Wild Stereomicroscopes

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This paper is adapted and expanded from Part 6 of an earlier paper on stereomicroscopes (Kreindler, September 2013).

Wild Heerbrugg, Switzerland

The Wild company was formed when Heinrich Wild, originally of Glarus, Switzerland, and formerly head of Zeiss' surveying instruments branch in Jena, Germany returned to Switzerland. In April 1921 he founded the Werkstätte für Feinmechanik und Optik (Workshop for Precision Mechanics and Optics) in Heerbrugg, Switzerland. He started with surveying instruments, in keeping with his experience with Zeiss. In 1923, he formed Verkaufsgesellschaft Heinrich Wild (Henrich Wild Joint Stock Company) to sell Wild instruments. In 1924 the original company became part of the Joint Stock Company.

Wild can be credited with many "firsts" including making the world's first aerial cameras, in 1927. In 1948, he set up its first overseas company, in the US, Henry Wild Surveying Instruments Supply Company of America, Inc.

Arguably, the best stereomicroscopes, optically and mechanically, were made by Wild (author: pronounced: vilt) of Switzerland, and Zeiss of Germany.

A Wild brochure on *Stereomicroscopes*, (Wild, 1975), explains their important characteristics.

Wild stereomicroscopes have some great features:

- *Swiss quality and precision in mechanics and optics*
- *Economically designed for convenient and comfortable use*
- *Value for money, because rugged design guarantees long life*
- *Easy to handle, because of clear basic concepts and logical assembly*
- *Astounding number of combination possibilities for accessories*
- *Good range of ancillary equipment for special applications*

This same brochure explains the key features of stereomicroscopes.

The main properties of the stereomicroscope are:

- *Three-dimensional image*
- *Erect, laterally-correct image*
- *Large working distance*
- *Wide field of view*
- *Considerable depth of field*

Because the image is the right way round and there is plenty of room underneath the objective, the specimen can easily be manipulated.

The wide field of view enables the stereomicroscope to be used for examining large, flat objects.

Stereomicroscopes have long been well established in all branches of science, and have now become indispensable tools in technology.

They are widely used in the production and assembly of small components, and in quality control at intermediate and final stages of manufacture.

Although Wild made its first microscope in 1947, it was not until over a decade later, i.e, 1958, that it released its first stereomicroscope, the Wild M5 (Figs. 1).

The M5 could be purchased with a variety of bases, e.g., an incident light only, or incident and transmitted light base. Fig. 1 shows a Wild M5 with transmitted light base, mechanical stage, and hand rests for support when dissecting. Wild M5s are still commonly found in use today, and they or the M5A, see below, and are often *the* dissecting microscopes of choice, particularly for entomology and some other areas of biology.

The M5 has four fixed magnifications, and with 10x eyepieces these magnifications are 6x, 12x, 25x, and 50x. The M5 was sold new from 1958 to 1989. It came with a metal protective dome that could be installed both for protection in the field, or on the research bench, and as a carry case. To assist in photography, the M5 also had phototubes available. Wild phototubes were available to convert the microscope to monocular, or trinocular versions for photography. An example of a monocular phototube is shown in Fig, 2. As configured below, the M5 microscope is rather heavy and weighs approximately 14 pounds, 7.4 ounces.

[Examples of Wild trinocular phototubes can be seen on the M8 and M10, Figs 20 and 28, stereomicroscopes shown toward the end of this paper, below.]

