a blur of what should be a sharp separation of light and dark at the edge of each line.

If we make several sets of object lines, some broadly spaced and some closer and closer together, we can look at what happens to the image with ever-finer line arrays. For broadly spaced lines, the image formed by a real lens (that is, not the "perfect" one of the textbooks) is slightly fuzzy at the edges of each line but is mostly white between the lines, dark within them. Now let the lines get closer. At some separation, the fuzziness fills up all the space between the lines and the intensity never gets quite to zero (that is, the image never gets competely white). The blackness within the lines is also affected as the lines themselves get narrower, and the image never goes completely to black. The image is still "modulated," that is, there is still a variation in intensity, but not all the way from 0 to 100%. When the object lines are made even thinner and closer together, eventually we reach a situation where the lens cannot resolve any variation in intensity, and the image is a uniform gray blur.

In practice the object used for MTF tests is a pattern of light-dark alternating bands within which the intensity varies sinusoidally; the test measures how well the lens reproduces the contrast of the light and dark parts and the shape of the pattern. For this reason Zeiss quotes the size of these structures in terms of "cycles per millimeter," although you will often see it quoted as "line pairs per millimeter." In both cases the measurement refers to the image size.

The test patterns can be oriented at various angles. MTF curves are generally presented for two orientations, those where the lines are parallel to radii leading from the center of the image plane toward the edge ("sagittal") and those where the lines are parallel to tangents drawn on circles centered at the center of the image plane ("tangential"). Any wide discrepancy between the two would be a sign of astigmatism. (Note that the distinction between tangential and sagittal disappears at the center of the field.)

The kind of simple lens test some of us have made with "Test Charts" involves photographing a chart printed with sets of parallel lines of various separations, and looking at the results to see what is the finest structure that can be resolved by the eye. In terms of the MTF exercise, we are looking at the image of the Test Chart to see where the modulation drops to zero. What the complete MTF test does for us is to give quantitative information about the behavior of the lens before we reach that point, that is, where the lines of the text chart can be resolved but the contrast is not 100%.

The numbers we see on the MTF graphs are obtained by a mathematical procedure called a Transformation Function (hence the "TF" in MTF). In this case the function is a Fourier Transform, the details of which I will leave, as my text books used to say, "as an exercise for the student."

When looking at lens MTF curves for an indication of how a lens would work in practice, one should remember that the formation of an image in the camera is only the beginning. Film also has an MTF curve showing the resolution of which it is capable, as do enlarging and projection lenses, and loupes.

Peter Hennig writes:

The powerful Sonnars with their apertures of f/2 and f/1.5, introduced in 1932 at the same time as the introduction of the Contax camera, meant a great and decisive step forward in miniature photography. In the 1930's, these lenses dominated available-light photography, thanks to their unique ability to produce high-quality pictures under all kinds of light conditions. However, in reaching this level of quality for powerful uncoated lenses, there had to be some drawbacks too; rather heavy distortion and some curvature of the photographic field.

Before lens coating (Zeiss patent, 5 October 1935), the reflection of light in photographic lenses was a great problem to lens makers. In a photographic objective reflections will occur, not just between the individual lenses in the objective, but inside these lenses too. Primary and secondary reflections must be taken into account from all reflective surfaces. If we count up the possibilities we find that the number of total internal reflections for lenses with 2, 3, 4, 5, and 6 elements will be: 6, 15, 28, 45, and 66. It is obvious that before lens-coating technology photographic lenses could not contain many freestanding elements. Generally the limit was set at three groups, which will produce 15 total internal reflections. Such a lens will have transmission and flare characteristics good enough for outdoor use in bright sunlight.

