

# **The Great Age of the *Taschenmikroskop***

## **Part II:**

### **Serious Amateur and Professional Instruments**

(Continued from Issue 189: July 2011)

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## ***Introduction***

In Part I of our series on the "[The Great Age of the \*Taschenmikroskop\*](#)", we surveyed the historical, social and economic background and evolution of the *taschenmikroskop* phenomenon of the 1920s and the early 1930s. We discussed and evaluated two smaller and originally less expensive representatives of this category: the Spindler & Hoyer "Junior" and the Hensoldt "Tami".

In Part II, presented here, we examine some more capable, and expensive, *taschenmikroskop* examples. These more elaborate microscopes were intended for, and sold to, serious amateurs, and professionals, and used by travelling scientists. The top of the line instruments in this category usually had higher magnification options, were equipped with advanced optics and accessories (e.g., oil immersion objectives, Abbe condensers, iris diaphragms, etc.), and were often versatile and innovative. At the high end are, arguably, "the royalty of the *taschenmikroskop* decade": the Hensoldt Protami and the Goerz Ultra-Lomara. These two microscopes representing different implementations will be discussed in the next Part of this series.

## ***The Microscopes***

### ***Mid-range microscopes***

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**Model Designation:** "Klemi" <sup>i</sup>

**Manufacturer:** Georg Kremp

**Location:** Wetzlar, Germany

**Production Year:** 1923-4

The company was founded by Christian Kremp (1843 - 1920). Kremp was a carpenter who moved to Wetzlar in 1877 to establish a workshop for the manufacture of musical instruments. Starting in 1881

the company gradually evolved from the manufacturing of musical instruments to the production of precision parts.<sup>ii</sup>

On the advice of Moritz Hensoldt in 1885, the division of musical instruments was abandoned in favor of other products. In 1913, the company was taken over by Georg Kremp, the son of the founder. By request of his father, he separated the workshop in 1920 into two companies. One of them, named after Georg Kremp, specialized in the field of microscopy.<sup>iii</sup>

Made in the tradition of what may be referred to as “the Wetzlar *taschenmikroskop* school”, this little microscope is nicely designed with chromed tube and japanned black enameled brass stand. Although its shape resembles the contemporary Leitz “Minor”, the design of the “Klemi” (Figure 1), is quite old fashioned and it looks like a better constructed, and more stable, version of the Spindler & Hoyer “Junior”.<sup>iv</sup> The tube is short and without drawtube capabilities and the magnifications are controlled by three button lenses and three optional Royal Microscopical Society (RMS) 23mm oculars, providing an overall magnification range of 25X-168X or 67X-280X, more or less in the range of the Hensoldt Tami. The optical quality is quite good, and the fine focusing by knurled tube is convenient. The use of standard RMS size oculars enables the employment of a larger choice of eyepieces, a very unusual feature within the *taschenmikroskop* category.

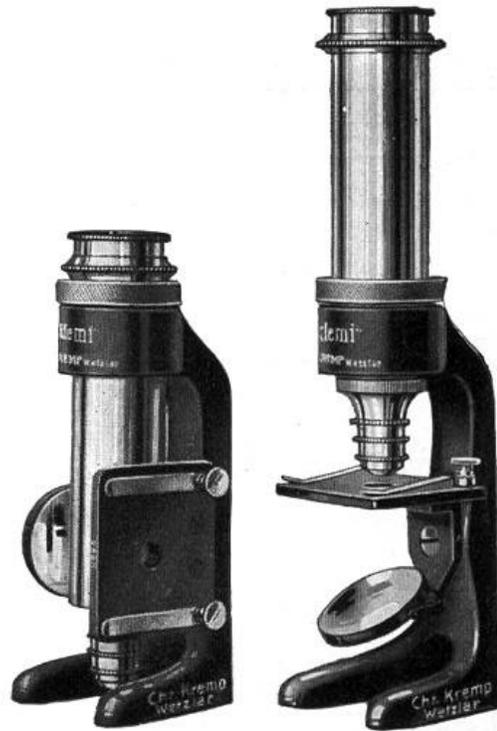


Figure 1: Kremp “Klemi” microscope folded and compacted (left) and extended for work (right), from the 1924 catalogue by Georg Kremp, Wetzlar

The microscope is collapsed for storage by rotating the stage and mirror around a pivot, and then sliding the tube down until the objective is inserted between the tiny horseshoe shaped legs of the base. The folded microscope is housed in a fitted box. In January 1924, the instrument was offered for sale with two optional cases: either packed in a black paper-coated cardboard case for 45 Goldmark (GM), or in a chestnut dovetail wooden box for GM 50.<sup>v</sup> Therefore, the price of the Klemi was more or less similar to that of the Hensoldt Tami.