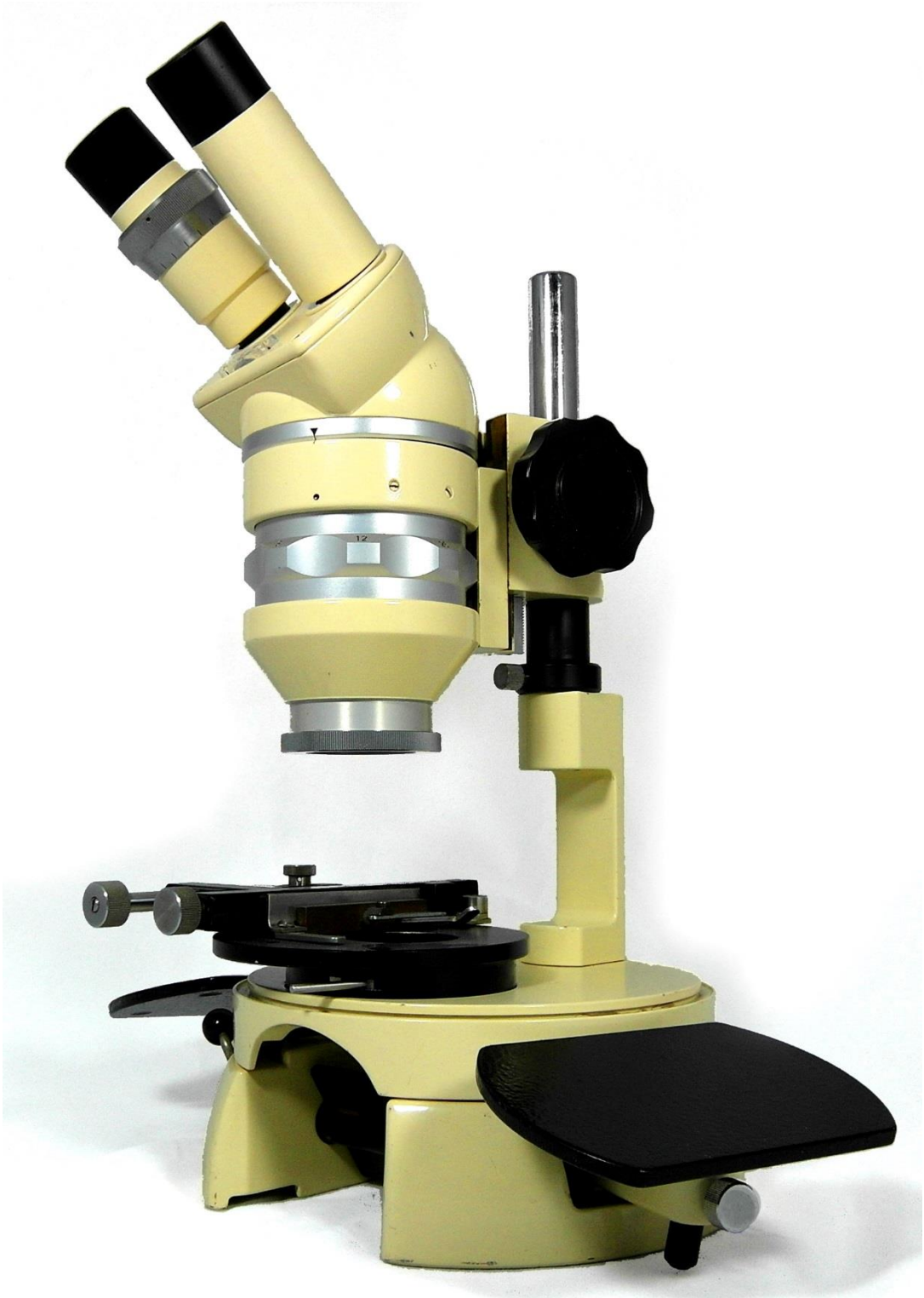

Figure 1. Wild M5 Stereomicroscope on transmitted-light stand

The M5 can be used with one or two lamps for incident illumination. If one lamp is used a spacing ring is placed on top of the objective's milled terminal ring, shown in Fig. 1. If a second incident lamp is used the spacing ring can be replaced with the second incident illuminator's ring. If this is done each lamp's lighting position can be adjusted independently from the other. [See Figs. 21 and 23 for more details of incident lighting attachment]

The optical quality of modern computer-designed high-end stereomicroscope systems from the top four makers, Leica, Nikon, Olympus, and Zeiss can, in resolution, magnification, and zoom range, sometimes exceed the original Wild stereomicroscopes. However, the mechanical quality of these newer systems, whose cost may exceed USD $15,000 when new, is debatably not as good. Their focusing systems often contain plastic components, and have in this author's opinion, a limited lifespan, and planned obsolescence, compared to the original Wild models, many of which are still in use today.

The M5 and its derivatives the M5A and M5D, see below, have optical paths further apart than do those of other Wild stereomicroscopes. Thus, many accessories are specific to the M5 series, e.g., any accessory placed between the body and head of these stereomicroscopes, as well as the binocular heads themselves.

Figure 2. Wild M5 Monocular

Although the standard magnification range of the M5, as noted above, is 6x to 50x in designated discrete steps with 10x eyepieces, this can be extended from 1.4x to 200x using various combinations of eyepieces and objectives.

The following magnification diagram is from the *Wild M5 Stereomicroscope: Instructions for Use* brochure, (Wild, 1964), Fig. 3.

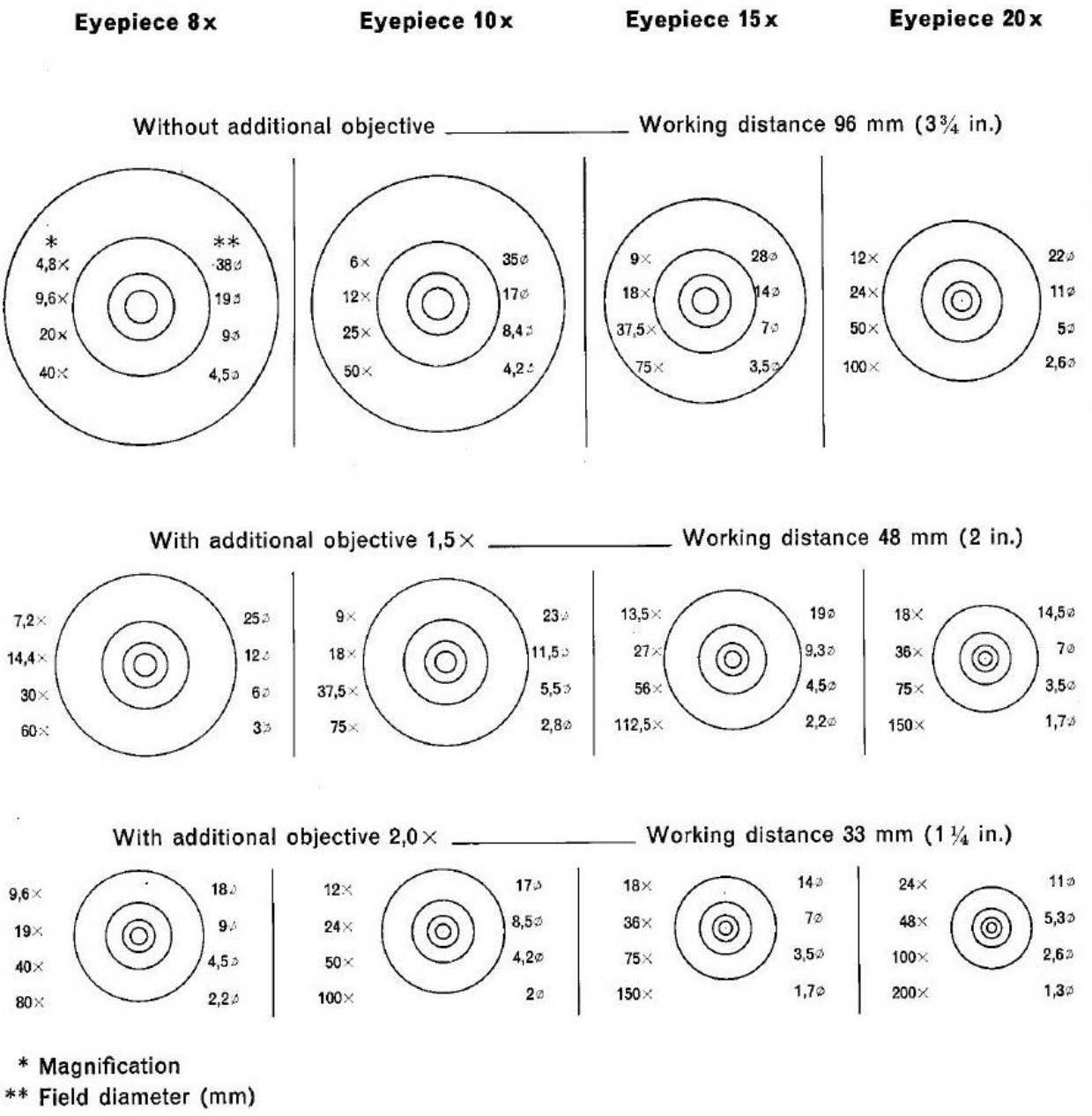

Figure 3. Wild M5 magnification diagram from Wild manual

Note: Single and double asterisks are in the manual's table, but are not applicable here.