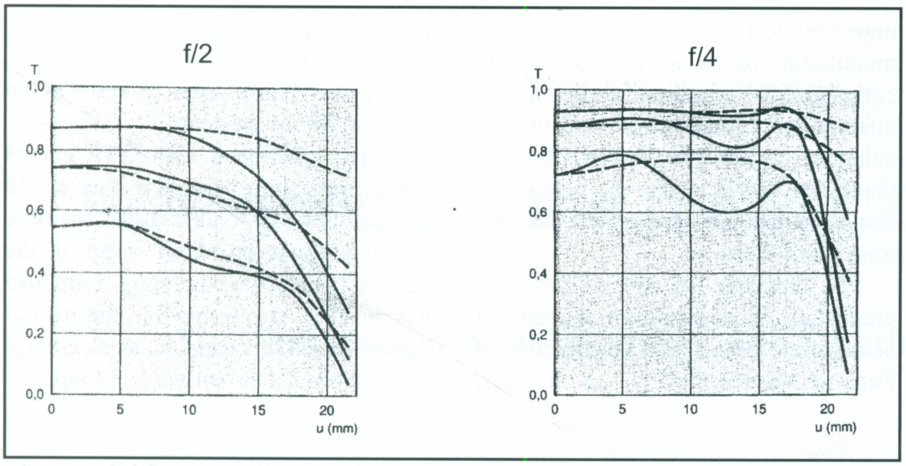
The heavy distortion and curvature of field that is present in the old Sonnar lenses was the price that had to be paid for such compact, uncoated, powerful objectives, containing many lenses—they were still able to produce good pictures both in poor light, and out on the beach in the bright sun. This was achieved by cementing lenses together, so that not so many reflective surfaces were left in the construction. However, if you cement most of the surfaces in a photographic objective, the weakness of this method becomes visible: both surfaces at every cemented interface must have the same spherical form. This will result in a great loss of correction possibilities, at the same time as all correction opportunities had to be used in order to correct the heavy aberrations that will occur in powerful lenses.

Ludwig Bertele with his calculations for the Sonnars: a stack of papers nearly one meter tall!

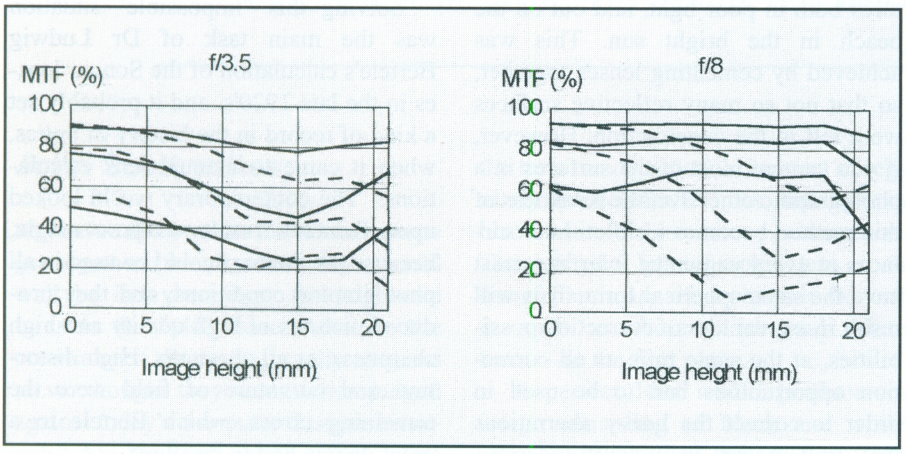
Therefore, really powerful lenses for general photography were considered impossible in the 1920′s.

Solving this "impossible" situation was the main task of Dr Ludwig Bertele's calculation of the Sonnar lenses in the late 1920's, and it probably set a kind of record in the history of optics, when it came to manual lens calculations. The contemporary world looked upon Bertele's results as pure magic, because the Sonnars could be used in all photographic conditions, and they produced pictures of high quality and high sharpness, at all apertures. High distortion and curvature of field were the remaining errors, which Bertele to a great degree had to swallow .

