THE LOCQUIN STABIFOCAL

A MICROSCOPE IN “NO MAN’S LAND”

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Figure 1. The Stabifocal

INTRODUCTION

It has been said that the history of the microscope shows “dead ends” in design; these are instruments that although innovative in construction fail to gain wide acceptance from users, so that eventually they disappear from the market. To describe such instruments, to bring them to the attention of collectors, and to speculate on the reasons for their commercial failure is an attractive task for the microscope historian. Here we will discuss the Stabifocal, a microscope that represents a “dead end.”

THE MICROSCOPE

The instrument at hand is microscope #097 in the MdC Microscope Collection (figure 1); it is unsigned but a sticker attached to it reads: “Precitec Co. North Reading, Mass.” As shown in the figure the instrument was built following a three-tier design. We will describe first the features and function of each of the sections and then evaluate the performance of the whole.

The microscope is built around a metal frame of very unique configuration, resembling a bridge or an inverted “U.” The body of the microscope is located at the apex of this frame, traversing it. The front arm of this “U,” which is the widest, is continuous with the front end of the base.

The top section (figure 2) comprises a concentric ring that controls the coarse focus and a hemispherical prism-housing. The ocular is labeled “10X.” All these parts are black finished, except the coarse focus ring; this has vertical chrome sections intercalated with narrower black finished perpendicular lines. This distinctive finish is shared by all the moving parts of the microscope and gives a touch of Art Deco to it. The inclined ocular tube is held in place by a fastening screw; loosening this allows the tube to rotate 360º.

Figure 2 shows the top section of the microscope, including the ocular, ocular tube, prism housing, and coarse focus ring.

The middle section (figure 3). Attached to the lower end of the body is a massive nosepiece with openings for six objectives. Presently four objectives are in place; they are labeled x6.3/0.15, x15/0.35, x45/0.65, and x91/1,20. They are all color-coded; the 45x and 91x are spring mounted. None of the objectives is signed. The powers of this set of objectives depart from the usual set 4x, 10x, 40x, 100x that was almost universal in the second part of the 20th century (complemented sometimes by the highly desirable 20x). This section, and the lower one, are finished in light-green enamel.

A horizontal metal plate separates the middle section from the bottom of the stand and supports a circular stage. The stage is made of iron, painted black and 10.8 cm in diameter; it glides in any direction and it rotates 360º, all by magnetic action on the supporting plate. There are two wide stage clips that are also held in place by magnets.

Figure 3. The middle section with the revolving nosepiece, objectives and circular stage.

The lower section (figure 4) accommodates the illumination unit formed by the condenser, iris diaphragm, and filter holder. This unit is held in place by a ring holder fit with a pair of centering screws. The unit can be focused by a rack-and-pinion mechanism controlled by a knurled knob placed on the right side. There is no indication of numerical aperture, or any other information on the body of the condenser. The top lens of the condenser can be removed to obtain even illumination when using low power objectives (figure 5).