As will be seen below, Wild for reasons not yet obvious to this author, chose to number its stereomicroscopes without regard to the sequence of their chronological release. Thus, e.g., the M5 was released before the M4, the M4A after the M4C, the M8 after the M7, and the M1 was released in 1973 (see M1 and detail of its stand in Fig. 6), etc. Therefore, model numbers should not be used as relative indicators of Wild stereomicroscope release dates. The M4 was introduced only a year after the release of the M5, i.e., 1959, Fig. 4 and 5.

Figure 4. Wild M4 stereomicroscope, 1st style

Figs. 5 show an M4 with magnification changer moved into its left- and rightmost positions, and finally removed. In the leftmost position, according to the Wild manual, with cartridge I in place the microscope's total magnification is 6x (not the 16x shown on the cartridge, see below for magnification with magnification changer removed) and in the rightmost position 40x. The cartridge can also be completely removed as shown in the rightmost picture of Fig. 5. With the cartridge removed the microscopes total magnification is, in accordance with the Wild manual, "Three-dimensional objects in natural relief", 16x.

There is also a magnification changer II. With stated magnifications of 10x and 25x, in left and right positions and 16x removed. With either magnification changer I or II the M4 has three magnification choices, two with the changer in left and right positions, and one with the cartridge removed. These magnification options can be further changed by changing eyepieces. Eyepiece choices include 8x, 10x, 15x, and 20x options.

The M4 was designed primarily as a simple educational microscope. It has a screw on the body that allows it to be raised for taller specimens or when an auxiliary lens with lower magnification is used, i.e., a 0.5x, to increase the working distance. Here the microscope, Fig 4, is shown on its Normal Stand with trapezoidal base plate, designed for stability. There is also a Swing-arm Stand, and a Table Clamp Stand. Its primary weakness is the two plastic "wings" that are placed underneath the magnification changer. These are often completely missing, as they are easy to damage and knock off.

Optional accessories included a variety of interchangeable stage plates, in addition to the metal (white on one side, black on the other) and glass stage plates. Inclined binocular tubes are shown in Fig. 4, but the M4 was also available with straight binocular tubes.

The M4C was introduced in 1965 and the M4A in 1967. Both were made until about 1970. Later versions of the M4, e.g., the M4A, had built-in circular magnification changers, somewhat similar to the original M5, rather than the sliding cartridge magnification changers available on the earlier M4s. Later models, including later models of the M4, were made in a lighter color, although the magnification changers were still made in black. The M4, Fig. 4, weighs approximately 8 pounds, 5.2 ounces, and is approximately 14 inches tall, in the position shown.

Figure 5. Wild M4 stereomicroscope, 1st style, showing three magnifications options

The Wild M1 series stereomicroscope, as noted above, was released in 1973. This M1 provides the capability to use interchangeable CMOs. Some versions of the M1 series, e.g., the M1A, Fig 6a, had the unusual, for Wild, additional extruding support with rectangular, cross-section on the pole stand for locking orientation and added strength. The M1 was available with both incident-only or transmitted- and incident-light stands, as well as a swinging-arm stand. This M1 series was a successor to Wild's M4 series, presented above. It was designed for education, as was the M4, which explains the decision, in some versions, to "fix" the orientation of the microscope's body over the object to be examined. This series was sold through the mid-1980s.

Using various combinations of eyepieces and objectives, the magnification range of the M1 can be extended from 1.25x to 40x.

Fig. 6b shows a section of a Hong Kong $100 bill through the M1A pictured. The M1A shown has Wild 8X eyepieces. As can be seen, this is a quite capable stereomicroscope.

Figure 6a. Wild M1A stereomicroscope (Wild, c. 1975)

Figure 6b. Picture of portion of Hong Kong $100 bill. Taken through Wild M1A stereomicroscope with 8x Eyepieces

Wild introduced the M5A, Fig 7, and the M5D, c. 1971, before the M1. These were available to c. 1989. An optional apochromatic objective was available for these at additional cost. The M5A is shown with a transmitted light base on a 25mm diameter column (25mm was the standard pole diameter for the M5A). The M5A is also available with a reflected light only base, Fig. 8. With 10x eyepieces, it provides magnifications of 6x, 12x, 25x, and 50x. These twist-to-select magnifications are marked on the M5's rotating turret ring. As with other Wild stereomicroscopes in the M-series, it can be equipped either with one or two lamps, mounted around the objective. When only one lamp is used, an additional spacer may be required.

The M5A was also available in an M5APO version. An E. Leitz/Wild advertisement in Volume 54, Number 4, of Analytic Chemistry (Wild, 1982) notes,

> **M5APO Stereomicroscope**. Special glasses and coatings were developed for total correction of chromatic aberration. For applications requiring the highest accuracy and detail in the areas of sharpness, contrast, resolution and color fidelity. The M5APO (apochromatic) has the same basic well-tested modular M5A design (the long time standard for dissecting-microscopes). All conventional M5A accessories can be used with the APO.
>
> The Wild modular design allows rapid conversion to photomicrographic use.

Figure 7. Wild M5A on transmitted-light stand

Wild introduced other models in the M-series. In 1972 it marketed the M3, Fig. 8 shows this model with a standard base. In this configuration, it weighs approximately 9 pounds, 6.4 ounces. As shown, it is approximately 16 inches tall.

The M3 was also sold with a bright field / dark field base. The dark field option can be invoked by sliding a lever, with a black sphere at the end, into the dark field position. This moves the default stage plate out of position to switch to dark field, Fig. 9.

The M3 shown in Fig. 9, as expected is somewhat heavier that the M3 shown in Fig. 8. It weighs about 11 pound, 6.2 ounces and is approximately 18" tall. Both Wild M3's have an achromatic CMO (Common Main Objective) of 1x. Their drum changers have three marked magnifications of 6.4x, 16x, and 40X. These apply if used with Wild's standard 10x / 21mm eyepieces. As with Wild's M4, in the 16x position, there is no additional lens present in the Galilean drum changer, optical path. Thus, the brightest images are obtained at 16x. The range of the M3, as with other Wild stereomicroscopes, can be extended with combinations of eyepieces and objectives. For the M3 this extended range is from 1.5x to 160x. Although shown here with inclined binocular tubes, the M3 was also available with a 'straight' non- angled binocular tube.

Wild also introduced at later stages models M3B, M3C, and M3Z, Fig. 15. The series was sold until 1994. All M3s like the M5s are considered excellent, and they are relatively easy to repair by maintenance professionals, as opposed to many models by competitors. All Wild models have a variety of optional accessories; some are discussed in this paper, and so they can be used in a myriad of applications.

