All of us can look back on key experiences during our careers which have been of particular significance, such as the first professional success, a fortuitous win at sports, or the knowledge of having made the right decision. As far as I am concerned, there is one key experience, which I would like to relate, as follows:

I can remember quite well a decisive experience during my medical student years. When, as a medical student, during an ophthalmoscopy course, I was called upon to examine one of my fellow students. Later that same day, I also had the opportunity of observing the anterior segment of a post-operative patient for the first time by means of a slit lamp. Both these experiences instilled me with a preference for ophthalmology and thus committed me to select this particular specialist field. The examining instrument I used at that time in the university eye-hospital was a HAAG-STREIT slit lamp.

HAAG-STREIT equipment was standard in all the examining rooms of that eye-hospital. The outstanding optical quality and the realistic image reproduced of the anterior segment meant that there was ample time to come to reliable results, in spite of the hustle and bustle of day-to-day clinical activity.
A decision for life

My decision to become an ophthalmologist is attributable, for the greater part, to my fascination with HAAG-STREIT optical instruments, which enable the eye to be image-reproduced in realistic, contoured focus.

During the phase of setting up my own practice, I was confronted with the decision of having to select a slit lamp for my daily consultations in the examining room. When acquiring this instrument, which is of such daily importance for the ophthalmologist, I resisted the temptation to place price before quality. It was my aim to use a slit lamp that would continually refresh my motivation and care for satisfaction whilst evaluating the fundus, despite the unavoidable pressures of my daily routine.

It was my aim to use a slit lamp, which would continually refresh my motivation and care for satisfaction whilst evaluating the fundus, despite the unavoidable pressures of my daily routine. An instrument which would provide fascination, even during the course of daily work, due to its elaborate performance.

My selection of this top class product, the slit lamp BQ 900® from HAAG-STREIT AG, fulfilled these expectations in every respect, and I have never regretted the extra price.

In the following article, I would like to relate why I am still able to experience overwhelming enthusiasm, working with both the HAAG-STREIT Slit Lamp BQ 900® and the stereo-variator (see Fig. 2).

What are the benefits offered by this slit lamp?

First of all, I can recommend the fascinating optics without hesitation. Above all, the professional view of the pathological changes is the deciding factor for any kind of certainty in matters of diagnosis. And this is exactly the point where the HAAG-STREIT slit lamp is superior in comparison to all other brands of instruments known to me. At the same time the ease of handling, the excellent finish and the durability of HAAG-STREIT products must be mentioned. When the instrument is carefully looked after, a HAAG-STREIT slit lamp requires practically no maintenance and may easily outlast an ophthalmologist’s career. But I would like to come back to the most important aspect, the optical characteristics.

In my practice I have, for example, another slit lamp which has no stereo-variator for use with an argon laser.

When I have carried out a fundus examination in my consulting room with a three-mirror contact lens and diagnosed, for example, a retinal hole (see Fig. 3) in the upper ocular section, I frequently have to advise the patient to undergo urgent laser coagulation treatment on the same day. Often the following phenomenon occurs:

Although I am absolutely certain, through my HAAG-STREIT slit lamp, in my ophthalmic diagnosis of the position of the pathological substrate, when I carry out the same examination with the laser slit lamp, I often experience difficulty in relocating the pathological position.
In this regard, I should also mention that in aspects such as magnification and illumination, both makes of slit lamp are absolutely equal by comparison. It is only the optics of the HAAG-STREIT instrument, that are significantly better. This may be due to the individual image-reproduction quality of each of the oculars. In cases of examining the periphery of the fundus, the stereo-variator emphasises this excellent image-reproduction capacity in particular.

The binocular image of the periphery of the fundus, for example, allows a reliable diagnosis of:

- horseshoe-shaped foramina
- hyaloid-body adhesion
- hyaloid bodies covering hidden foramina

(see Fig. 4)

As to whether a retinal detachment exists, this can be determined immediately, and with reliability, by means of the HAAG-STREIT slit lamp. Any elevated edgings of a possible hole can be definitely recognized as such with the stereoscopic fundus-viewing feature of the Slit Lamp BQ 900®.

There are other properties of any HAAG-STREIT slit lamp, in particular the HAAG-STREIT BQ 900®, which I would also like to mention. The fine-tuning adjustment of the instrument is familiar to very few ophthalmologists only. Often, the entire range of examination possibilities is not even known approximately. For this reason, I would like to describe some of the characteristics, which enable clinical examination capabilities and diagnostic reliability to be considerably improved.

The following possibilities are available for examinations of the fundus in mydriasis:

1.