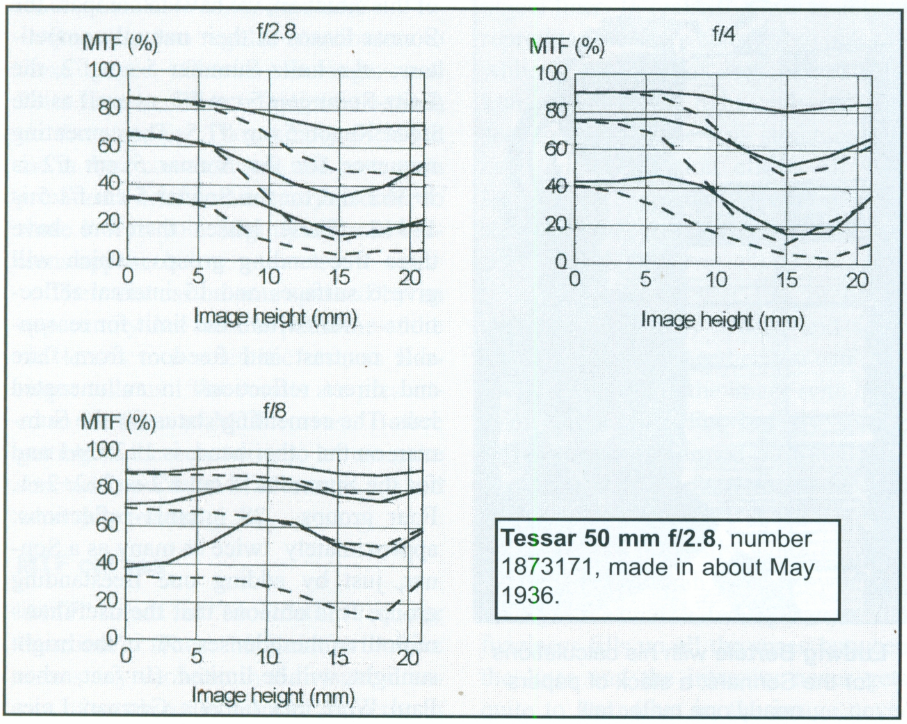
In order to get the complete picture of this situation, we have to compare the Sonnar lenses to their natural competitors; the Leitz Summar 5 cm f/2, the Leitz Summitar 5 cm f/2, as well as the Leitz Xenon 5 cm f/1.5. The cementing sequence for the Sonnar 5 cm f/2 is 1+3+2 and for the Sonnar 5 cm f/1.5 is 1+3+3. These lenses therefore have three freestanding groups, which will give 6 surfaces and 15 internal reflections—well within the limit for reasonable contrast and freedom from flare and direct reflections in an uncoated lens. The cementing status for the Summar, on the other hand, is 1+2+2+1 and for the Summitar 5 cm f/2 is 2+2+2+1. Four groups, 28 internal reflections: approximately twice as many as a Sonnar, just by adding one freestanding group. It is obvious that the usefulness of both of these lenses, out in the bright sunlight, will be limited. (In fact, when Paul Wolf, the famous German Leica



Planar T*, 45 mm f/2. A modern lens in the G-system mount. Compare these data with those of all the prewar lenses represented on these pages.



Tessar 50 mm f/3.5. This lens, number 2674412, was made in September 1940.



Tessar 50 mm f/2.8, number 1873171, made in about May 1936.

A note on the MTF graphs

The modulation transfer function T is plotted as the ordinate, from zero to 1.0 for the Planar (left) and from zero to 100% for all the others.

Image height in mm is shown on the abscissa, from 0 (the center of the image field) to just over 20 mm, the corner of a 24 × 36 mm frame.

Solid curves are for sagittal orientation, dotted ones for tangential. For each lens opening there are curves taken at 40, 20, and 10 c/mm, with 40 c/mm the lowest and 10 c/mm the highest. All are made in white light.

pioneer, made the pictures for his book *My Experience in Color* late in the 1930's, he used a Summitar 5 cm f/2 for all his indoor pictures but an Elmar 5 cm f/3.5, containing just three free-standing lenses, for all the outdoor pictures. That was the reality for a Leica photographer in the 1930's.)

The cementing status for the Xenon 5 cm f/1.5, finally, is 1+2+2+1+1, which will give 45 internal reflections. This lens is not be usable in strong light at all. The Xenon was meant for special use in poor light, and by developing the entire film to high contrast. Such was the situation in the field of photographic optics, before Alexander Smakula at Zeiss invented lens coating.

Leitz made a big deal in their advertising in the 1930's, concerning the ability to deliver "distortion free" and powerful lenses—but they forgot to tell their readers that these lenses are less usable in strong light, or were meant just for limited use outdoors.

This historical situation is almost forgotten by now, and thereby the main point of the powerful Sonnars is too. It is also to be noted that such a Sonnar lens, with internal reflections limited to 15 and with coating from 1941 onwards, will give a transmission status comparable to the multi-coated lenses of today.