The M3B provided greater field "flatness", compared to the somewhat "dome" shaped images of the M3. The M3B offered three clickstop magnifications, 6.4x, 16x, and 40x, with 10x eyepieces. The M3C added two additional magnifications for a total of five clickstop choices, with 10x eyepieces these are 6.4x, 10x, 16x, 25x and 40x.

The M3Z was unique in the M3 series, in that it offers a continuous zoom from 6.4x to 40x. It is available with achromatic or planapo objectives. The M3Z provides exceptional field flatness with its plan objectives. M3 objectives are interchangeable with the M5 series.

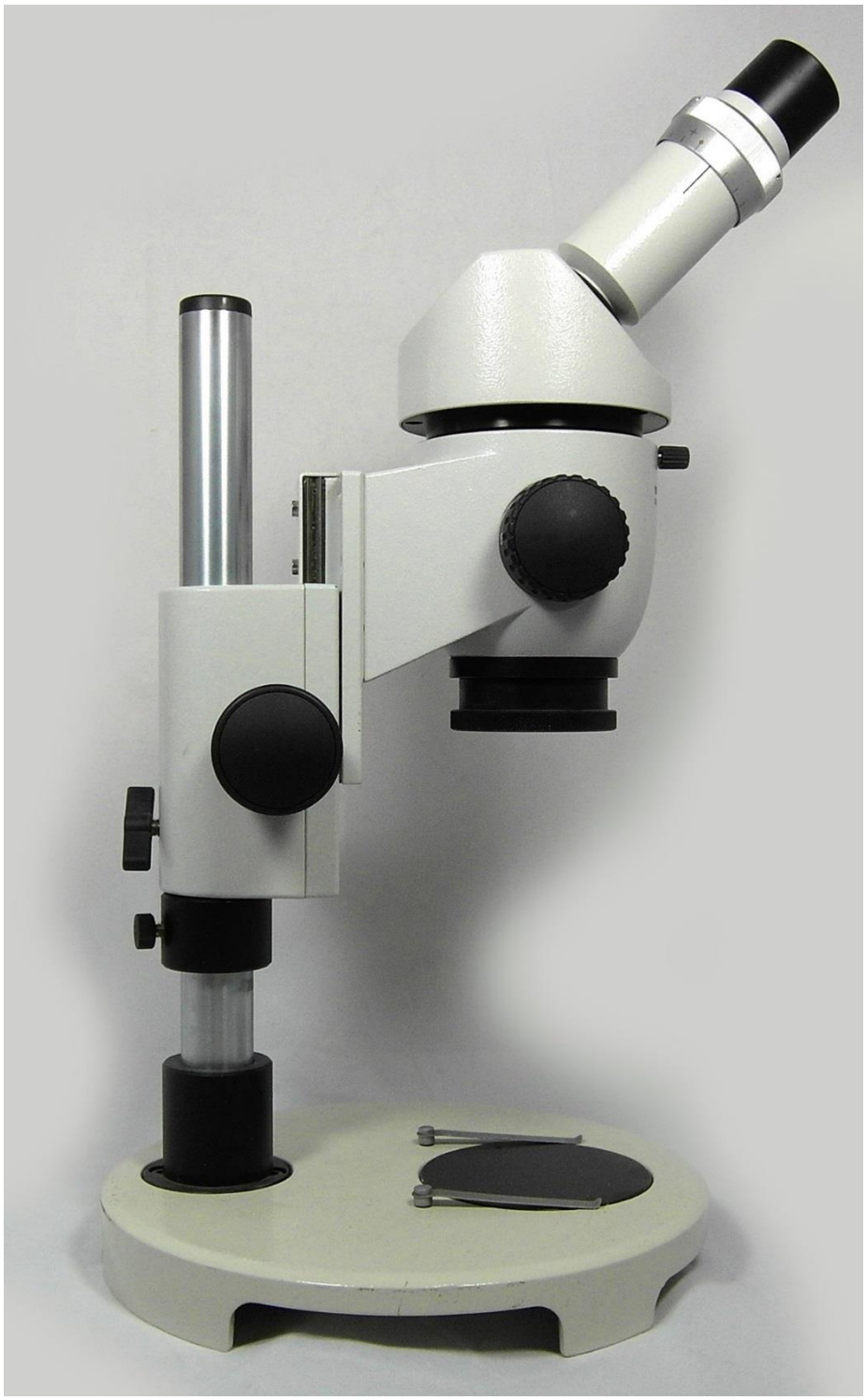

Figure 8. Wild M3 on incident-light stand

Figure 9. Wild M3 with bright / dark field base

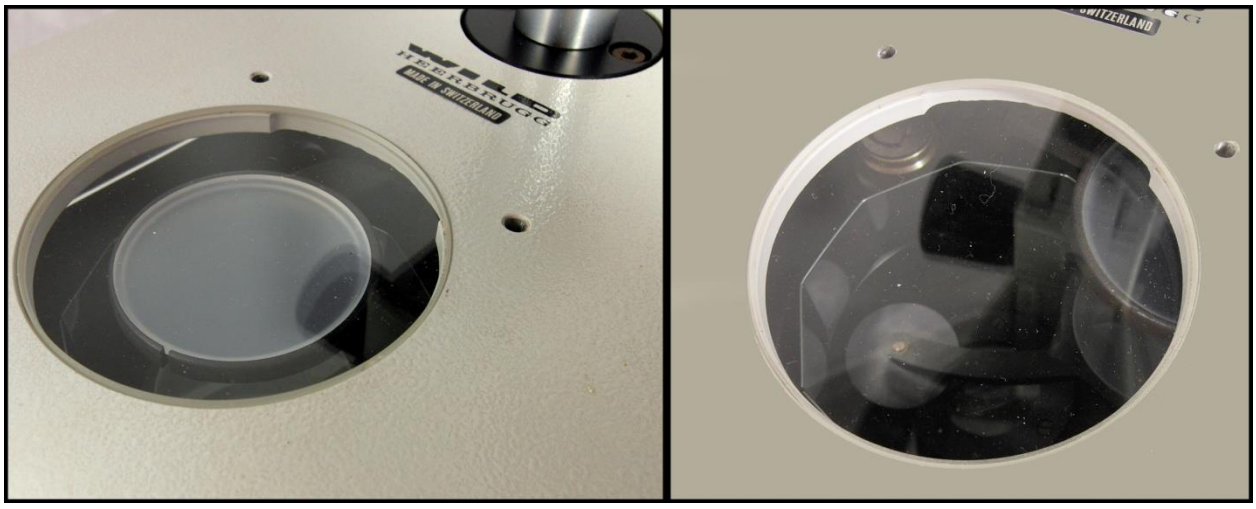

Figure 10. The Wild M3, results of using the rear lever to switch between bright field and dark field

The following table, Fig. 11, is given in the Wild manual (Wild, Unstated-1), *Wild M3: Instructions for use*. It shows the working distances and magnifications for various combinations of objectives and auxiliary lenses.