The Kremp “Klemi” is a charming small pocket microscope with good optical quality and an attractive design. However, in the authors' opinions it lags behind the quality and functionality of two of the other mid-range microscopes discussed here: the Leitz “Minor” and the Hensoldt Metatami. However, these models were much more expensive. The Klemi compares quite favorably with the Hensoldt Tami, which was sold at the time for the same price.

## Model Designation: "Lomara"

**Manufacturer:** Goerz

**Location:** Berlin-Friedenau, Germany

**Production Year:** 1928-34

Goerz was founded as a company in 1886 by Carl Paul Goerz. Originally, the company made geometrical drawing instruments for schools. In 1888 the company began to produce cameras and lenses. During the First World War, Goerz's main production was for the German and Austrian military. In 1895, Goerz founded an American branch in New York that was to become the C. P. Goerz American Optical Co in 1905. In 1926 the German branch of Goerz was saved from bankruptcy after it was merged with other companies to form Zeiss Ikon. An Austrian branch of C. P. Goerz was still active in the 1950s. The American branch of the company continued to operate independently in the USA until 1972.<sup>vi</sup>



Figure 2: A Goerz "Lomara" set with cases and accessories



Figure 3: Goerz "Lomara" detail

This little pen tube microscope, made of Bakelite (a newly invented material a decade before), is conveniently stored in its fitted leather pouch. The full set includes a second set of button objective lenses and a stand with a heavy iron ring base. These are stored in relatively simple black paper coated cardboard boxes (Figure 2). As only the pen tube is expected to be taken out for fieldwork, while the other accessories are for desktop use, this set-up seems appropriate. The Lomara stand can be seen in more detail in Figure 3.

The two objective sets, marked 3 and 5, are made of sets of button lenses fitted to each other by threads. The 3 set includes three lenses marked 3a-3b-3c (Figure 4), supplying in different combinations the magnification power of 15X to 50X, and the 5 set contains additional four lenses (marked 5a-5b-5c-5d) increasing the magnification power up to 250X. The different magnifications are achieved by screwing the button lenses according to different orders, specified in the inner side of the tube's cardboard box. The objectives are then surrounded by a nickel-plated brass hood, which can be leaned on a table or any other surface while using the pen microscope without the stand, or secured into the stand for bench-top use.

This innovative pen/pocket microscope dates to the end of the 1920s. It appears in journal advertisements from 1928 until about 1934. In 1928, the US price of the elementary pen microscope was \$6.75; the additional objective and the stand were \$4 each. Hence the complete set was \$12.75. The US Consumer Price Index indicates that a Lomara pen microscope selling for \$6.75 in 1932, would cost in today's

dollars about \$109.22. The complete package, with the stand and the optional second objective lens that was offered for \$14.75, would cost \$238.67 in today's prices. Because these were the years of the Great Depression, this price was beyond the reach of most amateurs.

Dimensions: Weight: 26.35 g (pen only), 233.15 g (with stand). Height with stand: 18 cm, pen length: 12.8 cm.

Performance: Focusing is achieved by turning the outer knurled tube around the pen. While the Bakelite pen and the nickel finished brass hood are very light, the relatively heavy cast iron ring base and the swivel limb connected to it by a compass joint make the operation of this microscope very convenient in consideration of its extremely compact size. The small rounded stage with its two clips can still hold conveniently standard RMS slides. The optical quality is surprisingly high for such a small microscope. However, the field is very narrow providing only  $1380\mu$  at 50X magnification (objectives 3a+3b+3c).

The main drawback of the Lomara is concerned with the change of magnifications. Because it is not equipped with a draw tube like many other small microscopes of this era, the differing magnifications must be controlled by changing the combination of the button objectives. We found it quite tedious to have to release and remove the pen microscope from the stand, unscrew the nickel hood, take off the objective set, and combine the tiny button lenses according to the index in the inner part of the cardboard box, then re-attach the hood, and insert it back in the stand each time the magnification needed to be changed. While working in true field conditions, these small button lenses can easily get dusty or even lost during this operation, and dust or dirt can enter the housing. This, together with the narrow field of view and the low cost and concurrent low quality cardboard boxes, make this otherwise attractive Lomara, again in the authors' opinions, quite inferior to the other members of the low to medium magnification range category of the pocket microscopes such as the Tami and the Klemi.



