

A NEW TYPE OF BIOMICROSCOPIC EXAMINATION

“RETRO — TRANS — ILLUMINATION” (X)

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The Biomicroscopy with Slit Lamp a type of objective eye examination, which is nowadays so common that one cannot allow anymore the ignorance of its methods. Of these, four can be considered basic for their qualities of semerotic value. They are, *Direct Focal Illumination*, *Indirect Focal Illumination*, *Specular Reflection* and *Retro-Illumination*. The latter can be divided into another two, *Direct Retro-Illumination* and *Retro-Illumination* (1). The other methods such as *Sclerotic Scatter* and *Diffuse Illumination*, are less important but also have their value in the general computation of biomicroscopic examinations. In figure n.º 1 we outline the principal types of illumination used in Biomicroscopy.

FIGURE N.º 1

All these methods of examination use the light from Slit Lamps not equipped with special attachments, that is to say, light passes into the eye in a much too wide angle, reaching scarcely beyond the anterior third of the vitreous.

KOEPPE (2) in 1918 had the bright idea of placing a small silver mirror in the extremity of the arm of Gullstrand's Slit Lamp, thus obtaining the deviation of the beam of light and therefore a greater penetration in the eye, for it narrowed the angle of incidence, which was superior to 30 degrees, to a little more than 3 degrees. The purpose of this alteration of his was, and still is, the possibility of examining the fundus with the corneal microscope. This was impossible the ordinary microscope due to the great power of refraction of the cornea and remaining segments of the eye, which led KOEPPE himself to devise his *contact lens*, the dioptric power of which neutralizes the ocular refraction. The stereoscopic vision of the retina was thus achieved, with great perfection and with a magnification equal to that already used for other segments of the eye.

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Today, the use of apparatus equipped with special attachments is generalized, enabling, with great comfort, to make real in seconds the dream of the great KOEPPE.

For quite sometime we have been devoting ourselves to the stereoscopic examination of the retina and had in fact the opportunity of proposing and adaptation to GULLSTRAND 's (3) Slit Lamp and another to COMBERG 's (4), thus making them fit for this type of examination. We had recently the opportunity to adapt KOEPPE's mirror used in POSER's Slit Lamp, made by Bausch-Lomb, to COMBERG 's (5) Slit Lamp, aiming always at a simpler, and more efficient method for the examination of the retina.

In carrying out this new adaptation, the idea of examining the patient's eye fundus with naked eye occurred to us which proved very easy it being enough to approach our eye as near as possible to the eye one wishes to examine. The retina displays itself with great clearness and magnified about 10 times, which of course is due to the lens. If we put between ours and the patient's eye a convex lens of 10 to 20 spheric diopters, we shall be able to perform the ophthalmoscopy at a greater distance and more comfortably.

Bearing in mind this possibility and as the illuminated area seemed to us sufficient, we thought of making the examination of the anterior segments using the corneal microscope. This was possible and in an unexpectedly perfect manner thus creating the biomicroscopic examination by means of transillumination which uses the ways of light reflected by the retina, due exclusively to the narrower angle of incidence of light when penetrating into the eye.

This type of transillumination enables us to see with same perfection as the one which receives the rays of light reflected by the iris or the anterior and posterior capsule, not only the cornea and lens, but a great part of the vitreous as well, displaying to us a reddish-brown colour or a very bright orange-red background.

On this type of examination which to our knowledge has not been used before, we made a communication in the form of a *preliminary report to the Society of Ophthalmology of São Paulo*, on the 14th last and called it *Retro-Transillumination* in order to distinguish it from the Retro-Illumination and the Transillumination or Diaphanoscopy (1).

In order to perform this examination POSER's Slit Lamp or any other can be used, to which has been adapted a flat mirror or a total reflexion prism. At present we are using the Slit Lamp made by Haag-Streit to which KOEPPE's mirror was adapted by Bausch-Lomb, in

views of the fact that Goldmann's prism, being too large, does not provide good visibility. The patient's eye should be as near as possible to the mirror and light should penetrate in the narrowest possible angle with the antero-posterior axis. Light should reach the retina passing very close to the edge of the pupil, either nasal if one wishes to examine the temporal half, or vice versa, so that the rays reflected by the retina may well illuminate the opposite half of the pupillary area. The pupil needs not be in complete midriasis for we have already examined eyes without making use of midriatics. Fig n.º 2 give us an idea of the exact position of the microscope and the Slit Lamp.

FIGURE N.º 2

The illuminated area which is somewhat larger half of the pupil in a vertical cut, displays an orange-red colour in the periphery and shows a lighter colour, almost yellow and very bright, in the centre, where at times it looks like a colour lighted artificial fountain, as though we had placed a small lamp within the eyeball. Fig. 83 in BERLINER's Textbook (1), if it displayed all the above mentioned colours, would give an exact idea of how the area illuminated by this method appears. This enables us to use also in this case the two methods of Retro-illumination already mentioned, namely the *Direct* in the centre and the *Indirect* in the periphery. This centre of lighter colour is roundish when we direct a pencil of light into the retina and has the shape of an upright area when we direct a beam of light.

The optical phenomenon of such a remarkable difference in colour is based on the fact of the retina being a powerful concave mirror, capable therefore of concentrating the rays of light which reach it, and of these already concentrated rays having to pass through the crystalline lens, which is a biconvex lens of even greater power of convergence. This would explain the lighter coloured light beam which appears in the centre of the illuminated area and which at times is of such an intensity as to force us to dim the light of the slit in order to achieve a more clear examination.

This new method of examination has enabled us to examine the iris, the lens, the vitreous and chiefly the cornea where, as we believe its greater semeiotic value remains. Fig. 3, 4, 5 show aspects of an old "pannus" of keratic precipitates, and of lens anterior vacuoles

All this appears under a new aspect, giving evidence to the "pannus" which is seen as a splendid capillary network, hung before a screen illuminated by red light, in the inner part of which the blood circulation can be perfectly seen.

FIGURES 3, 4, 5

This type of examination does not offer the slightest difficulty to the person who performs it, and only requires a little skill in handling the Slit Lamp. It is extremely attractive to the operator and brings no discomfort to the patient.

We will be glad to receive any suggestion from colleagues who are interested. It is our purpose to publish within a short time the biomicroscopic findings which we are recording.

S U M M A R Y

The author describes a new method of biomicroscopic examination using rays reflected by the retina, to which he suggests the name of *Retro-Transillumination*. The work is illustrated with 5 drawings, all by the Author himself.