Technical data for M3 – Données techniques, M3 – Technische Daten M3 – Características técnicas del M3

Total magnification, working distances, field of view and viewing angle
Grossissement total, distances de travail, champ visuel et angle d'observation
Totalvergrößerung, Arbeitsabstände, Gesichtsfelddurchmesser und Betrachtungswinkel
Aumentos totales, distancia de trabajo, ⌀ del campo de visión y ángulo de observación

Eyepiece Oculaire Okular Ocular	Additional objective Objectif additionnel Vorsatzobjektiv Objetivo adicional	Working distance Distance de travail Arbeitsabstand Distancia de trabajo	Total magnification/Field of view at position: Grossissement total/Champ visuel pour position: Totalvergrößerung/Gesichtsfelddurchmesser auf Stufe: Aumentos totales/⌀ del campo de visión en la posición: 6.4	16	40	½ viewing angle Demi-angle d'observation Halber Betrachtungswinkel Semiángulo de observación
8× 10× 15× 20×	– – – –	91 mm 91 mm 91 mm 91 mm	5.0×/ 35.0 mm 6.4×/ 35.0 mm 9.6×/ 28.5 mm 12.8×/ 21.5 mm	12.5×/13.0 mm 16.0×/13.0 mm 24.0×/10.5 mm 32.0×/ 8.0 mm	32.0×/ 5.0 mm 40.0×/ 5.0 mm 60.0×/ 4.0 mm 80.0×/ 3.0 mm	6.90° 6.90° 6.90° 6.90°
8× 10× 15× 20×	0.3× 0.3× 0.3× 0.3×	265 mm 265 mm 265 mm 265 mm	1.5×/117.0 mm 1.9×/117.0 mm 2.9×/ 95.0 mm 3.8×/ 72.0 mm	3.8×/44.0 mm 4.8×/44.0 mm 7.2×/35.0 mm 9.6×/27.0 mm	9.6×/17.5 mm 12.0×/17.5 mm 18.0×/14.0 mm 24.0×/11.0 mm	2.06° 2.06° 2.06° 2.06°
8× 10× 15× 20×	0.5× 0.5× 0.5× 0.5×	160 mm 160 mm 160 mm 160 mm	2.5×/ 70.0 mm 3.2×/ 70.0 mm 4.8×/ 56.5 mm 6.4×/ 43.5 mm	6.5×/26.0 mm 8.0×/26.0 mm 12.0×/21.0 mm 16.0×/16.0 mm	16.0×/10.5 mm 20.0×/10.5 mm 30.0×/ 8.5 mm 40.0×/ 6.5 mm	3.43° 3.43° 3.43° 3.43°
8× 10× 15× 20×	1.5× 1.5× 1.5× 1.5×	45 mm 45 mm 45 mm 45 mm	7.0×/ 23.5 mm 9.6×/ 23.5 mm 14.4×/ 19.0 mm 19.2×/ 14.5 mm	19.0×/ 8.5 mm 24.0×/ 8.5 mm 36.0×/ 7.0 mm 48.0×/ 5.5 mm	48.0×/ 3.5 mm 60.0×/ 3.5 mm 90.0×/ 3.0 mm 120.0×/ 2.0 mm	10.33° 10.33° 10.33° 10.33°
8× 10× 15× 20×	2.0× 2.0× 2.0× 2.0×	31 mm 31 mm 31 mm 31 mm	10.0×/ 17.5 mm 12.8×/ 17.5 mm 19.2×/ 14.0 mm 25.6×/ 11.0 mm	25.0×/ 6.5 mm 32.0×/ 6.5 mm 48.0×/ 5.5 mm 64.0×/ 4.0 mm	64.0×/ 2.5 mm 80.0×/ 2.5 mm 120.0×/ 2.0 mm 160.0×/ 1.5 mm	13.88° 13.88° 13.88° 13.88°

Figure 11. Wild M3 Technical data

The 8x, 10x, 15x, and 20x eyepieces listed in Fig. 11 can be seen in Fig. 12.

Figure 12. Some Wild objective lens pairs: 8x, 10x, 15x, and 20x

The auxiliary lenses presented in the table above can be seen in Fig. 13.

Figure 13. Some Wild auxiliary lenses: 0.3x, 0.5x, 1.5x, and 2.0x

One of the advantages of the Wild stereomicroscope is the modular nature of the models in its various series. Wild microscopes can be configured with a variety of modules. Leica (Leica AG, Unstated-1) mentions this, and notes that you can choose whatever is needed currently, and be assured that the M3 chosen could be adopted to any future needs.

Accessories and modules include auxiliary lenses, phototubes, pods, eyepieces, polarizing attachments, etc. Fig. 14 shows a Wild M3 with polarizing attachments, and Fig. 15 shows more detail of these polarizing attachments. All Wild stereomicroscopes can be adopted to polarized light work, and a rotating stage.

Three Wild M3 series microscopes are mentioned in the Leica pamphlet.

> [The] Wild M3 series offers several versions:
>
> - **Wild M3B** with three-step magnification changer
> - **Wild M3C** with five-step magnification changer and either an achromatic or planapochromatic objective (M3C PLANAPO)
> - **Wild M3Z** with 1:6 zoom and either an achromatic or planachromatic objective (M3Z PLAN)
>
> *(Leica AG, Unstated-1)*

This pamphlet explains that this series can be used in a variety of areas, including the automobile industry, agronomy, telecommunications industry, semiconductor industry, dental laboratories, electronics industry, chemistry, and biology. It further notes that these stereomicroscopes have received the international quality certificate for ISO 9001. Some instruments in Wild's M3 series are shown below.