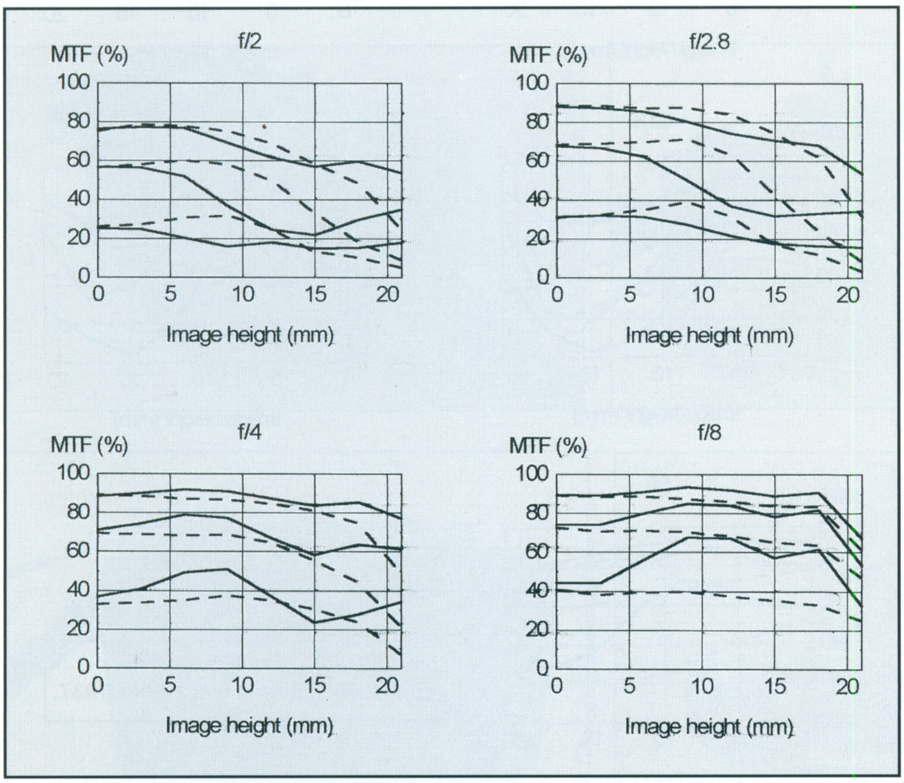
Charles Barringer writes...

The challenge of devising an objective, repeatable, quantifiable assessment of lens quality has frustrated lens makers and photographers since lenses were first used to fix images on film. It would not seem to be so difficult to do this, but while experts have successfully measured resolution and contrast objectively as independent criteria, along with a host of other factors defining image quality, the combined effect of these parameters has remained largely subjective.

Most of you are probably familiar with the term Modular Transfer Function (MTF), the latest, most comprehensive attempt to quantify, in an objective, repeatable and uniform manner, a photographic lens's performance. The results are presented in the form of a family of neat graphs, one for each aperture tested. Each graph shows a given lens's percentage of contrast (in percent on the vertical axis) across the angular field of the image projected by the lens (in mm on the horizontal axis). Three pairs of curves are generally shown, a pair at each of several spatial frequencies of high-contrast targets arranged both sagitally (like the spokes of a bicycle wheel, radiating from center) and tangentially (at right angles to these.)

The complete MTF portrait of a lens therefore consists of a series of curves with Modular Transfer, expressed either as a percentage or a fraction of unity, on the *y* axis, and distance from center of the field, expressed in mm, on the *x* axis. Tests are run at various apertures, each one generating a graph. The family of graphs represents a given lens's MTF portrait. Each graph shows these data at a single aperture, so the full MTF assessment includes several graphs, one for each aperture.

The frequencies commonly chosen for a photographic lens test, 40, 20 and 10 line pairs per millimeter, may seem laughably gross by the standards of which we know these lenses to be capable. (Remember *Modern Photography*'s resolution criteria?). But keep in mind that MTF is not only resolution. Lens makers have realized that in the real world, with real photographers using real equipment, 40 l/mm with 75% contrast in the lab will equate to very a very high standard of performance in the vast majority of photographic situations.