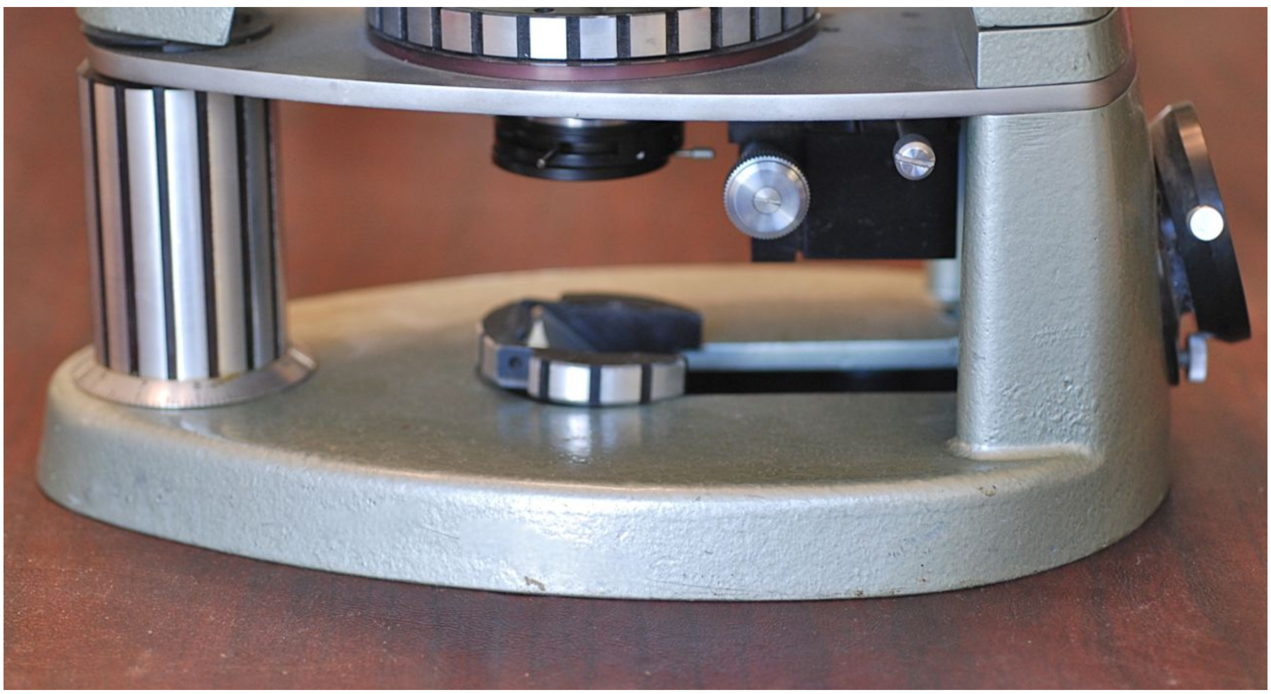


Figure 4. Key features of the lower section are the light port (to the right), the condenser-iris diaphragm, and filter holder unit (center up), the mirror holder (center low), and the fine-focus control knob (left).

Figure 5. The illumination unit is composed of the filter holder (left), and the iris diaphragm that is attached to the lower side of the condenser. The removable top lens of the condenser is shown to the right.

The base has an ovoidal outline; it is 28.0 cm long and 18.0 cm wide. Inserted into the base is a removable mirror housing. The mirror itself is fixed at an angle close to 45º.