Figure 14. Wild M3 with polarizing accessories on transmitted-light stand

Figure 15. Detail of Wild polarizing accessories

Fig. 16 shows an M3B pod. Leica purchased Wild, along with other microscope competitors including AO, and Bausch and Lomb. The M3B shown in Fig. 16 displays both the Leica and Wild trademarks, as does the M10 in Fig. 28. After a number of iterations of stereomicroscope releases, the Wild trademark was discontinued. Fortunately, Wild is arguably one of the most easily repaired stereomicroscopes, with a vast variety of interchangeable parts seemingly always available, and Wild second-hand stereomicroscopes continue to serve as useful instruments even for today's scientists. They continue to, appropriately in this author's opinion, obtain high prices on the used market.

Figure 16. Wild M3B

Fig. 17 shows a Wild M3Z. The M3Z has a unique and helpful feature for photography. The entire microscope pod can be moved so that the optical center of the lens is directly in-line with the optical center of the left eyepiece. Fig. 18 shows a photograph taken with the M3Z moved so that only the left eyepiece is functional, and centered over the objective.

Figure 17. Wild M3Z on incident-light stand

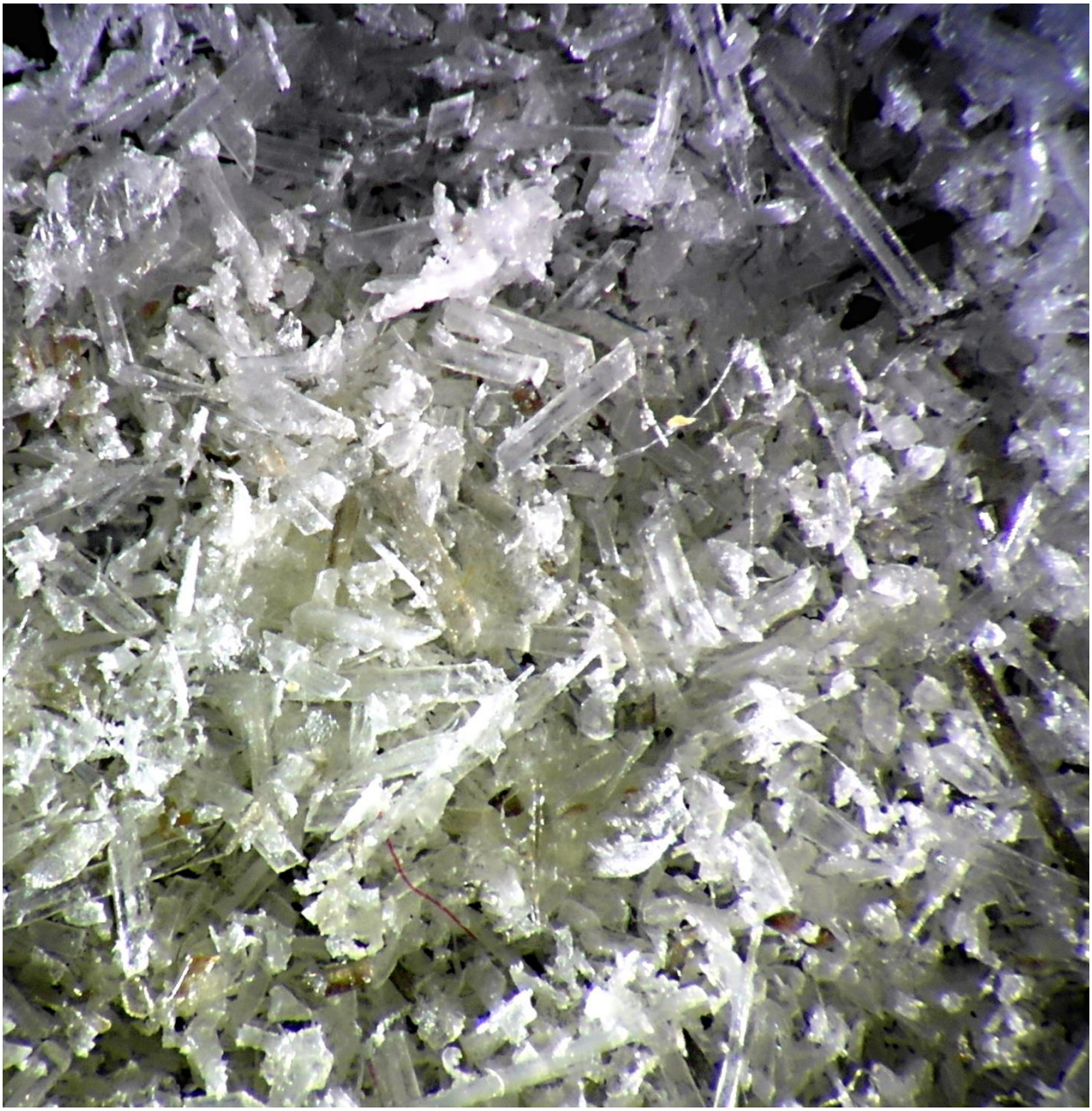

Figure 18. Photograph of “wiskers” through a Wild M3Z, stereomicroscope

Later model CMOs in the Wild M-series were also available, e.g., Wild introduced the M7 a 6x to 31x zoom in 1970. It was followed by the M7A, Fig. 19, with a similar zoom magnification range that can be extended, from 3x to 124x, with various combinations of eyepieces and objectives. Wild also introduced the M7S, which is optically similar to the M7A with a significant improvement for, e.g., photography.

Figure 19. Wild M7A, courtesy and with permission, Hatcher (Hatcher, 2014)

The M7S can be used as a regular stereomicroscope using two eyepiece tubes for normal viewing, or it can be used as a monocular microscope. The monocular arrangement is useful when employing polarized light attachments, for measurement, or for photomicrography. For this later application, the single light path provides more light and less distortion.

The M8, Fig. 20, introduced in 1975, has a zoom capability yielding 1:8 ratio. With 10x eyepieces, it provides 6x to 50x magnifications that is both parfocal and continuously variable. In its standard version, it includes a five-element common main objective that is almost distortion-free. Its magnification range can be extended, as with other Wild's, using combinations of eyepieces and objectives. For the M8 this extended range is from 2.4x to 160x.

As with earlier Wild stereomicroscopes, the inclined binocular tubes can be exchanged for straight tubes. The M8 also has adjustable eyepieces that allow one to compensate for visual differences of the eyes, and provide for focusing that can be fine-tuned throughout the full range of magnifications. The example, Fig. 20, presented here includes the trinocular adapter, useful in photomicrography, and the bright field /dark field stand. As with other Wild's, additional accessories include measuring eyepieces, single or dual illuminators, drawing tube, educational discussion tube, and photomicroscopy adapters.