It is possible to obtain a remarkably thorough examination of the central fundus and the intermediate periphery by means of the Volk Superfield or 90D lens. In this regard, a particularly excellent assessment of the pupils can be obtained by means of the stereo-variator. For this purpose, the illumination unit of the slit lamp is either set precisely in the centre or at an angle of 10° relative to the right or the left of the...
Diagnostic reliability

central position (0°). The slit lamp has three settings, which can be sensed by a slight retarding engagement effect when turning the illumination unit. A selection of one of these three precise engagements will provide an optimum illumination for a binocular field of vision.

From this examination position for example, excellent preconditions are available for carrying out an assessment of the pupillae. The excavation of the pupilla is easily measurable by means of a narrowly focused slit width (see Fig. 6). Comment: The evaluation of the pupilla excavation is not always as clear as on these images. In the early stages, the central pallor of the pupilla fundus is often not ascertainable. In such cases, a narrowly focused slit width is particularly suitable for undertaking vertical and horizontal measurements of the excavation.

The same goes for an examination of the macula. With the slit width adjusted extremely narrow, an excellent assessment is achieved such as, whether there is a hole in the macula, whether the margins have already exfoliated, or if a macula edema is present.

2. The three-mirror contact lens, according to Goldmann, provides the examiner with a first class insight view of the retina, both of the posterior pole as well as of the central and outer periphery. With the stereo-variator switched on, the contact lens can be introduced and the illumination unit swung by an angle of 10° to the right or left relative to the central position (0°). While I am examining with the contact lens in place, I prefer to select a magnification of 10x; allowing the entire fundus to be surveyed binocularly. As well as the impressive image of opacities of the hyaloid body, vitreous bands, and possibly existing cells in the hyaloid body, hyaloid adhesion also becomes remarkably visible. Floating lids, exfoliating margins, horseshoe-shaped holes (Fig. 4), are literally caught by the eye of the examiner, in comparison to scrutinising the fundus without the stereo-variator. The decision for a possible laser therapy can be taken more easily and reliably due to the stereo-variator. Diagnostic reliability is thus improved dramatically.

Slit lamps by HAAG-STREIT offer a whole range of technical properties many of which are, in my opinion, used by few ophthalmologists to their full extent as they are not sufficiently known. As an example, I would give the diversity of the various filters (Fig. 7).

When surveying the fundus of mydriasis, by means of the contact lens, the Volk Superfield and the 90D lens, the red-free filter in particular provides a specially enhanced contrast image. Also, the evaluation of blood vessels can be concluded more easily than without a filter for example. Diabetic retinopathies can be better classified, and the blinding effect for the patient is reduced considerably. Using the grey filter, it is particularly easy to examine the anterior segment because it allows the user to switch rapidly between full and reduced illumination. Also there is the possibility to reduce the illumination by the use of a potentiometer. Furthermore, the aperture can be used to reduce the illumination, which is only partially recognised. Of particular mention is the fixation star, which is highly suitable for examining children suffering from amblyopia with squints.

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Fig. 6: Increase in pupilla excavation.

Fig. 7: Filters (1 open aperture, 2 heat absorption screen (permanently mounted within the illumination pathway in BQ models newer than 2004), 3 grey filter (10%), 4 red-free filter, 5 empty space for accommodating an additional filter).

Fig. 8: The apertures are operated by the knurled control knob (1 fixation-star, 2 round apertures, 3 wedge-shaped apertures, 4 blue filter).
The 8, 5, 3, 2, 1, and 0.2 millimetre apertures also serve to facilitate diagnosis of pathological conditions of the anterior segment. The wedge-shaped diaphragm (see Fig. 8, No. 3), with a continuous sliding adjustment of the slit length, is of great benefit for documenting pathological changes, which can be precisely recorded. The rapid adjustment of the slit length is extremely important to be able to examine the anterior segment under conditions of high magnification. A narrow slit width, which can also be reduced in length, can thus be projected into the anterior segment.

The following indications, amongst others, can be examined by various methods of illumination:

- cells in the anterior segment or the Tyndall effect (see Fig. 9)
- amyloid endothelial coating of the cornea on cases of chronic iritis (see Fig. 10)
- two various types of cataract (see Fig. 11a and 11b)
- a pseudo-exfoliation of the ocular lens (see Fig. 12)
- corneal scars (see Figs. 13a and 13b)
- irisnaevi, or changes in the posterior segment

Any extension of pathological changes can be well diagnosed by means of the fully adjustable slit length. A blue filter in the illumination beam path is necessary to achieve an excitation of the fluorescein from the applanation tonometry. The addition of fluorescent to the lachrymal film in connection with the blue filter will facilitate the examination of the breakup-time. The intensive green hue (see Fig. 14a and 14b) is of great significance for the evaluation of the corneal epithelium. Thus, any stipples on the cornea can be ascertained and any extension of erosion in the cornea can easily be assessed.