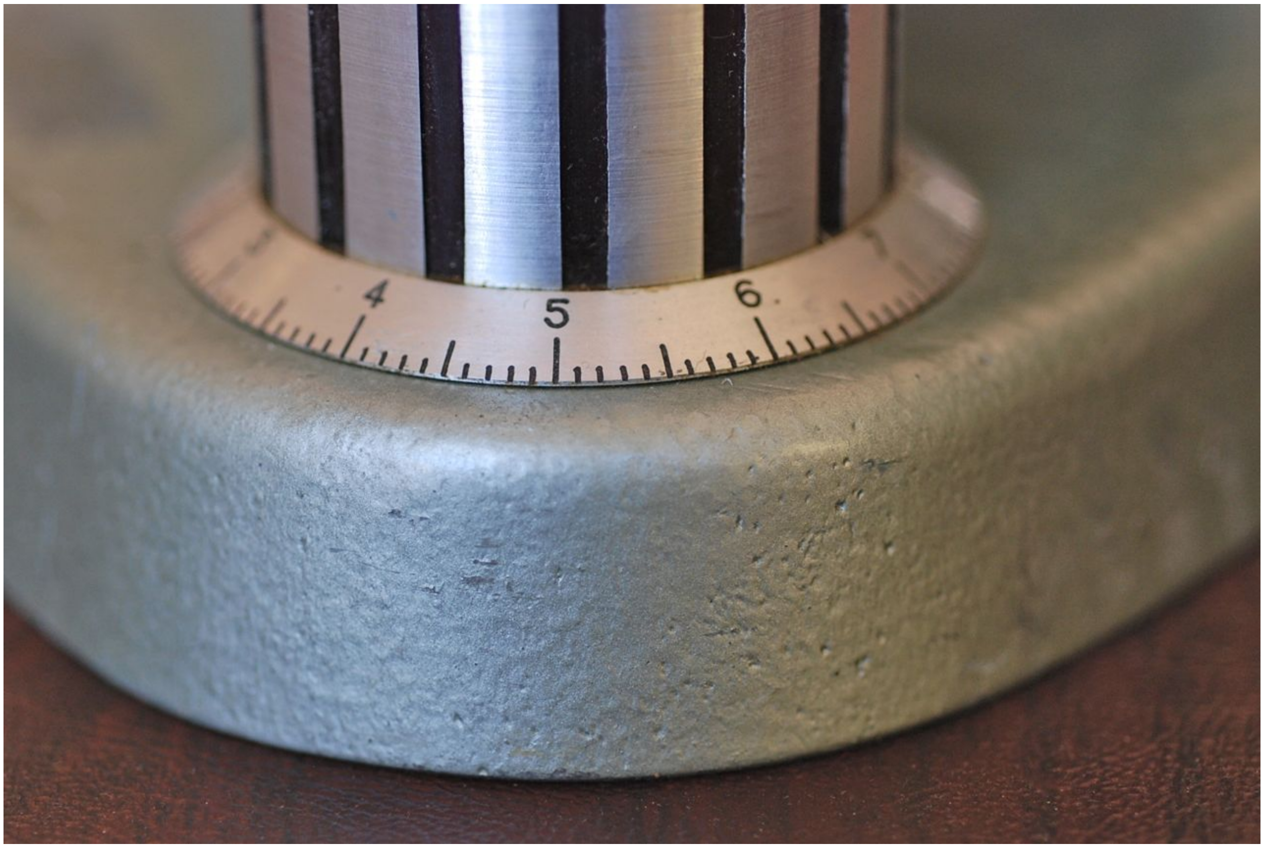


Figure 6. The base of the fine-focus vertical knob has marks on it but there is no indication of what the measuring unit is and no point of reference engraved on the base.

The front of the microscope has an illumination port with centering screws, but no illumination source came with this instrument. It is of note that neither the Stabifocal at the RMS Collection (Turner, 1989), nor the one illustrated in the Molecular Expressions web site <http://micro.magnet.fsu.edu/primer/index.html>, nor the one in Recoulles' book (1991), show an illumination source. A most interesting reference (*) to the illuminations sources for the Stabifocal has been found in a book by Moenke and Moenke-Blankenburg (1971). These authors state at p.43 that: "Since 1963 M. Locquin, Paris, has offered the models

“Stabifocal” and “Neofocal” with abuilt-in ruby resonator of 7.5 cm in diameter.” The same source offers the following citation at p. 45 of the: “Bruma and Velghe have converted a commercial version of the Stabifocal model for work with transmitted light into a simple laser microscope.” For the moment the question remains, what was the illumination source the Stabifocal was issued with?

OPTICAL PERFORMANCE

We tested the performance of this microscope for visual observation and for photomicrography. For both purposes we used a histological sections of an ovary, stained with hematoxylin-eosin and a stage micrometer made by Bausch & Lomb, Rochester, NY. Although the coarse focus mechanism is presently frozen, the fine focus has enough range to permit the effective use of the dry objectives.

The 6.3x objective provides a very good and flat image and so does the 15x objective. The 45x objective provides the sharpest and more contrasted image of the three. When using the 10x ocular the field diameters are 1,700 µm, 670 µm, and 220 µm respectively.