Various stage plates are also available. The Wild manual (Wild, 1975) notes that if a frosted glass plate is present the frosting should face down. The M8 example shown has a 1x plan objective, and a dark field / bright field stand. It is suited for photomicrography;, its extended 350mm column, shown here, is appropriate for examining larger objects and attaching alternate stage plates with some additional height.

A used M8 probably provides the best cost/benefit ratio in the Wild line-up, but it is closely followed by the M3Z and M3C. The Wild M10, see below is also excellent, but as it is the last Wild model, and was released in the 1990s, it is still tends to be too expensive to be practical when used Wild M5s, M5As, M3s, and M8s are readily available. The incremental capabilities of the M10, in this author's opinion, do not justify its price increase over the M8, or other Wild models. Second-hand Wild M8s can usually be obtained for less than ½ the price of a used M10, and the other Wild models, most often, for even less.

Figure 20. Wild M8 stereomicroscope with bright field/dark field transmitted-light stand

However, as noted above, the Wild name was retired by Leica. Some M-series models were for a time renamed as Leica Wild, Fig. 16. Later the Wild name was completely dropped and replaced by the Leica name. The more modern Leica MZ5 is somewhat similar to the Wild M3C, and the Leica MZ6 somewhat similar to the M3Z.

Various accessories are available for Wild stereomicroscopes that allow their use in a myriad of applications. These included a wide range of stands including incident only, incident and reflected light, boom stands, and desk clamp stands, etc. The M1 was focused by adjusting the objective mount. This allows it to be attached directly to various devices and focused as one might a camera. Reticules (graticules) are available, in various styles, for the 10x and 20x measuring eyepieces.

As with the M5, most Wild stereomicroscopes allow for the use of either one or two incident lights, Fig. 21, and the transmitted light stands provide provision for an additional light. This figure shows the two different sizes for the ring that attaches the lighting fixtures to the objective lens. If lighting holders with a thicker ring, shown at the left middle of fig. 21, are used an additional spacer is not used, but only a single holder can be attached if one with a thicker ring is used. If a holder with a thinner ring, shown in the center and rear center of the photograph is used, a spacer, several are shown at the middle left, is used is required if only a single lamp is to be used. However, two holders with thinner rings can be used together to provided, independently adjustable illumination. This is particularly useful in photomicrography with incident light. This figure also shows from left to right, respectively, a low voltage 6v/15w lamp (that can be used for both incident and transmitted light), a lamp mounted in a Wild lamp holder, and a Wild lamp holder inserted into a Wild lamp attachment for the stereomicroscope's objective.

Wild illuminators can also be used free-standing mounted to a "cast base". To quote Wild (Wild, 1978),

> This incident illuminator consists of a cast base, which bears a short column (315271) for mounting the lampholder (266617) with a suitable adapter. A low-voltage lamp fits into the lampholder. The free-standing illuminator is used mainly for observing larger objects, and where the lamp needs to be separate from the instrument.

Wild transformers can be used to provide power for these lamps, and they often allow adjustments in brightness. Fig. 22 shows some Wild adjustable transformers.

A comparison tube can be used with two identical Wild stereomicroscopes to compare two objects.

Figure 21. Wild lamp holders and attachments

Figure 22. Three Wild variable transformers

Figure 23. Wild stereomicroscope with triple illumination, two for incident and one for transmitted-light. Image inverted (white on black) to better show the lamps.

One interesting Wild accessory is the Wild Dual Iris Diaphragm, Fig. 24. It is placed between the eyepiece tubes and the body. This device allows for adjustment in object contrast, by e.g., reducing reflections and enlarging or reducing the diameter of the beam of light viewed. Its use can also result in a greater depth of field. It contains two iris diaphragms, each below the associated binocular eyepiece. The setting values can be seen directly on the scale provided on this accessory. One represents the minimum aperture and 10 the maximum.

Figure 24. Wild Dual Iris Diaphragm
Dual diaphgrams, on the right, are set to '1', and almost fully closed.

A helpful Wild accessory is shown in Fig. 25 is the 10x measuring eyepiece. It contains a reticule and a line that can be moved, using the large knurled knob, to align with an object feature of interest.

Figure 25. 10x measuring eyepiece

Fig. 26 shows the view through the 10x measuring eyepiece and its installed reticule. The long line shown in this photograph can be adjusted via the large top knurled knob is Fig. 25 above.

