

The Excellent Leitz Microscopes with Black Enamel Finish



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In the following few paragraphs, several famous Leitz microscopes are introduced. Each of the microscopes comes in a beautiful black enamel finish.¹ All these magnificent instruments were developed sometime between 1937 and 1972.

Updated and revised 5th edition

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¹ We are not sure whether Leitz was using porcelain enamel (a substantially vitreous or glassy inorganic coating bonded to metal by fusion at a temperature above 800°F).

Acknowledgements

Most of the information in this paper has been obtained from the many helpful members of the Yahoo group "Microscope" and the newsgroup "sci.techniques.microscopy". Of course, various brochures and manuals available at Gordon Couger's Web site [2], at Bernard Doudin's Web site [12] and kindly provided by Arthur Rosenfelder were crucial in answering some important questions.

For the 4th edition of this paper, we added information kindly provided by Howard Lynk [13]. We included the Leitz Laborlux III from 1954, which is the first Leitz microscope with a triangular base.

A figure loosely resembling a family-tree of Leitz microscopes produced from 1937 until 1972 has been added. – We also included some important information kindly provided by Brian Hall who is the proud owner of a Laborlux III.

Several changes for the 5th edition were made. A picture of an Ortholux with the famous Leitz Aristophot stand got included. A reference to an extensive list of serial numbers of Leitz microscopes was added. The section about Leitz condensers got extended to include various different condenser systems.

The authors want to thank all readers for their interest in this little project. This is the final edition of this paper.

The Leitz Ortholux, Dialux and Laborlux of the Forties and Fifties

In 1937, the Leitz Ortholux microscope was introduced. It was a new type of instrument that offers a compact basic stand for research. This type of microscope is of high stability and is suitable for a comprehensive range of accessories. The research stand was designed to meet the highest standards in respect of performance and adaptability. The Ortholux is considered to be one of the finest microscopes of all times. It offers a built-in illuminating system for transmitted and incident light. The first version of the Ortholux has a built-in mirror that is flipped up and down to switch between episcopic and diasopic illumination. Only one lamp can be connected (see microscope on the left in Figure 2). Later versions of the Ortholux dropped this restriction and allowed two independent illumination sources to be connected to the scope. – Leitz Ortholux microscopes were sold until the 1970s. The later models were offered with a dark gray finish. A manual of this marvelous microscope can be obtained from Gordon Couger’s Web site [4].

The early Leitz Dialux (sometimes referred to as “baby Ortholux”) from the 1950s has a T-shape base like the bigger Leitz Ortholux (see microscope in the middle of Figure 2). The viewing body is attached on top of the arm and not in front of it like on the Ortholux. A good article about this microscope has been published in Micscape Magazine [5].

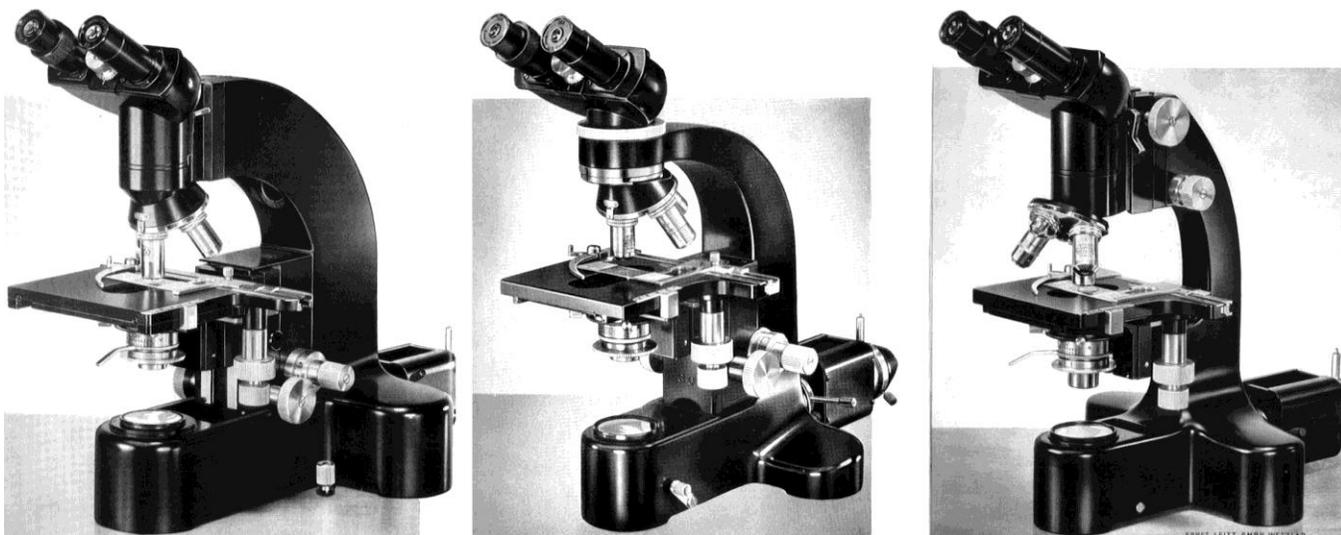


Figure 2: Leitz microscopes from the 1950s. From left to right: Ortholux, Dialux, Laborlux. All these microscopes have a built-in illuminating system. They are equipped with a coarse focusing and micrometer screw with graduated drumhead (1 interval = 0.001 mm) [Copyright © Ernst Leitz GmbH Wetzlar].



Figure 3: Bayonet-type head attachment on Dialux stand [Copyright © Ernst Leitz GmbH Wetzlar].