For photomicrography, we used a Nikon 80 Digital SLR mounted on a standard adapter (figure 7) and set to the manual mode. Illumination was by fluorescent light provided by a flash light place underneath the condenser. The first set of pictures was taken with the 10x original ocular in place (figures 8 & 9) and the 15x objective. Then a second set was taken using a 2.5x Olympus NFK LD photographic ocular (figure 10 & 11) with the same objective.

Figure 7. The photographic setup used to test the Stabifocal.

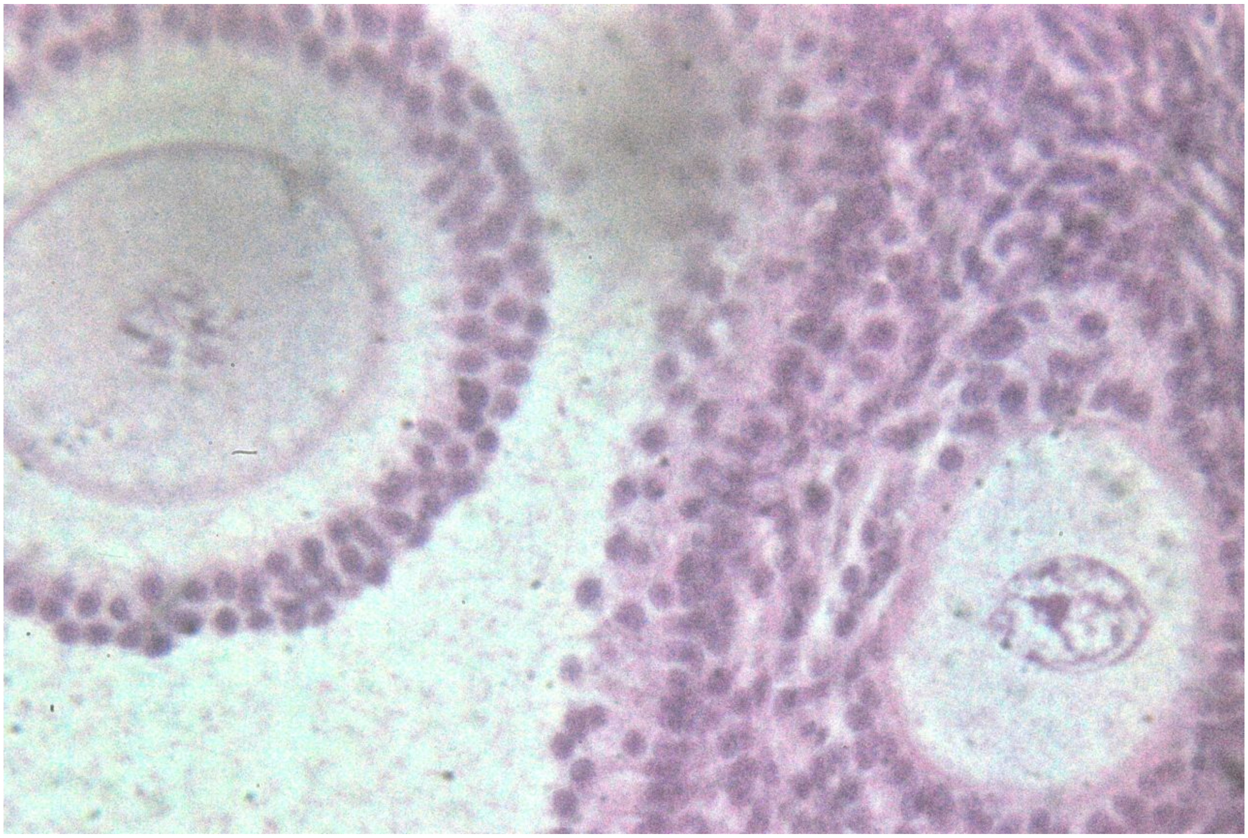
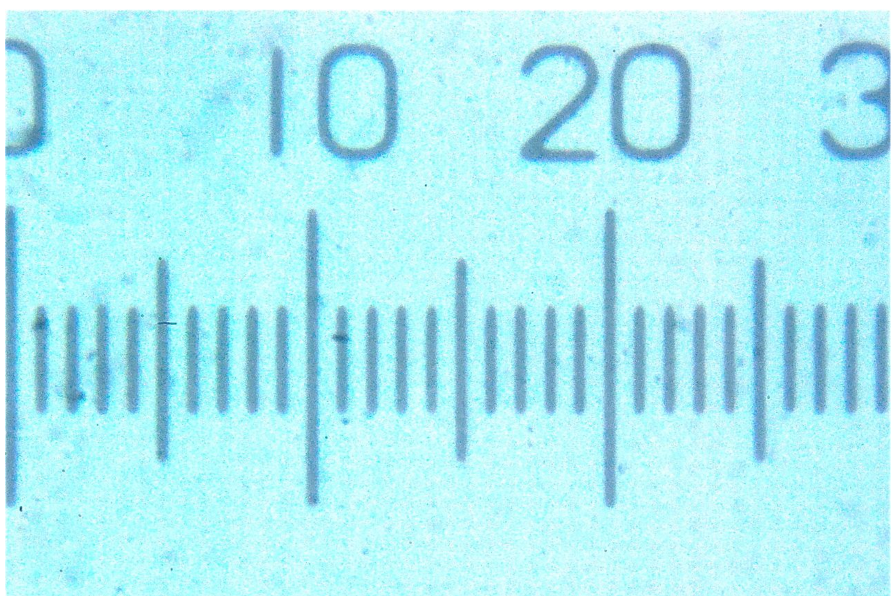