Sonnar 50 mm f/2, number 2230663, made in February 1938.

MTF curves for high-performance modern lenses, for example, are generally included by the manufacturer as part of the documentation provided to the purchaser. Looking, for example, at the MTF curves of the 45 mm f/2 Zeiss Planar (for Contax G), a modern lens acknowledged to be at the top of its class, one sees that at f/4 (the time-honored "sweet-spot" two stops down from wide open) both curves for 40 l/mm swoop across the *x* axis at levels near 70% out to 18 mm from the center, or the entire width of the 35 mm frame. At this aperture the curves drop sharply past 18 mm, i.e. in the corners of the field. In other words, 40 l/mm is a completely useful criterion for field photography, and is the standard, with 20 and 10 l/mm.

Note that Carl Zeiss and other lens makers adjust the criteria to the task at hand. Lenses for microdocumentation, and other applications such as chip manufacture, are tested at much higher frequencies because these lenses will need to satisfy far more stringent requirements and will be used under very exacting conditions.

Even this relatively brief presentation shows why MTF is often misunderstood, and it is but one of a long list of parameters. Importantly, understanding MTF also requires a clear understanding of what the MTF does not measure; criteria not revealed by MTF but affecting the final photographic result that must be included in any definitive appraisal. A Zeiss representative talking to a potential client would present a thick dossier including not just the MTF analysis but a sheaf of other documents and curves assessing other optical characteristics of the lens under consideration, to say nothing of a host of other factors involving the commercial and non-optical aspects of the issue.

Those of us who own and use older photographic equipment are often quite defensive about the perceived quality of the results made by our favorite playthings. We were able to address this frustration recently when an enthusiast friend briefly obtained access to a first-class modern lens-testing facility and subjected a few favorite lenses—prewar Carl Zeiss Jena 5 cm Sonnars and Tessars for the Contax—to MTF analysis. The results obtained satisfy a long-term curiosity shared by many of us to know just how competent these 60-year-old lens designs really are compared to, say, the G-series 45 mm f/2 Planar. We had really hoped that the comparison might be extended to postwar Contax-mount Sonnars and Tessars from Jena and Oberkochen, but for now, at least, here is what we have. Fortunately MTF data should be comparable regardless of the facility, date, or conditions of the tests, so when we or anyone else next has a crack at the test bed, the results can be compared directly with these.

John Scott writes:

Data for eight prewar 50 mm lenses were made available to me; two f/2.8 Tessars from 1934 and 1936; two f/3.5 Tessars from 1938 and 1940; two f/2 Sonnars from 1937 and 1938, and two f/1.5 Sonnars from 1937 and 1938. In each case the performance of each of the two lenses of a pair did not differ by any significant amount, so I chose just one to represent each lens type. (When there was a discernable difference I chose the "better" one.) I also reproduce the MTF curves for a modern f/2 Planar in G-system mount.

The tests were made in white light, at three frequencies: 10, 20 and 40 cycles per millimeter. It is always true that MTF values are higher for low-frequency test patterns (10 c/mm) than for high-frequency ones (40 c/mm). I have read in many different sources that a high MTF value at low frequency, 10 c/mm, is a sign of good contrast behavior by a lens, whereas high MTF at high frequency, 40 c/mm, means good sharpness. I'm not sure I know exactly what this means because subjectively a lens showing good contrast can appear to be very sharp, and vice versa.