Figure 4: Lomara with 3a + 3b + 3c objective combined in order, with hood removed to show lenses.

For most current collectors, the Lomara is not an instrument of desire and prices for this microscope have, to date, remained relatively low. The Lomara currently sells for considerably less in the collectors' market than if it were sold in today's dollars at its original price, often selling for less than 1/3rd of its original cost.

## Model Designation: "Minor"

**Manufacturer:** Ernst Leitz

**Location:** Wetzlar, Germany

**Production Year :** 1924

The Leitz "Minor" folding pocket microscope is constructed of aluminum alloy, zinc die casting, and chrome-plated brass. It weights only 360 grams, providing a magnification range of 50X to 250X. It offers crisp viewing and superb top of the line optics.<sup>vii</sup>

Compared to the contemporaneous single pillar Hensoldt Tami, also produced in Wetzlar, the Leitz "Minor" unfolds into a convenient form of a continental microscope (Figure 5)<sup>viii</sup>, enabling handy and rapid focusing and magnification control. The mirror, set on a long L-shaped arm, can be rotated to supply sub- and above-stage illumination. In order to achieve different magnifications, the draw-tube can be pulled out and the flip-on objective moved in or out (Figure 7). The coarse adjustment is done by sliding the tube through its holding sleeve, and the fine focus by turning a spindle knurled tube.

As opposed to the Tami "family", with the exception of the uncommon, optional accessory stand for some "Tami" family members, the "Minor"

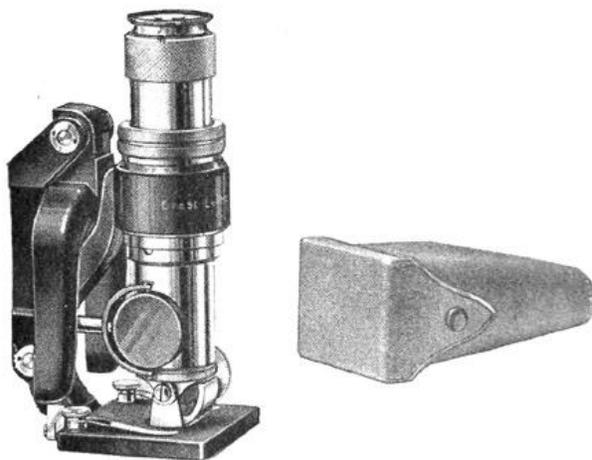


Figure 6: The Leitz "Minor" in folded position and leather holster, from the instruction manual



Figure 5: The Leitz "Minor"

microscope can be tilted for greater functionality and accessibility to the eyepiece. While it's lightweight, and folds into a quite compact pocket size, extended its functionality and size is nearly equivalent to a desktop instrument. This is achieved by a combination of modern materials for its era (aluminum alloy and chrome), and an ingenious folding construction. Despite a nearly 90 year old design, it is still functional in the field today.

This microscope folds into a leather case, in the shape of a handgun holster (Figure 6). The packing or unpacking of the folded microscope into, or from, the leather holster unfortunately scuffs the paint from the front side of the stand. Damage to the "Minor" signature and serial number can be is seen in almost all

surviving examples<sup>ix</sup>. The microscope is equipped with kit lens No. C, which includes fixed and flip-on objectives, providing a choice of magnifications (Figure 7). This kit also includes another 26X objective, a screw-in 5X eyepiece, a further screw-in 2X eyepiece. All these optics were especially developed for the "Minor".

The low magnifying lenses were housed in a small compartment in the cover of the leather case. In addition to a condenser, other accessories could be acquired, including a mineralogical polarizing set with an adaptable rotating stage.

In 1925 the cost of the basic stand was Reichsmark (RM) 100. The price for the additional low magnification eyepiece was RM 6, and the low magnification objective was a further RM 10. The 1925 exchange rate shows that RM 116 was equivalent to US\$ 27.60. Using the US Consumer Price Index this equals in today's dollars about \$477. In the 1920s, this sum was less affordable than today. Like the high end members of the Tami "family", this was not an inexpensive hobbyist instrument but a professional tool for well-funded scientists and institutions.

Dimensions: Weight: 360 g (without case), *ca.* 500 g (with case, estimated, as the case in our collections is incomplete). Height: 126 mm (folded), 250 mm (fully extended), width: 45 mm (base).