Not commonly known, there was also an early Leitz Laborlux from the 1940s.⁴ This frame has similarities with the early Dialux but comes with a fixed stage (see Figure 2). The viewing body of the early Laborlux is identical to the one for the Ortholux. Most likely, this early version of the Laborlux is a direct descendant of the Leitz BS stand, which still has the horseshoe base (see microscope on left in Figure 4). – Already in 1954, Leitz introduced the first microscope with a triangular base, the Leitz Laborlux III. The newer Leitz SM, which followed in 1958, and the improved Laborlux IIIa (1959) directly descended from the Laborlux III (see Figure 4).

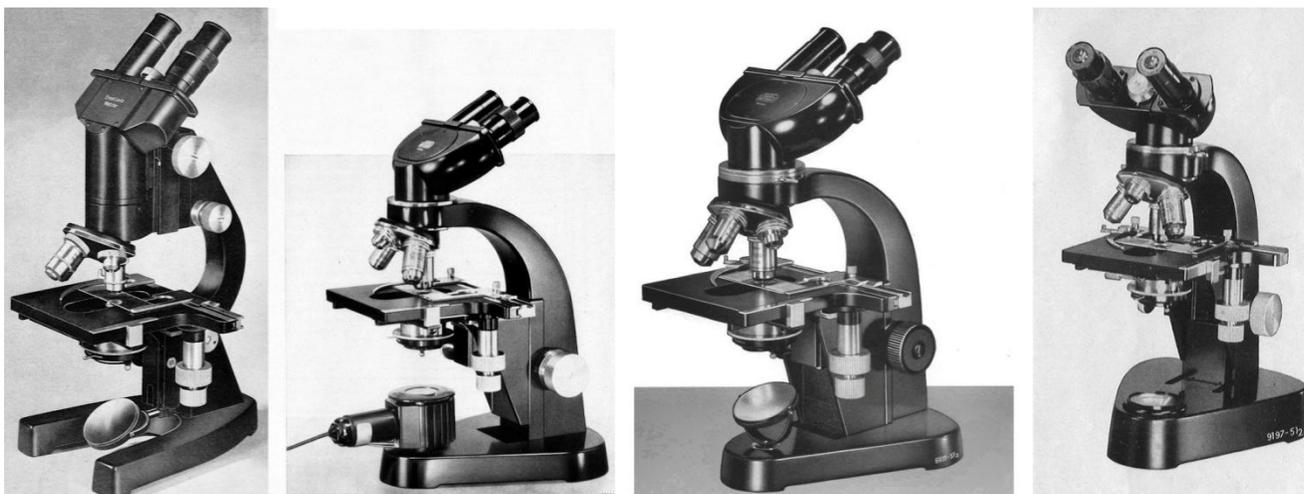


Figure 4: From left to right: Leitz BS 48 92K (1950), Laborlux III (1954), SM (1958), and Laborlux IIIa (1959). [Copyright © Ernst Leitz GmbH Wetzlar].

⁴ We have not been able to exactly determine the date of introduction of the first Leitz Laborlux.

The Leitz Laborlux II

Leitz sold the older Leitz Laborlux until the late 1960s. It was known as Laborlux II. While most modern, research microscopes move the stage up and down for focusing, the Laborlux II keeps the stage in a fixed position. Therefore the specimen remains fixed. This has tremendous advantages for several key applications. In 1960s, Leitz sold heavy micromanipulators (see Figure 5 for a picture of the Laborlux II with two micromanipulators). These micromanipulators were not attached to the microscope's stage. They were fixed onto a heavy metal plate that also supported the entire microscope. For such a configuration to work properly, it is required that the specimen does not move when adjusting focus.

Other successful and often used designs include the attachment of the micromanipulators directly to the stage. However, connecting the manipulators to the object stage puts restrictions on the design of the micromanipulators. When looking at some of the newer inverted microscopes, such as the Nikon Eclipse TE2000, we find that focusing is accomplished via a "nosepiece up/down" movement. This ensures that the specimen's position is not changed during focusing. Conceptually, this is very similar to the Laborlux design. – The Leitz Laborlux of the early 1950s was a truly useful microscope.



Figure 5: A Laborlux II is shown with two Leitz micromanipulators. This picture is from a brochure published in 1966 [Copyright © Ernst Leitz GmbH Wetzlar]. The Laborlux II has a fixed object stage.

The Leitz Ortholux, Dialux, Labolux, Laborlux and SM of the Sixties and Early Seventies

The next two decades were rather busy for Leitz. Besides creating many different models, Leitz also started to work on the successor of the Ortholux, called the Orthoplan. During this time period, Leitz often switched back and forth between the model name “Laborlux” and “Labolux”. The reason for this switching back and forth is unclear.⁵

In 1963, Leitz announced the first Labolux. It was identical to the previously introduced Laborlux IIIa (see Figure 6).



Figure 6: Various Leitz microscopes with triangular base. From left to right: Labolux (1963) (identical to the Laborlux IIIa), Dialux-Pol (1964) with a single-knob focusing control, Laborlux-Pol (1965), Labolux-D (1967), and SM-D LUX. [Copyright © Ernst Leitz GmbH Wetzlar].