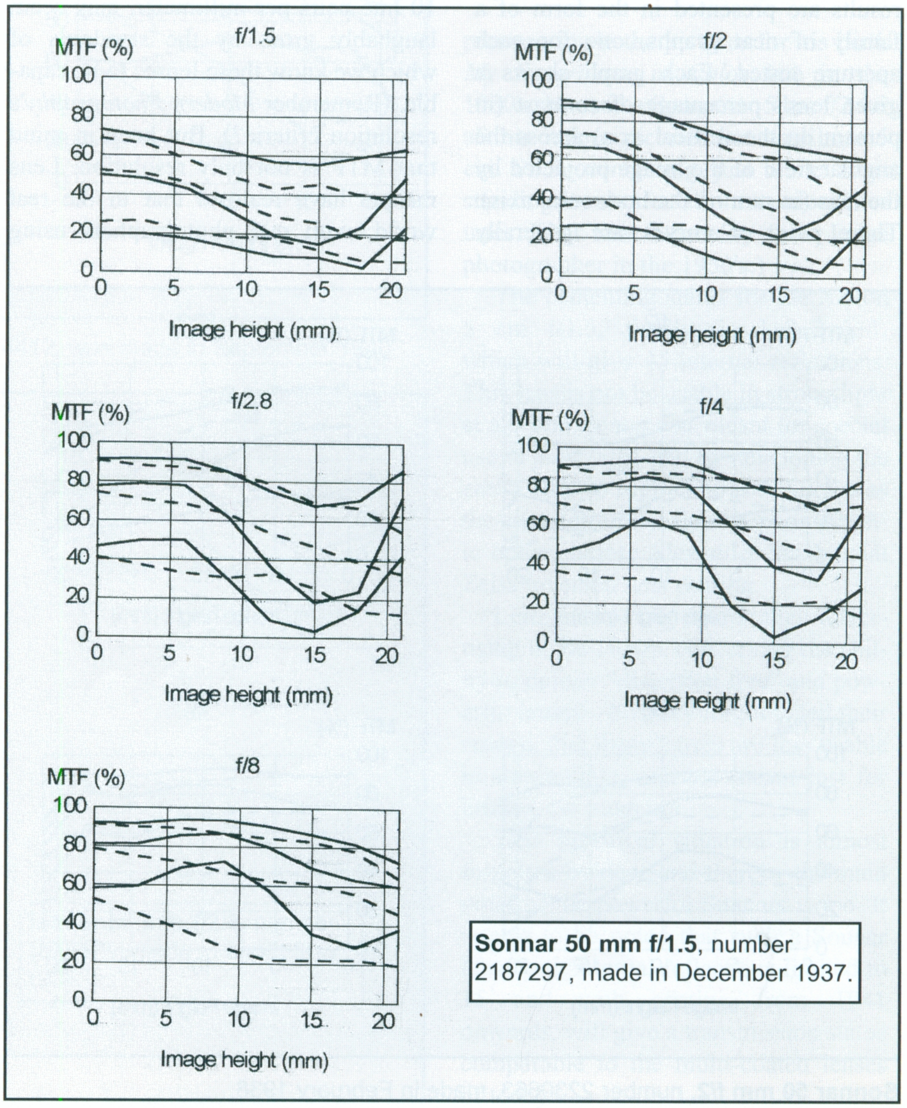
You can have a happy time studying these graphs to see what they tell us. All I can offer is some broad conclusions:

1) All these lenses perform excellently in the image center at full aperture and for low-frequency 10 c/mm test patterns. The theoretical maximum varies according to aperture but is usually up around 90%; here we see measurements of at least 80% for all lenses.

2) The Tessars look very good against their cousins the Sonnars. Look particularly at the 40 c/mm data for image heights of 15 to 18 mm (close to the edge of the frame). The f/1.5 Sonnar appears especially weak in this region. Based on these data I would find it difficult to recommend the Sonnars over the Tessars if the full f/2 or f/1.5 apertures were not important. However, bearing in mind Peter Hennig's comments above, the good performance of the Sonnars at 10 c/mm—apparently implying good contrast rendering by these lenses—made them able to "dominate available-light photography, thanks to their unique ability to produce high-quality pictures under all kinds of light conditions" in Peter's words.

3) The modern lens is certainly "better" (by these tests) than the older ones, particularly at 40 c/mm. Comparing performances at f/4 and for 40 c/mm, the Planar never goes below 60% until the edge of the frame is reached, whereas the older lenses are in the 20-40% region at 15 mm image height.

4) None of this makes any difference if you have a lens that you like and which gives you results that meet or exceed your expectations. (My own way to get clearer, sharper enlargements is to shift to a larger-format camera, but that's another story.) ❐



Sonnar 50 mm f/1.5, number 2187297, made in December 1937.