Performance: The optical performance of this microscope is exceptionally good and the field is relatively wide, providing 1600 $\mu$  at 100X, excellent functionally even for a bench-top microscope of this period. With its three objective options, optional rotating stage, and polarizers, it is a quite versatile microscope designed for professional use that meets the highest technical and optical standards.

In our opinion, this is the best *taschenmikroskop* of the mid-range category, and one of the best field microscopes of any time period. For field uses that do not require magnifications higher than 250X, this is the microscope we would choose.



Figure 7: Detail of the flip-on objective, stage and sub and above stage mirror

## Model Designation: "Metami"

**Manufacturer:** Carl Hensoldt & Söhne

**Location:** Wetzlar, Germany

**Production Year:** 1923-28

The "Metami" (*mediziner-taschenmikroskop*) is the mid-range pocket microscope of the Hensoldt "Tami family". The Metami was introduced in 1923<sup>x</sup>, three years after the introduction of the smaller and less expensive Tami in 1920. While the first model of the Protami, to be discussed in the next part of this series, was introduced in 1925.<sup>xi</sup>

Like the Tami, the Metami is constructed of brass with painted and chrome surface finishes. The outer case is made of black enameled aluminum. The microscope is focused by means a knurled collar located midway on the body. A second objective is stored in the bottom base. These objectives, combined with various setting of the drawtubes provide magnifications in the range of 25X-600X. The microscope is also equipped with condenser and iris diaphragm, flip-up stage clip, and flat and concave mirrors on an adjustable arm. All these features are improvements from the Tami. For easier access for the replacement of the objectives, the stage can be flipped out of the optical path.

The Metami was not an inexpensive device. In the 1928 Hensoldt catalogue its price tag was RM 120, by 1932 it had risen to RM 150. For comparison, at the same time the price of a quality Kosmos Humboldt microscope, with three objectives and four oculars set in a fitted wood case, was also RM 150<sup>xii</sup>. According to official German statistics, during the same years the average monthly salary for white- and blue- collar workers was approx. RM 160.



Figure 8: The Hensoldt Metami

Dimensions: Weight: 818.5 g (packed), 680.8 g (unpacked). Height: 155 mm (packed), 235 mm (unpacked, tube fully extended), diameter: 45 mm (base).

Performance: As with other Hensoldt "Tami family" microscopes, the optical quality is quite good, providing a reasonable field of 990 $\mu$  at 100X. However, like the anecdote about the middle born child<sup>xiii</sup>, the Metami seems to suffer from the same syndrome. With a price tag three times the cost of a Tami (RM 45), it has a cost equivalent to a contemporaneous standard laboratory-quality bench-top microscope. Unfortunately, in the authors' opinions, the Metami does not have the advantages of either the Tami or the Protami.

As a small pocket microscope for preliminary field or laboratory tests it would have been much too expensive, and as a professional travel or expedition instrument it is too elementary and inconvenient to use. This was most likely the reason why its production ceased in the 1920s, after only a few years of manufacture. Conversely, the Tami and the Protami continued to be manufactured with improvements well into the 1930s.

We may, therefore, assume that the Metami<sup>xiv</sup> had, in consequence, the smallest total production run in the "Tami family". Apparently, a smaller number of working copies are extant. Although rare is a relative term, no microscope in the "Tami" family is really rare, appearing in auctions, dealer inventories, and for on-line sale from time to time. In fact, at the time this paper is being written a fair number of Tamis have come to the market for sale. However, our feelings are that the Metami is less frequently offered for sale.