The following attributes can be used to distinguish various Leitz microscopes from this era (see Figure 1 for reference):

- 1) Base (T-shape base or triangular base)
- 2) Shape of triangular base (the late 60ties versions have a more elongated base, such as the Laborlux introduced in 1967)
- 3) Size of base (the SM type has a smaller base)
- 4) Size of stand (again, the SM type has a smaller stand)
- 5) Focusing mechanism (single-knob control or coaxial focusing knobs)
- 6) Removable nosepiece (such as the Laborlux 1967 and the Labolux-D 1967)
- 7) Slot for a slider above nosepiece (Labolux-D 1967)
- 8) Type of illuminator (built-in or external)

Many versions have built-in illuminators (such as the Dialux-Pol, Labolux-Pol, Labolux-D, and the Laborlux). While most SM stands have a separate lamp or mirror that sits on the base beneath the condenser, the SM-D LUX has a built-in illuminator (see the microscope on the right side in Figure 6). – Except a few microscopes (such as the Dialux-Pol, Labolux-Pol, SM-D, SM-D LUX, and the Labolux-D), all stands use a very cleverly engineered single-knob focusing control. With this single-knob control, coarse and fine focusing motions are

⁵ While the name “**Laborlux**” makes much sense in the German language, it suggests a rather “laborious” experience in English.

combined in a single operating control. The knobs were either made out of a durable plastic or have chromium-plated focusing heads.⁶ The others (like the Dialux-Pol, Labolux-Pol, SM-D, SM-D LUX, and the Labolux-D) have a coaxial fine focus assembly that resembles more closely the new style used on today's research stands. – The Labolux and Dialux frames are larger than the frame of the SM and also come with a larger mechanical stage.

In order to better understand the difference in height between the Labolux-D/Labolux and the SM-D/SM, we put a Labolux-D side by side with an SM-D stand (see Figure 7).



Figure 7: Side-by-side comparison between SM-D (left side) and Labolux-D (right side). The scale bar is in inch. Please note that both microscopes have the same focusing knobs.

For a successful identification of a microscope from this time period, one must consider the height of the frame and the length of the base. As a rule of thumb, if the height of the scope (including its triangular base but without the viewing body) is around $9\frac{1}{2}$ inches, it is a SM-type microscope. But if it has the taller frame, which is around $11\frac{1}{2}$ inches, it is most certainly not an SM, SM-M or SM-D but either a SM-D LUX, Dialux-Pol, Labolux-Pol, Labolux, Labolux-D or a “newer” Laborlux.⁷ To distinguish the SM-D LUX from the others, one measures the length of its base. The SM-D LUX has a base that is roughly $7\frac{1}{2}$ inches long (compared to the ~ 9 inches for the Labolux-D) (see Figure 7). – The type of focusing knob may further help in identifying the scope.

⁶ The chromium-plated focusing head was an option available for all Leitz SM microscopes (except for the SM-D, which used a coaxial focusing control). It was standard on the Leitz Labolux stands (except Labolux-D).

⁷ The exception to this rule is the Leitz Laborlux III (1954). It has a smaller stand that is very similar to the SM (see Figure 4, second microscope to the left).

The Dialux-Pol, Labolux-Pol, Labolux, Labolux-D, and “new” Laborlux have a removable nose piece that is slightly larger than the one of the SM-style microscopes (see Figure 8).



Figure 8: Removable nose piece of the Leitz Labolux-D.

But also the Ortholux underwent a few modifications. The “updated version” of the Ortholux (see Figure 9) got equipped with a field iris in its base and, consequently, has a few more adjustment screws.⁸

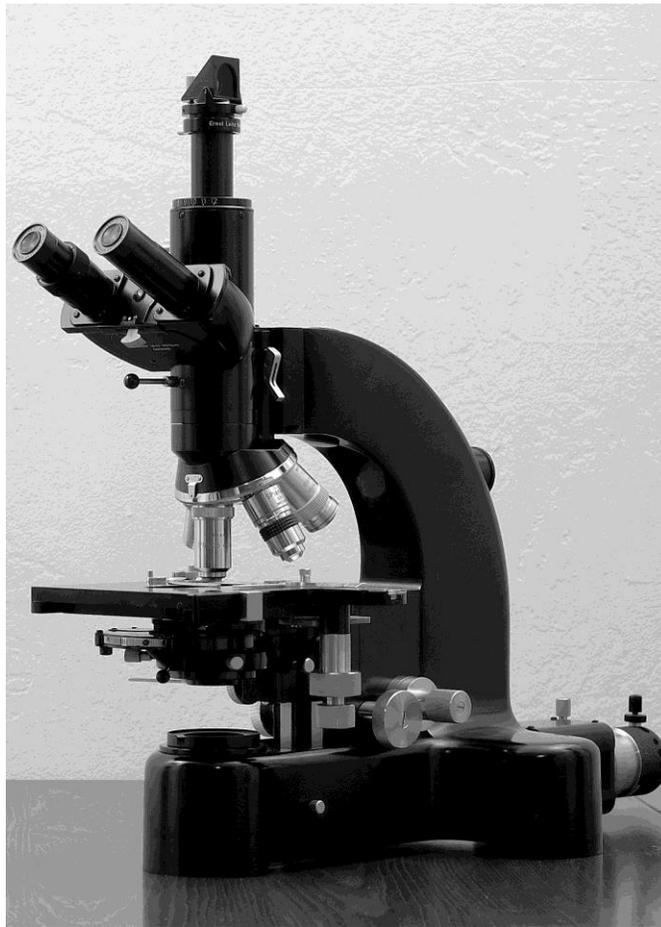


Figure 9: Leitz Ortholux for diasopic illumination and Leitz phase contrast condenser PHACO #402a.

⁸ In the 1970s, the Ortholux was replaced by the Leitz Ortholux-2, which is similar in appearance to the Orthoplan.

When looking more closely at the objective turret of the Leitz Ortholux depicted in Figure 9, the experienced microscopist may have noticed the Olympus S-PLAN 40x NA 0.70 objective and a newer Leitz objective. This is done on purpose and the reason becomes quite clear in the paragraph “Compatibility with Newer Objectives”.

The mechanical tube length for all these older Leitz microscopes is 170 mm. This makes many optical components interchangeable. Additionally, several mechanical parts can be shared.⁹

Starting in the late 50ties, the Leitz Ortholux received a separate illuminator for episcopic illumination (see Figure 10).