Figure 8. A section of cat's ovary photographed with the 10x Locquin ocular and the 10x objective.

Figure 9. The photographic field with the same optical combination as in figure 8 was 290 µm.



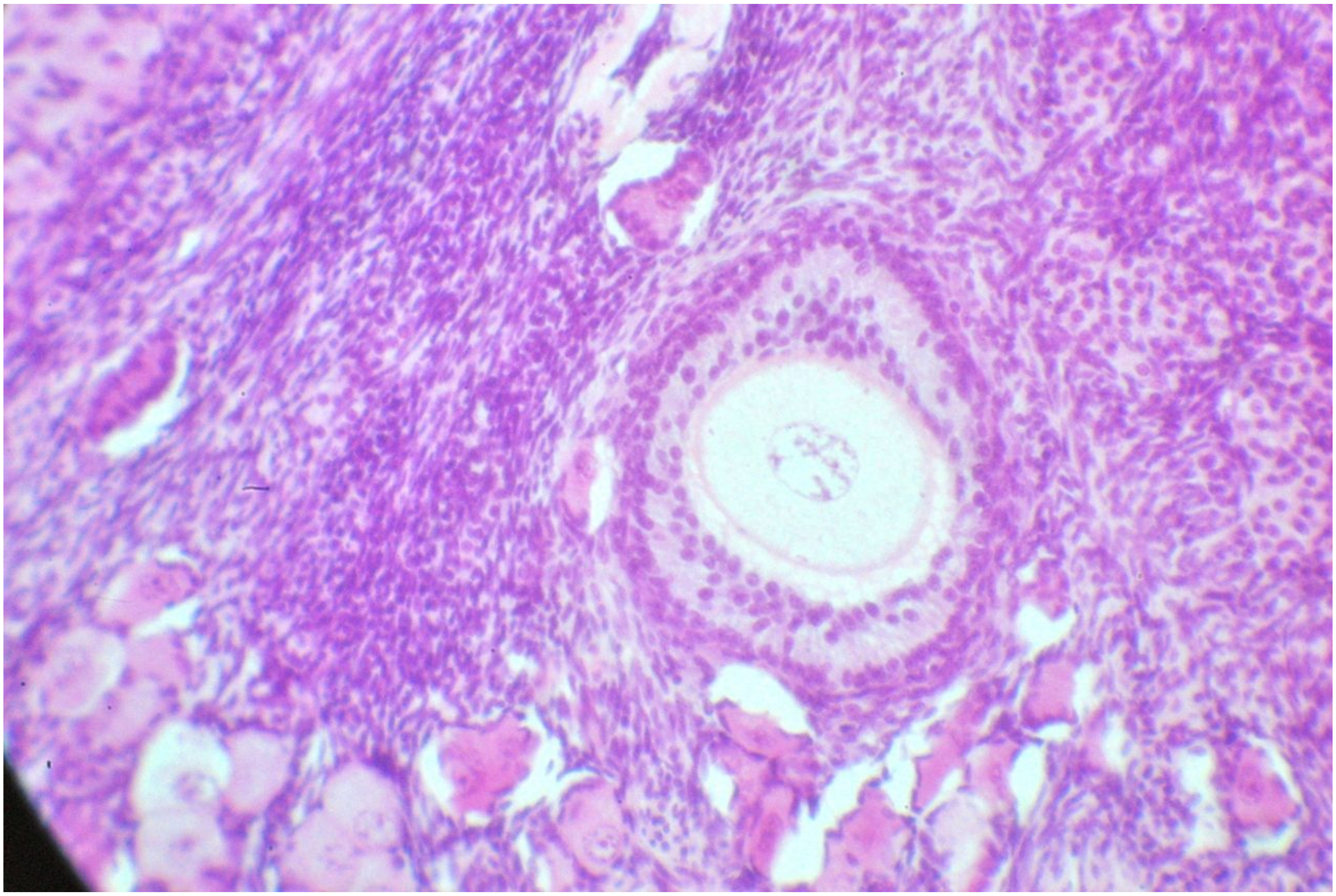
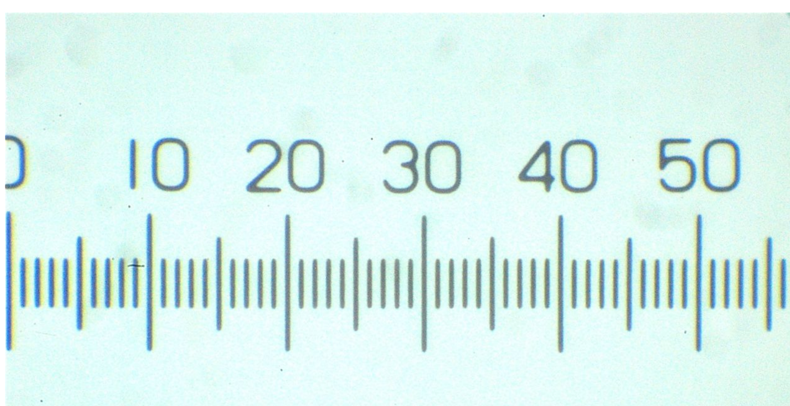


Figure 10. A section of the same cat's ovary photographed with the 2.5x Olympus ocular and the 15x objective. The image is sharper in the center and the color more true, but some field curvature can be seen in the corners.

Figure 11. The photographic field with photographed with the optical combination above is 570 µm.



In conclusion the testing showed that the Stabifocal is fit with optics quite good for the standards of the times. Photographically, the 15x objective and 10x ocular allowed pictures that although low in contrast conveyed sufficient information about the specimen. This in spite that we were working with non-Koeller illumination and the 10x ocular was likely not designed for photographic use. The quality of the picture improved when a photographic ocular was used, even thought it was one of a different brand. Optically, the Stabifocal must have been competitive among the middle-range microscopes of its times.