A new Contax-mount rangefinder camera

John T. Scott, Glen Ridge, New Jersey

Cosina of Japan has added a Contax-mount version to its Voigtländer Bessa range

Cosina's R2C, a member of this company's so-called "Voigtländer Bessa" range, offers an opportunity to use Zeiss rangefinder-coupled, Contax-mount lenses in a camera equipped with through-the-lens metering, lever wind, and viewfinder frame lines for 35, 50, and 85 mm lenses in a smart black body.

I have used mine for a few months now, and it has become a favorite. The rangefinder baseline looks laughably short at about 40 mm compared with the 73 mm of a Contax IIIA or 90 mm of a Kiev, yet it delivers very clear twin images to the central patch in the viewfinder that makes focussing (via the Contax-style knurled wheel for a righthand finger, for 50 mm lenses) very precise and easy. The viewfinder itself is (dare I say it in this publication?) better than that of the classic Contaxes, at least for this eyeglass wearer. Frame lines for whichever of the three focal lengths is selected show very clearly as suspended-frame yellow lines.

Also showing clearly in the viewfinder are three LED's, for over-, under-, and correct exposure. This meter is the only electrical feature of the camera; everything else is manual.

The metal focal-plane shutter has speeds from 1 s to 1/2,000th, plus B.There is no self-timer. Flash synchronization is at 1/125 s.

Contax lenses fit nicely in the mount, with the same compatibility that you find in postwar Contaxes. That is, all 50 mm and longer lenses fit, but not all prewar wideangles or Russian wides do.

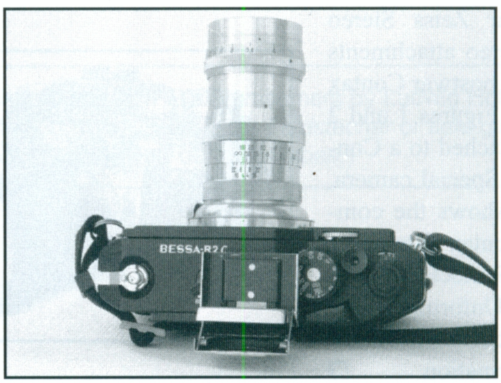
A nice black plastic body cap comes with the camera. (You can use it on your Contaxes, too!)

The instruction book with my camera is in excellent English (a rarity these days!), but I noticed that the name "Cosina" appears nowhere in it.

The camera is distributed in the US by Stephen Gandy. Go to his Website,

http://www.cameraquest.com/,

for many more details than I have space for here. ❐



The Voigtländer Bessa R2C by Cosina with a 50 mm f/2 Sonnar (top left). The 135 mm Sonnar needs an accessory viewfinder, such as this Albada folder (top right), but then the shutter speed knob is hard to see and to adjust (bottom right). The back of the camera (bottom left) proclaims "Voigtländer / Germany Since 1756." Only on the bottom plate do we read "COSINA CO., LTD" in white lettering and "MADE IN JAPAN" in unpainted molded letters.

Matters arising...

Nicholas Grossman, Rockville, Maryland, USA

A strange Nazi binocular

Stefan Baumgartner, in his article in *Zeiss Historica,* Fall 2002, page 24, describes with detailed illustrations a World War II Zeiss Contax II camera that includes a large Swastika attached to the front of the camera body. I have a strange World War II 6×30 Zeiss binocular bearing two of the same type and size Swastikas (figure 1).

Looking at the ocular side, we see that the left side is engraved: 6×30 LÁTSCÖ (Hungarian for binoculars), below it the Nazi eagle with the Swastika, and a date: VII 1944 (figure 2). The right side is engraved: carl zeiss jena (all lower case; no capitals), then a small Swastika, and below it the number 11316 (figure 3). The front covers each have a large Swastika, visible in figure 1.

My assumption is that this was a standard 6×30 Zeiss production model, made for the Hungarian military. It was found recently in a flea-market in Sofia, Bulgaria, and I have no other clues about it. It does confirm, however, that the Swastika on the Contax II camera is not unique.