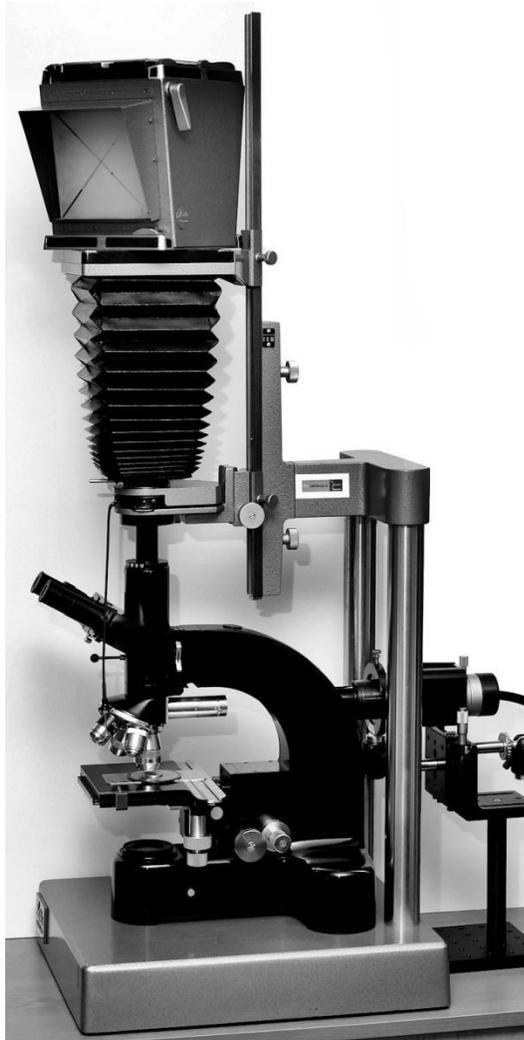


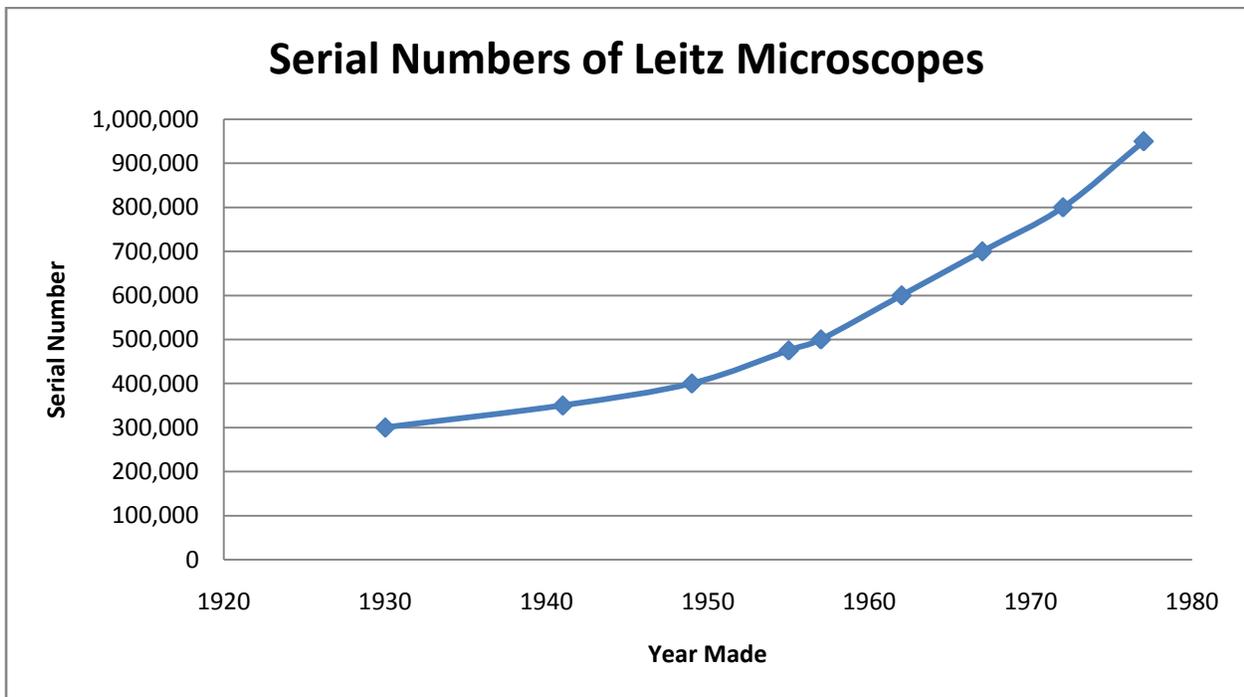
Figure 10: Leitz Ortholux with episcopic illumination and Leitz Aristophot. A 4x5" bellows camera is mounted to the Aristophot.

⁹ However, this “compatibility” has its limits. There are numerous reports that the mount of the viewing body can be different between various Labolux and SM stands. While the authors have only found attachments with a circular collar for the SM and Labolux, information about a bayonet-type head attachment is reported (see section “Parts and Accessories” in [10]). So far, we have only seen this bayonet-type attachment on a Dialux 1 (see Figure 3).

Historical Snapshot of Selected Leitz Microscopes between 1930 and 1977

Over 125 years (between 1849 and 1977), Leitz produced more than one million microscopes. The multitude of different configurations is astounding. During this entire time period, every microscope got carefully labeled with a unique serial number. The following is a snapshot of the very long list of serial numbers and year of production (from [3]). This time period covers the peak of the excellent black microscopes made by Leitz.

Serial Number	Year Made
300,000	1930
350,000	1941
400,000	1949
475,000	1955
500,000	1957
600,000	1962
700,000	1967
800,000	1972
950,000	1977



A more complete list of serial numbers can be found in [14].