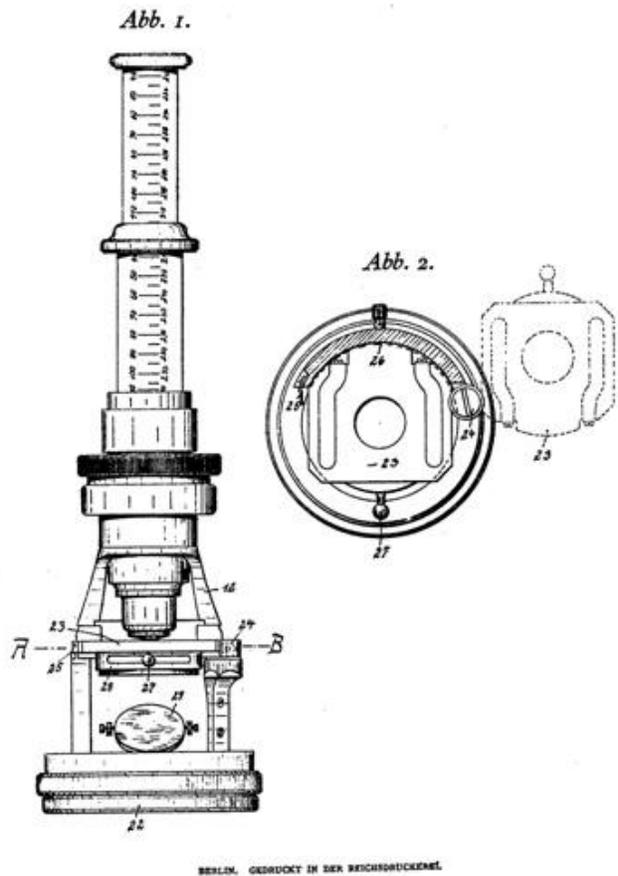


Figure 9: From German Patent Application for Metatami

The perceived value, as collectibles, of all microscopes in the Tami family has risen as more papers about these instruments have been written. With the increased interest these papers have generated, and the concurrent price increases, the expected supply and demand response has occurred and more microscopes in the "Tami" family have appeared for sale, and more are likely to do so.

**Note:** This is Part II of a multi-part paper on *the Great Age of the Taschenmikroskop*:

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The authors would appreciate any suggestions for corrections, improvement, or expansion. They can be contacted at:

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## References

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<sup>i</sup> Our thanks to the Science Museum in London and Ms. Rebecca Storr, Collections Access Coordinator at the Blythe House, Kensington Olympia, London, for allowing us to examine this microscope ("Klemi / CHR. KREMP Wetzlar", Inventory No. A172969). Our review is based on this examination. Unfortunately, permission to include our pictures of this microscope could not be obtained in time for this publication

<sup>ii</sup> Kremp/Wetzlar continues to specialize in precision parts. From the company's current web site (translated to English from German) <sup>ii</sup>,

"KREMP | WETZLAR is an experienced producer of precision engineering and specializes in high-precision gears of all kinds

From wooden gear with a diameter of 500 mm to the smallest helical rack and pinion with  $d = 0.9$  mm and 0.10 module all intermediate steps in all possible materials are possible. Starting with wood on all plastics and nonferrous metals and special high-strength steels. ..."

<sup>iii</sup> For another review of this model see: Mappes, T. Georg Kremp: Klemi. *Museum Optischer Instrumente* [http://www.musoptin.com/Klemi\\_1362.html](http://www.musoptin.com/Klemi_1362.html).

<sup>iv</sup> Goren, Y. and R. J. Kreindler. *The Great Age of the Taschenmikroskop, Part 1*. Micscape Magazine, July 2011.

<sup>v</sup> Mappes, (above, n. note iii).

<sup>vi</sup> Goerz, <http://camerapedia.wikia.com/wiki/Goerz>.

<sup>vii</sup> For more data and some more detailed views of the Leitz Minor, see:

- (1) Portable field microscopes, The Leitz Collection, <http://www.leitzmuseum.org/getportablemicros.html> ;
- (2) The Lundy Antique Microscope Collection, item 066C in <http://www.techinst.com/antiquecollection.html> (with optional rotating stage and polarizers);
- (3) Mappes, T. Ernst Leitz Wetzlar: Kleinmikroskop Minor. *Museum Optischer Instrumente* [http://www.musoptin.com/leitz\\_227611.html](http://www.musoptin.com/leitz_227611.html).

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<sup>viii</sup> Ibid iv, Figure 2.

<sup>ix</sup> Mappes, (above, note vii).

<sup>x</sup> Deutsches Reich Reichspatentamt Patentschrift Nr. 394022, und 399407, Jun. 13, 1923. The authors would like to thank Mr. Rainer Teubner for copies of the original patent files and his useful comments.

<sup>xi</sup> Henkel, K. 2000. Das Protami von Hensoldt – Eine Nutzer-Evaluation. *Mikrokosmos* 89, Heft 5, p. 295, <http://www.urbanfischer.de/journals/mikrokosmos>

<sup>xii</sup> Henkel (above, n. xi), P. 296.

<sup>xiii</sup> The “middle child syndrome” refers to a middle or second born child, or children, being perceived as of less value than the first or last born.

<sup>xiv</sup> Ibid x

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