The following peculiarities, inherent in the HAAG-STREIT slit lamp, are less known and/or are scarcely used, respectively:

Height marker of the head rest:
The patient is prepared optimally for the examination, the nurse is able to place the patient in the correct position, and adjustment of the chin rest can be tuned without the slit lamp having to be switched on.

Inclination range of angles from 5° to 20°:
Extraordinarily, the latch (see Fig. 15, No. 3) for the inclination angles from 5° to 20° is very seldom used. This function produces an altered direction of beam (in 5°-stages) which will enable an optical cut on the fundus by means of a narrow horizontal slit.
Quality of binocular viewing

A short mirror for the slit illumination and the turning of the upper illumination unit (see Fig. 15, No. 1) by 90° are required for this purpose. The microscope and the illumination unit, on the other hand, remain in the central position (0°).

Another useful feature for examining the fundus in mydriasis, is the latch (see Fig. 15, No. 3). Consider the case where the anatomy of the patient fails to permit an insight view into the upper fundus section; even by means of the contact lens. This is often the case with patients who have deep-set eyes or prominent bone formations over the orbita. By changing the fixation of the patient while you are examining the fundus in mydriasis, it can be used to give an insight view of the whole fundus.

Additionally, by unlocking the centring screw (Fig. 15, No. 2) the slit image can be relocated away from the centre of the field of vision. This is called regrediental illumination, which allows an unhindered examination binocularly through an arc of lateral angles of 3° to 10° (see Fig. 16). The slit image is automatically re-centred simply by re-tightening the knurled centring screw.

It is possible to relocate the slit image into the horizontal plane by means of the knurled control knob (see Fig. 15, No. 1); for example for measuring the size of tumours, ascertaining corneal alterations or other pathological changes, etc., and this facility, in my point of view, is used quite rarely. That is exactly the point where the high precision of a HAAG-STREIT slit lamp comes into its own. The examination slit can be swung into any imaginable position. These features differentiate the HAAG-STREIT Slit Lamp BQ 900® from other similar products.

The quality of binocular viewing for examining the fundus is often underestimated for diagnostic purposes. There is no other slit lamp on the market which can match the level of precision and imaging quality provided by the HAAG-STREIT Slit Lamp BQ 900®.

A precondition for precise viewing is correct setting of the oculars (see Fig. 17) – something which is often not paid sufficient attention to. The oculars of the HAAG-STREIT slit lamp can, and should, be separately adjusted to accommodate the refraction of the examiner, as is the case with any ordinary binocular device. Correct setting to the pupillary distance (PD) of the user is also of importance.
An investment for life

I have fitted an adapter for 20°-inclined eye-pieces to the slit lamp (see Fig. 18). This alleviation pays significant dividends in daily practice. Tiredness is easily caused by horizontal viewing and can be avoided by means of this feature. The head of the examiner can be positioned in a relaxed and ergonomically correct manner to the slit lamp instrument, thus easing the physical stress of a long working day. The last two decades of my life, in my practice as an ophthalmologist, have allowed me close collaboration with the instrument industry, HAAG-STREIT AG in particular. I would conclude by saying that I have never regretted my investment in the uniqueness, quality and precision of these instruments. Due to my many years of experience working with these products, I am more than happy to recommend this slit lamp to anyone who wants to invest in a product which should last for decades.

Author:
R. Herrmann MD
Ophthalmologist
Kirchstrasse 21
D-71634 Ludwigsburg
Germany

References:
HAAG-STREIT
Cover photo; Fig. 1, p. 2; Fig. 2, p. 2; Fig. 7, p. 4;
Fig. 8, p. 4; Fig. 15, p. 6; Fig. 17, p. 7; Fig. 18, p. 7
Kanski/Spitznas, Lehrbuch der Augenheilkunde, Thieme Verlag
Fig. 3, p. 2; Fig. 4, p. 3; Fig. 5a-5f, p. 3; Fig. 6, p. 4; Fig. 9, p. 5;
Fig. 10, p. 5; Fig. 11b, p. 5; Fig. 12, p. 5; Fig. 14a-14b, p. 5
Spalton/Hitching, Alllas der Augenkrankheiten, Thieme Verlag
Fig. 11a, p. 5; Fig. 13a-13b, p. 5; Fig. 16, p. 6

Fig. 17: Ocular with prism body.
Fig. 18: Adapter for 20°-inclined eye-piece.