Over the last couple of years, the authors were able to acquire six Leitz microscopes from this time period; all of them are fully functional and are still in use today. These microscopes are truly built to last. Perfect optical components are combined with the best mechanical parts. (See Figure 11 for an image of four selected microscopes.) – Just for sake of completion, their serial numbers are listed below.

1. Leitz monocular student microscope model LL 412,848 (from around 1951) with newer nosepiece
2. Leitz SM 528,690 (from around 1959) with monocular viewing body from SM-D 614,506
3. Leitz Ortholux 632,987 (from around 1962) with trinocular viewing body
4. Leitz SM-D 724,739 (from around 1968) with binocular viewing body from SM 528,690 and triangular base from SM-D 614,506
5. Leitz Labolux-D 752,346 (from around 1970) with trinocular viewing body from the early 1960s
6. Leitz Ortholux 626,837 (from around 1962) with trinocular viewing body and Metallux II nose piece from Ortholux 633,224



Figure 11: From left to right: Leitz monocular student microscope LL, Leitz SM with illuminator, Leitz SM-D (coaxial focusing assembly) with Leitz Berek condenser, Leitz Ortholux with trinocular viewing body and Leitz PHACO #402a condenser.

Starting already in the 1930s, Leitz created the most impressive collection of microscopes, which led to the true microscope system known as the Ortholux. While other makers of this time period focused more on specialized microscopes, an Ortholux could be configured to suit someone's special needs. Today, all major microscope makers have adopted this approach. An important part of the marvelous microscope systems by Leitz were excellent objectives, such as the Leitz apochromatic objectives (see Figure 12).



Figure 12: Leitz APO 40x NA 0.95 objective with correction collar. This is one of the many Leitz objectives produced during this time period.

Compatibility with Newer Objectives

Compatibility with newer Leitz and non-Leitz objectives is of great importance to the microscopist using these older microscopes.

During the glory days of the “black” microscope stands, Leitz offered objectives with two different parfocal distances. The older objectives use a 37 mm parfocal distance (“short barrel”) while the newer ones were designed for a 45 mm parfocal distance. In order to combine the two different types on the same nose piece (objective turret), Leitz offered special adapters called PLEZY and FLU-PLEZY.

In 1976, with the introduction of the Leitz Dialux 20, Leitz adopted German Standard Commission DIN 58887 [6]. DIN 58887 recommends a mechanical tube length (TL) of 160 mm. The Leitz Inter-Office Memorandum [7] clearly states that in most cases objectives designed for a mechanical tube length of 160 mm can successfully be used on the older Leitz microscopes, which use a 170 mm mechanical tube length. Of course, the oculars designed for a 170 mm tube length must be used in all cases. In a nutshell, the reason for this backward compatibility is the fact that the older Leitz microscopes use an optical tube length (or image distance) of 152 mm, which is just 2 mm longer than the one proposed by DIN 58887 (150 mm). (See Figure 13 for details.)