THE CREATOR

The similar microscope that is part of the Royal Microscopical Society Collection is described and illustrated at page 219 of Turner book (1989). That particular instrument is signed Locquin, Paris. The name Locquin corresponds most likely, to Marcel V. Locquin, a distinguished French scientist of multifarious activities. Marcel V. Locquin was the Secretary-Founder of the French Society of Microscopies (sic), 1948-1960. In 1946, he was awarded a prize by the Society of Arts and Letters of Lyon. He held more than one hundred patents pertaining to the light and electron microscope. He co-authored an excellent Handbook of Microscopy (Locquin and Langeron, 1983). We consulted this book but found no depiction of the Stabifocal among the many instrument illustrated in it; it may be that by the time the book was published the life of the Stabifocal had run its course.

THE MAKER

The lack of maker identification in a microscope of this kind and date is surprising. Recoules (2001) describes the **Stabifocal** as a product of the SEROA Company of Monaco (p. 256). He comments of the availability of a binocular head and of photo and video adapters, but concedes that the instrument never achieved commercial success. SEROA was created in 1956; initially, the Company was specialized in mechanical precision but according to their web site, SEROA soon “experienced important development increases and a marked orientation towards scientific apparatus." So it is quite conceivable that the company undertook the manufacture of the Stabifocal (they also developed advanced reflex photographic cameras). The **Precitec Co.** sticker affixed to this instrument, may refer to a reseller or user of it. At the time of this writing, Presitec KG is a global Company based in Germany and devoted to the production of laser cutting and laser welding equipment as well as measuring technology.

Documentation about the Stabifocal is very limited to say the least. Our attempts to obtain additional information on it from the French Society of Microscopies (sic), or from SEROA were unsuccessful. It is hard to accept that there is no surviving information on this microscope, either in scientific publications, or under the form of advertisement in technical or scientific journals. Searching for that elusive piece is an ongoing project for us, any help from the readers will be greatly appreciated and acknowledged.

FAILURE

Turner's comment (1989): "Certainly innovative, this is an unpractical design which did not succeed," is correct and shared by others. This is an instrument optimal for neither the amateur nor the professional. This stand that weights 8.5 kg is too ponderous (and likely, too expensive) for the amateur and lacking some important features for professional work. One limitation in particular was obvious to us while using the instrument. We accidentally moved the stage while switching optics for photography. The magnetic stage glides in any conceivable angle and there are no coordinates that will help to locate and return to a particular position. This made our efforts to relocate the field shown in figure 8 so vexing that we abandoned our attempt; not a tolerable situation in a professional instrument. It is to be noted that research microscopes contemporary with the Stabifocal featured highly precise, graduated mechanical stages

In sum, this is an instrument that, commercially, fell into "no man's land"; that makes of it a very desirable item for the collector.

SOURCES

Locquin, Marcel and **Maurice Langeron** (1983) Handbook of Microscopy. Butterworths, London, English version of the 1978 French edition by Harold Hillman. Butterworths, London.

(*) **Moenke, Horst and Lieselotte Moenke-Blankenburg** (1973) Laser micro-spectrochemical analysis. Crane, Russak, and Co., New York.

Recoules, Andre (1991) Une Histoire du Microscope. Moulins, France. Recoules describes the Stabifocal as a product of the SEROA Company of Monaco (p. 256). He comments of the availability of a binocular head and of photo and video adapters, but concedes that the instrument never achieved commercial success.

Seguy, E. (1949) Le Microscope Emploi et Applications. Encyclopedie Practique du Naturaliste, Vol. XXXIV. Tome II . Paul Lechavalier edit. Deuxieme Edition, Paris; cites eight papers by M. Locquin (pp. 951-952). Those papers were published during the period 1942 to 1947. Whether M. Locquin was the designer of this microscope is unknown but likely. His earlier articles, mostly published in the Bulletin of the Linnaean Society of Lyon, deal with microscopic techniques, while the latest one discuses the application of phase contrast.

Turner, Gerard L'E. (1989) The Great Age of the Microscope. Adam Hilger, Bristol, UK.

(*) We are most grateful to our Editor, David Walker, for providing us with a difficult-to-find reference to the Stabifocal.

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