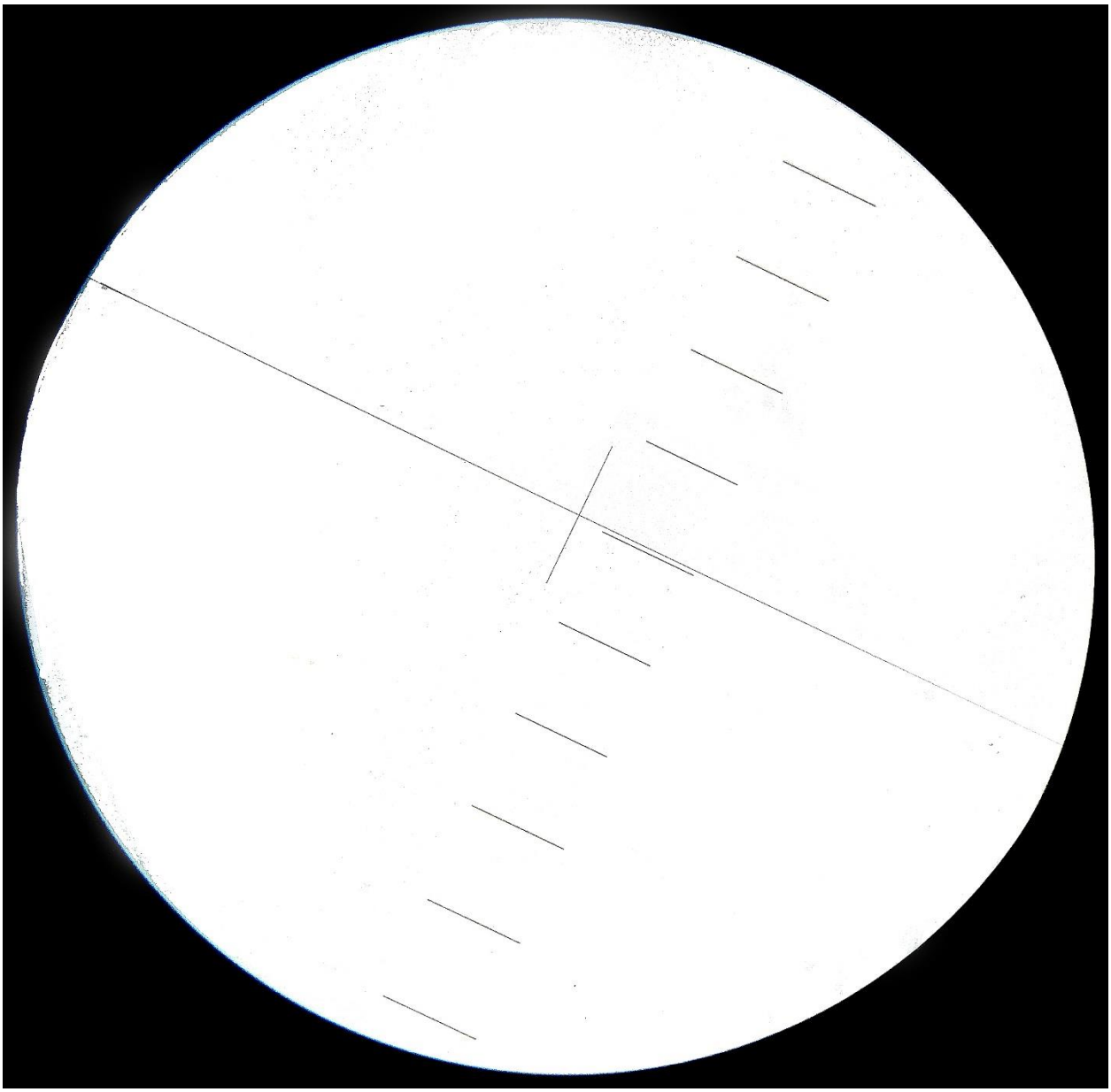

Figure 26. View through 10x measuring eyepiece

An additional optional add-on is the Wild drawing tube, which allows an object to be seen while simultaneously drawing it, or adding information to the image.

One accessory that is particularly useful when examining objects with deep intentions or dips is the Wild prism for vertical illumination. This adapter, Fig. 27, is mounted on the distal end of the stereomicroscope objective. It contains a prism that deflects the light from a Wild low-voltage illuminator at right angles from the lamp's horizontal orientation to place the illumination directly on top of the object.

Figure 27. Wild prism adapter for vertical illumination

Wild stereomicroscope stands can be fitted with rotating stages, as well as other optional stages, and polarizing accessories. Additionally, film based cameras, ranging from 35mm to 4 x 5 inch, were available, including Polaroid backs, but today most Wild stereomicroscopes are used with digital equipment for imaging.

Leica stereomicroscopes such as the MZ6, MZ7.5, MZ9, and MZ12.5 all have components that are, in varying degree, compatible with the M3-series. The final stereomicroscope carrying the Wild name was the M10, Fig. 28. This figure has both the Leica and Wild names. The Wild M10 is apochromatic microscope, including its apo objective, Fig. 29, and this stereomicroscope is corrected through the entirety of its optical paths. Its magnification zoom range is 1:10, with 10x eyepieces, 8x to 80x. It is be used with one of two different trinocular adapters. One uses a fixed trinocular attachment that mounts behind the eyepieces. The second, and more capable, use a trinocular attachment that mounts on the side, similar in appearance to that on the M8 in Fig. 20.

Motic (Motic, 2014) makes copies of discontinued Wild microscopes. Thus, some Motic parts may fit older discontinued Wild models. Fig. 30 shows a Motic K-series microscope. Unlike some chat room and forum posters, I find Motic optics work well, but my personal experience finds that their stereomicroscopes often go out of alignment, more frequently than Wild instruments, and need adjustment. I was able to switch both eyepieces and the 1.0x plan objective from the Motic, shown below in Fig. 30, to the Wild M5A, Fig. 7, and obtain sharp images. As with the Wild M5A this Motic provides changer markings of 6x, 12x, 25x, and 50x.

Infrequently, a Motic accessory is an improvement, in some way, over a Wild item. This is the case with Motic's drawing attachment (K400 Drawing Tube) which is more robust, and arguably, more functional than its original Wild cohort. Below, Fig. 31, this Motic accessory is shown mounted on a Wild M5 stereomicroscope. In use, the object is seen with one eye, as shown the left, and the paper, drawing pencil, and the hand drawing with the pencil with the other eye.

Figure 28. Wild M10 trinocular with planapo 1.0x CMO, Photograph courtesy and with permission of Sychrostream Solutions

Figure 29. Wild M10 trinocular planapo 1.0x CMO, Photograph courtesy and with permission of Sychrostream Solutions

Figure 30. Motic K-Series stereomicroscope with plan objective

Figure 31. Motic K400 Drawing Tube mounted on a Wild M5A

As Wild stereomicroscope series numbers were not related to their date of introduction, the table below may help to place the various series in an appropriate perspective.

Wild Stereomicroscope Series	Approximate Year Stereomicroscope First Available	Approximate Year Stereomicroscope Discontinued
M1/M1A/M1B	1973	1986
M3/M3B/M3C/M3Z	1972	1994
M4/M4A/M4C	1959	1971
M5/M5A/M5C/M5D	1958	1989
M7/M7A/M7S	1970	1991
M8	1974	1991
M10	1990	Unknown

Table 1. Wild series ordered according to their model designations

The quality and performance of Wild stereomicroscopes cannot be overstated. They are major milestones in the history of stereomicroscopy, and CMOs in particular. Only a brief discussion of some Wild stereomicroscopes was presented here. Each Wild stereomicroscope model deserves a dedicated paper.

Final Thoughts

A Used Wild stereomicroscope can be an excellent option compared to a new instrument. All Wild stereomicroscopes provide outstanding images. With a new instrument, once you use it the value is significantly reduced. With second-hand Wilds, the only type now sold, you have the advantage of quality, if the microscope was not abused, and lower cost. It should last your full lifetime. Should you decide to sell some years after purchase, you will likely be able to can get almost as much as you paid, or possibly more. In addition, second-hand Wild stereomicroscopes can be better than many new models, and likely can be more cost-effectively repaired should any issues develop after purchase. As is often said, a good used instrument is worth more than a lower quality new one.

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