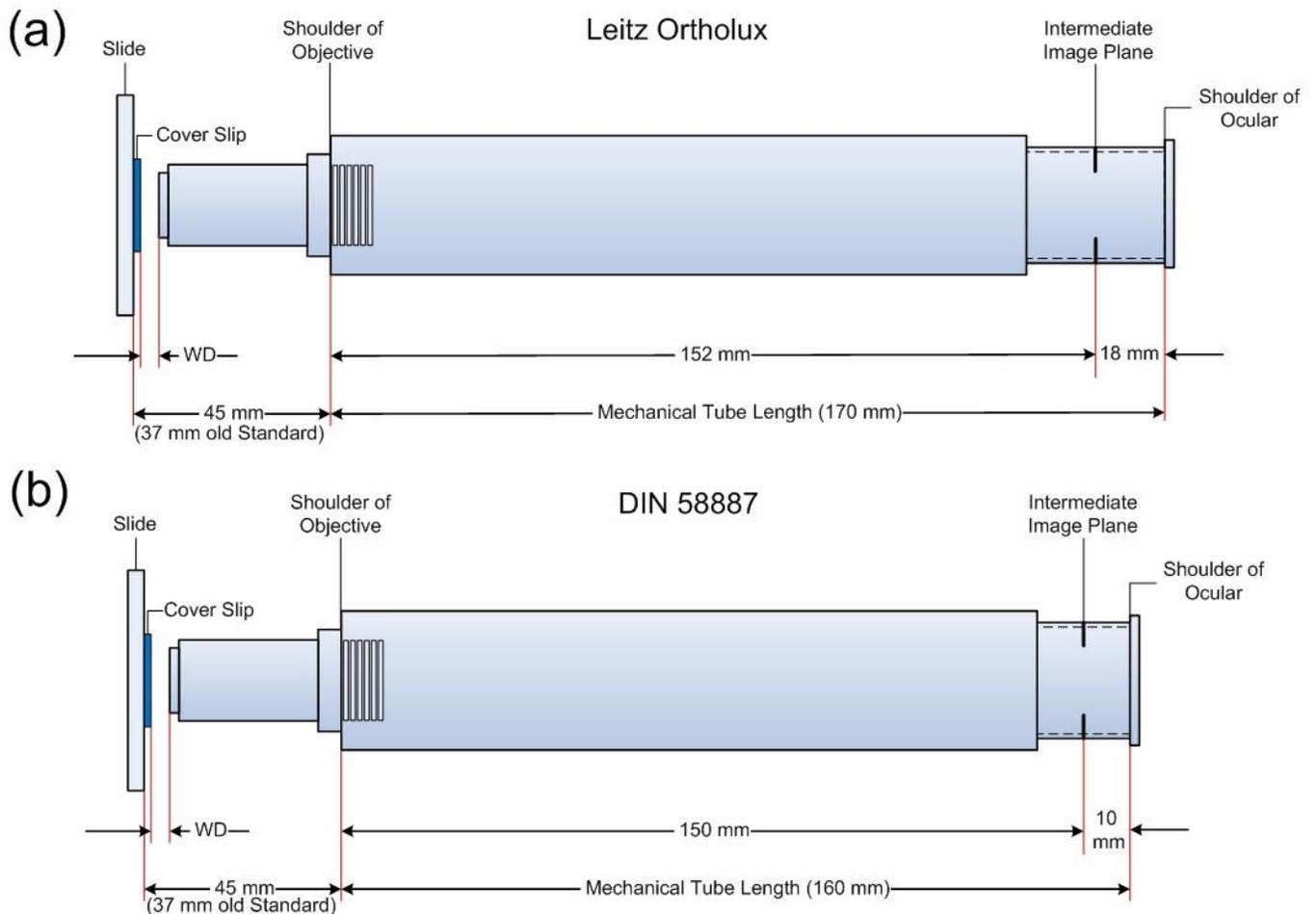


Figure 13: Dimensions for Leitz microscopes prior to 1976 (a) and for DIN 58887 (b).

For objectives with a magnification larger than 1:16, the 2 mm displacement of the intermediary image has no noticeable effect on image quality. Roger P. Loveland plotted the tolerance to tube length change versus objective NA in his excellent book about photomicrography [8]. Loveland concludes that the tolerance to change of tube length is affected only by the numerical aperture NA of the objective. Every dry lens with an NA of 0.80 or less should cope very well with a 2 mm difference in image distance. Even better, a difference of just 2 mm does not impact image formation when oil immersion objectives are used. The reason that Leitz does not recommend using objectives with a magnification of less than 1:16 is most likely due to the fact that one cannot maintain parfocality. If parfocality is not desired, even lower power objectives designed for a 160 mm TL could be used.

From the same Inter-Office Memorandum we can learn that newer oculars should not be used on older Leitz microscopes. Of course, when using an adjustable monocular viewing port, one may still be able to use newer oculars by appropriately reducing the mechanical tube length.

The authors are successfully using an S-PLAN Olympus 40x objective and several Leitz objectives that are corrected for a 160 mm mechanical tube length on these older microscopes (see Figure 9).

The Leitz Condensers

One very important common feature of most advanced Leitz microscopes from this time period is the dovetail condenser holder. Each condenser for this type of mount has its own centering mechanism. Additionally, Leitz offered one that has a “sleeve mount”. The sleeve mount was often used on SM stands. The Berek and Heine condensers and the system 600, 400 and 700 are all designed for the dovetail mount.

Leitz Brightfield Condenser System 600

The condenser system 600 is based on a standard bottom part (No. 600), which is a centering convertible condenser. This bottom part consists of a condenser lens for low powers (up to NA 0.25), an aperture diaphragm and a mount for one condenser top. Leitz offered several condenser tops of various corrections, intercept lengths and apertures. The condenser top can be swung out of the beam path, as illustrated in Figure 14. The condenser system 600 is computed for a field diaphragm built into the stand of an Ortholux microscope. When used with a Laborlux or Labolux-D stand, an auxiliary condenser lens (adapter lens) is added to the bottom of the condenser (see Figure 14) in order to establish Köhler illumination on these stands.¹⁰ The condenser top depicted in Figure 14 has an NA of 0.90 and is known as an Achromatic condenser top (Achr 0.90).



Figure 14: Leitz brightfield condenser 600 with Achromatic condenser top. An adapter lens for a Leitz Laborlux is shown in the right image.

¹⁰ While most such adapter lenses are used to adjust for a shorter distance between field diaphragm and condenser, for the Leitz Orthoplan a special adapter lens is recommended to increase the illumination field for improved illumination.

Leitz Phase Contrast Condenser System 400 According to Zernike

Just like the condenser system 600, the system 400 is based on a bottom part with aperture diaphragm for brightfield illumination and with an interchangeable swing-out condenser top. The main difference is the newly introduced annular stop turret with a number of annular stops. All annular stops can be individually centered using special centering screws (see Figure 15). Again, an auxiliary condenser lens is required to use one of these condensers on a Laborlux or Labolux-D stand. An Achromatic phase contrast condenser bottom part 400a with a top 002 is shown in Figure 15. This configuration is also known as a 402a. The condenser top is identical to the one of the system 600.



Figure 15: Leitz phase contrast condenser 402a with centering screws, green filter and phase centering telescope.

Leitz Dedicated Darkground (Darkfield) Condensers

For the dovetail mount, Leitz offered two darkground condensers, the D 0.80 and the D 1.20-1.40. The D 0.80 was also available for the sleeve mount. Figure 16 shows two darkground condensers with dovetail change. The immersion darkground condenser D 1.20-1.40 is designed for work with oil immersion at high to very high magnification. It produces a light cone with an NA between 1.20 and 1.40. Every objective with an NA of less than 1.10 can be used for proper darkfield illumination. The darkground condenser D 0.80 is used for dry objectives with an NA of less than 0.70.