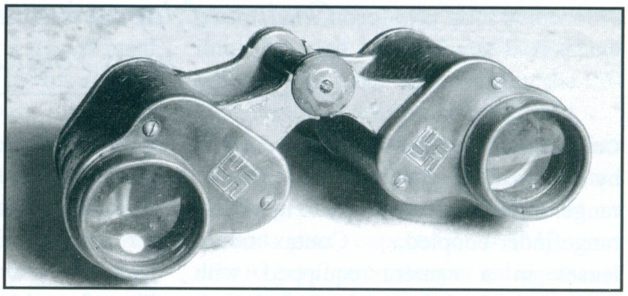


Figure 1

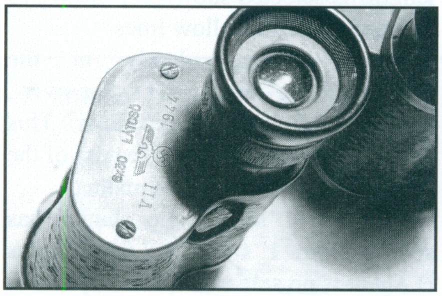


Figure 2

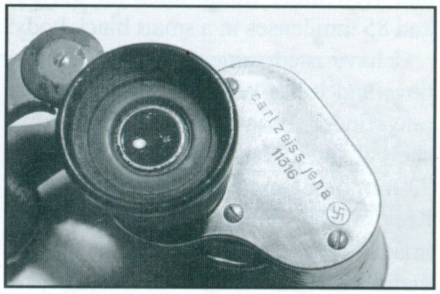


Figure 3

Stereo lenses for microscopes

Bernd Otto, in his article in *Zeiss Historica,* Fall 2002, page 7, described and illustrated the postwar Zeiss Contarex prototype Stereotar Tessar lenses. *(See also this issue, pages 13–17, for more on Zeiss stereo lenses).*

It is interesting to note that, while Zeiss management decided not to produce and market the Contarex camera stereo lenses, they did market stereo lenses for the postwar Zeiss Stereo Microscopes. These stereo attachments were designed to fit the postwar Contax and Contarex cameras. Figures 1 and 2 show the stereo lens attached to a Contax IIa and a Contarex Special camera, respectively. Figure 3 shows the complete setup with the Contax fitted to a Zeiss (Oberkochen) Reflected Light Stereo Microscope. Unfortunately I have not been able to locate model numbers or any further information. ❐

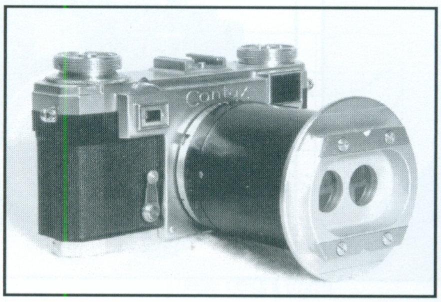


Figure 1

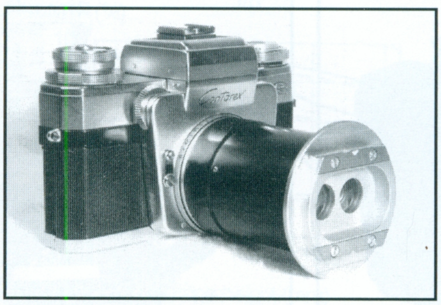


Figure 2

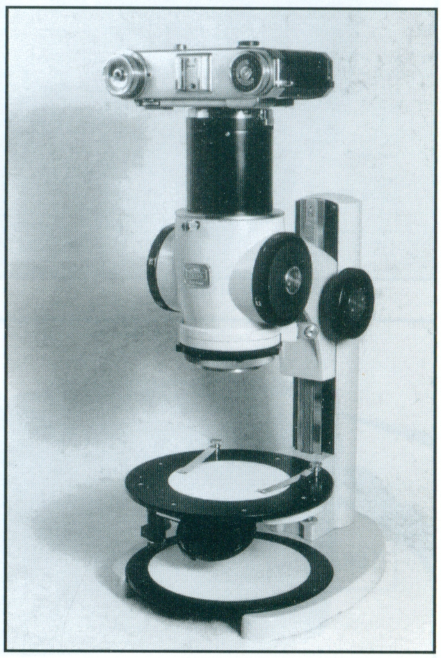


Figure 3

Back cover: A 1912 advertisement by Ludwig Hohlwein of Munich, advertising Zeiss *Feldstecher* or field glasses. (From the collection of Larry Gubas.)


ZEiSS
FELDSTECHER
LUDWIG HOHLWEIN
MÜNCHEN