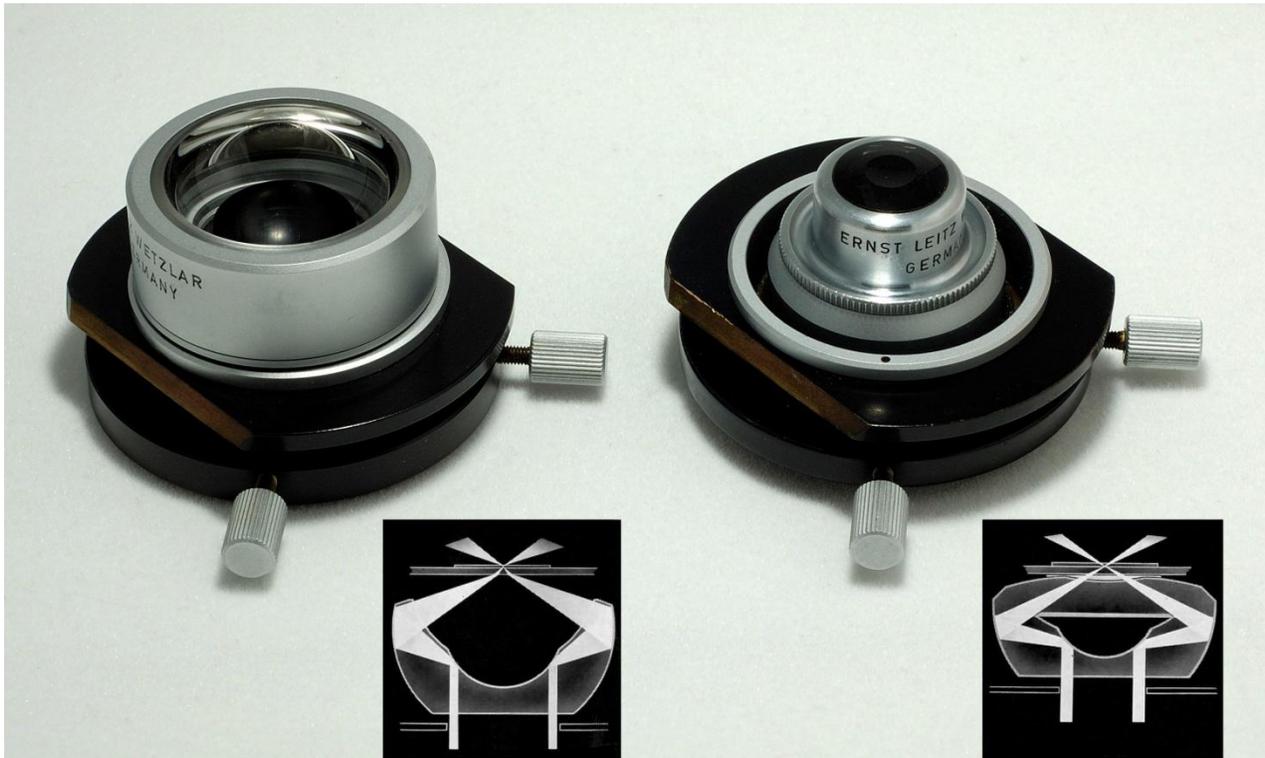


Figure 16: Leitz darkground condensers D 0.80 (left) and D 1.20-1.40 (right). The optical path is illustrated in the two insets. The insets are Copyright © Ernst Leitz GmbH Wetzlar.

These darkground condensers are also known as Cardioid condensers. This type of condenser is not trivial to operate and the following steps must be taken when working successfully with this unit:

1. The object slide should be between 0.9 and 1.1 mm thick and the cover glass should be as near 0.17mm as possible
2. Use immersion oil between condenser and slide (only D 1.20–1.40)
3. Clean surfaces of slide carefully
4. Do not expect too much performance when using thick samples
5. Avoid slides made out of glass with many fluorescent impurities
6. Use centering screws to center condenser for optimal darkfield illumination
7. Do not use an objective with an NA of more than 1.10
8. Do not use an objective with less than 10x magnification

The Leitz Berek Condenser



Figure 17: Famous Leitz Berek two-diaphragm condenser.

Our favorite condenser is the Berek two-diaphragm bright field condenser (No. 76) (depicted in Figure 17).

This condenser is named after Dr. Max Berek (1886 – 1949) who was one of the most famous scientists working for Leitz. Max Berek became famous for his contributions to the field of polarization microscopy.

This condenser is an Achromat, swing-out type model with an NA of 0.95. The top lens elements can be moved out of the optical path to create a more even illumination for low power objectives. An optional oil immersion top is available to increase the NA to 1.40. – It is a joy to use this condenser

on every older Leitz stand that provides the appropriate condenser mount. With only some minor adjustments, it is possible to establish an almost perfect Köhler illumination with any regular desk lamp. First, one needs to properly center this condenser and move the lamp into a position where its bulb appears focused in the back focal plane of the objective. Second, after adjusting the field iris, which is built into the condenser, one is able to enjoy a perfectly evenly illuminated specimen. This condenser is its weight worth in gold. – It is not clear to the authors why nowadays such an elegant condenser design is no longer manufactured.

Leitz also offered the polarizing condenser system 700 and the Heine phase contrast condenser (condenser No. 64). For the sleeve mount, there are several special condensers available, such as the two-lens Abbe condenser with an NA of 1.20 (condenser No. 66), which is very commonly found on Leitz SM stands.

Digital Photomicrography using the Leitz Ortholux

Of great interest is the suitability of these older Leitz microscopes for digital photomicrography, which is photography through the microscope using a digital image sensor. One of the best stands for this task is indeed the Leitz Ortholux microscope (see Figure 18).



Figure 18: Leitz Ortholux with Nikon AFX camera system and Nikon FM SLR camera. For this picture, a Nikon FM is used instead of a DSLR. An Olympus NFK 2.5x photo eyepiece is used. It is added with a custom adapter in such a way as to capture the intermediary image produced by the objective.

The trinocular viewing body of the Leitz Ortholux microscope provides an ISO 38 mm port for today's modern photo adapters/couplers. The older Leitz microscopes use the ocular to complete the correction for lens aberrations, which are only partially handled inside the objective. Mainly lateral chromatic aberration (also known as chromatic difference in magnification = CDM) is not fully corrected inside the older Leitz objectives. A compensating ocular or photo relay lens is required for fully correcting CDM. The details are well explained in the literature. A good starting point is R. P. Loveland's great two volumes [9], which are very highly recommended.

One of the authors is using a legacy Nikon AFX camera system with the AFX-II controller and an Olympus NFK 2.5x photo eyepiece. Of course, there are many other ways to connect a digital camera to such a microscope. Another good approach is to connect a Nikon Coolpix 990 with a Leitz Periplan ocular to the photo port. But in this case, it has to be ensured that the Periplan ocular picks up the intermediate image at the correct location. And last but not least, by using monochromatic illumination, one can directly project the intermediate image onto the image

sensor using a 1x C-mount adapter that is directly connected to the 38 mm ISO port of the trinocular viewing body. This type of setup is particularly useful for IR photomicrography and video microscopy using a deep red filter (such as Wratten 89B -> 720nm).

Conclusions

It is overwhelming to see all these different models that Leitz produced from 1937 to 1972 (see Figure 1). We did not even mention special versions of Leitz microscopes, such as the Leitz Panphot. We also did not include the famous Orthoplan microscope. – One of the most puzzling aspects of this investigation was the almost random assignment of “Laborlux” and “Labolux”. At one time, Leitz did not even bother updating the image in the catalogs but just renamed the Laborlux IIIa (1959) into Labolux (1963).

The Leitz SM, Laborlux, Labolux, Dialux, and Ortholux are truly remarkable microscopes. – The Ortholux is a perfectly suitable platform for digital photomicrography. All these older instruments are still very capable of the highest quality work. – At reasonable cost, there is no brand-new equipment that can compete with the quality of these Leitz microscopes.

More information about Leitz microscopes can also be found on the following good Web site [10]. Last but not least, an interesting article about the Leitz Orthoplan microscope was recently written by Mike Andre [11].

We hope that the reader finds this article useful. All omissions and errors are the fault of the authors. We appreciate any comments and corrections you may have.

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- [6] DIN 58887 recommends: mechanical tube length = 160 mm, intermediate image of the eyepiece = 10 mm, distance of the objective image = 150 mm, and matching distance = 37 mm, and later 45 mm.
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ORTHOLUX



Ortholux 1940
Introduced 1937

- Very first modular microscope system for research
- Removable viewing body
- Removable nosepiece
- Built-in illuminator for diascope and episcopic illumination

- Two separate lamps for diascope and episcopic illumination
- Coaxial stage controls



Ortholux 1960

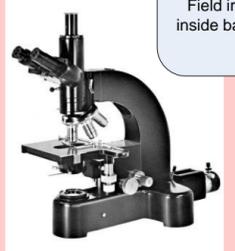
Special version for only episcopic illumination



Metallux 1966



Ortholux-Pol 1967



Ortholux 1966

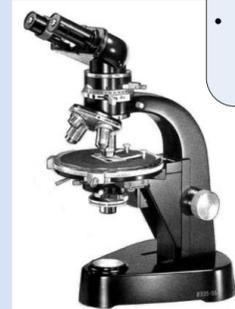
Field iris inside base

DIALUX

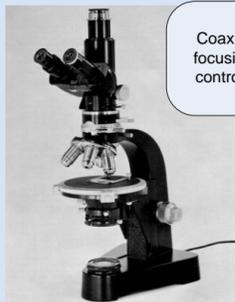


Dialux 1957
Introduced ~1950s

- Triangular base
- Built-in illuminator
- Single-knob focusing control with chromium plated heads



Dialux-Pol 1964

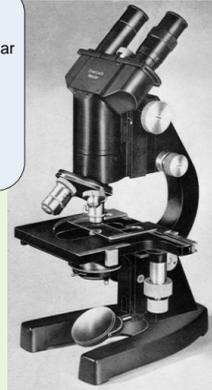


Dialux-Pol 1971

Coaxial focusing controls

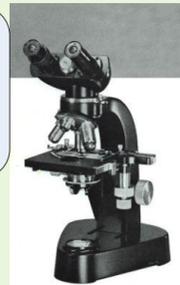
LABORLUX LABOLUX

- Predecessor of Laborlux
- Removable binocular viewing body
- Removable nosepiece
- Coaxial stage controls
- Fixed stage



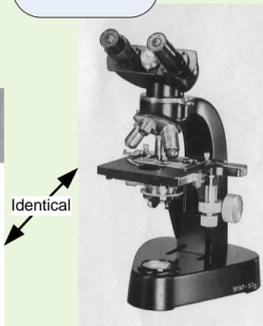
BS 48 92K 1950

- Built-in illuminator
- Larger frame and base



Laborlux 1963

Just a name change from Laborlux to Labolux



Laborlux IIIa
1959

Identical

Coaxial focusing controls



Labolux-D 1967

- Removable nosepiece
- Larger x/y stage
- Longer triangular base
- Slider just above nosepiece



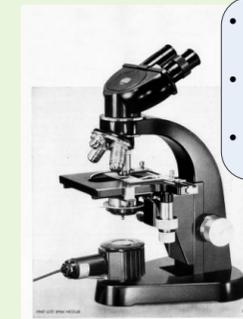
Laborlux 1967

SM



Laborlux
Introduced ~1950s

- T-shape base
- Fixed stage
- Built-in illuminator



Laborlux III 1954

- First Laborlux with triangular base
- Predecessor of SM and newer Labo(r)lux
- Single-knob focusing control



SM 1958

- Small triangular base
- Single-knob focusing control with plastic heads



Laborlux-Pol 1965

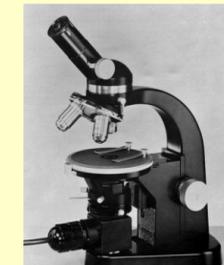
- Coaxial focusing controls
- Version without built-in illuminator is known as SM-D



SM-D LUX 1968



SM-M 1967



SM-Pol M 1971



SM-Pol 1966

The Excellent Leitz Microscopes with Black Enamel Finish

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Flow of Time