Arch. Soc. Amer. Oftal. Optom. (1967) 6 . 115.

MICRO-OPHTHALMIC SURGERY

BY

A. RICHARD A. PERRITT, M. D.

Chicago, Illinois

The corneal binocular dissecting microscope with co-ordinated and intensive spot illumination has been used by me since 1946.

It was first presented as part of a course on corneal surgery at the American Academy of Ophthalmology in 1950.

The operating microscope is a modification of the binocular microscope: highly advantageous for both thorough examination, especially in the operating room, and actual performance of surgery. It is equipped with three pair of eye pieces, 3.5X, 7X, and 10.5X at a working distance of approximately 5 to 6 inches, a built in illuminator, controlled with a prism, casting a brilliant shadowless spot of light illuminating the entire eyeball and its' environs.

Figure I Operating Microscope.

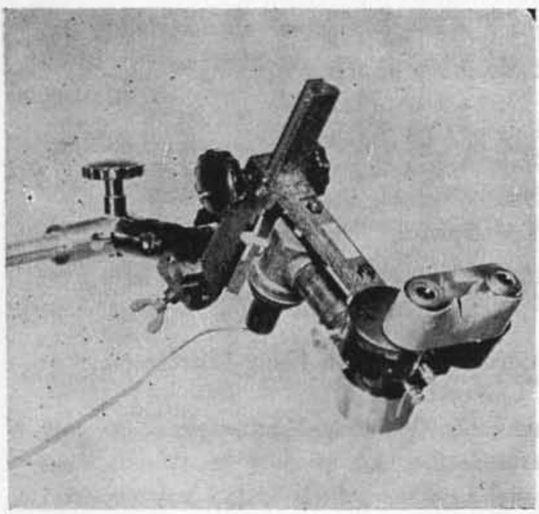

Fig. 1-A-Perritt operating microscope

Since 1946, I have evolved the following indications:

Figure II (A & B)	Calcareous degeneration of cornea, Corneal Leukoma,
Figure III (A & B)	Malignant Pterygium, Dermoid Cornea, Corneal Abscess,
Figure IV (A & B)	Blood Cyst, Hemorrhagic Tumor, Corneal Transplantation,
Figure V	9 mm. Lamellar Graft,
Figure VI (A & B)	Brick Fragments on Endothelium, Solitary Iris Cyst,
Figure VII (A & B)	9 mm. Penetrating Graft, Chemical Burn of Cornea, Dystrophic Corneal Leukoma, Multiple Intraocular Foreign Bodies Removed, Corneal Laceration Sutured,
Figure VIII (A B C D)	Malignant Melanona of Iris,
Figure IX	Foreign Body or Cyst of Iris. Corneal Graft, Aphakic, Corneal Cyst, Glass on Endothelium, Lens Dislocated into Anterior Chamber, Laceration of Cornea,
Figure X	Suturing Corneal Laceration Using Microscope, Tumor of Ciliary Body, Cyclectomy Using Operating Microscope, Corneoscleral Graft, Needlings and.

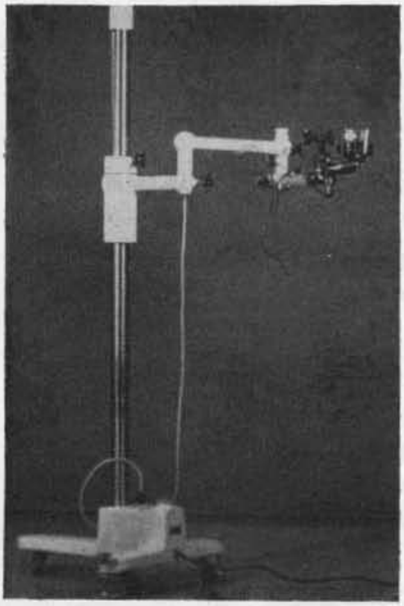

Fig. 1-B-Operating Microscope. - Perritt Model

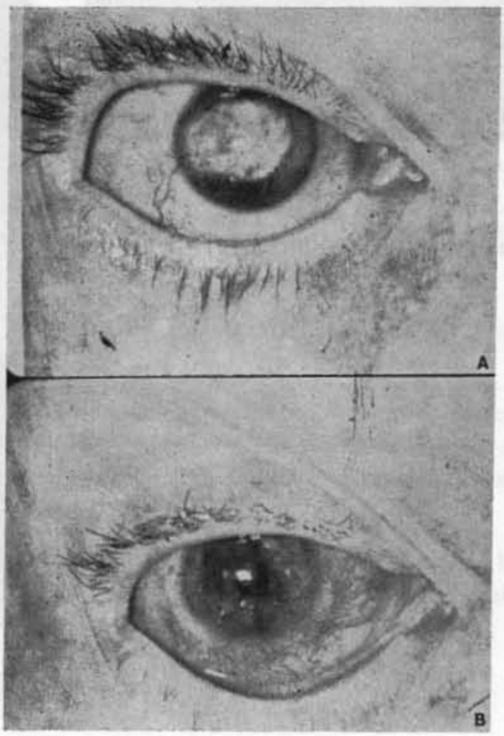

Fig. 2 Calcareous degeneration of cornea.

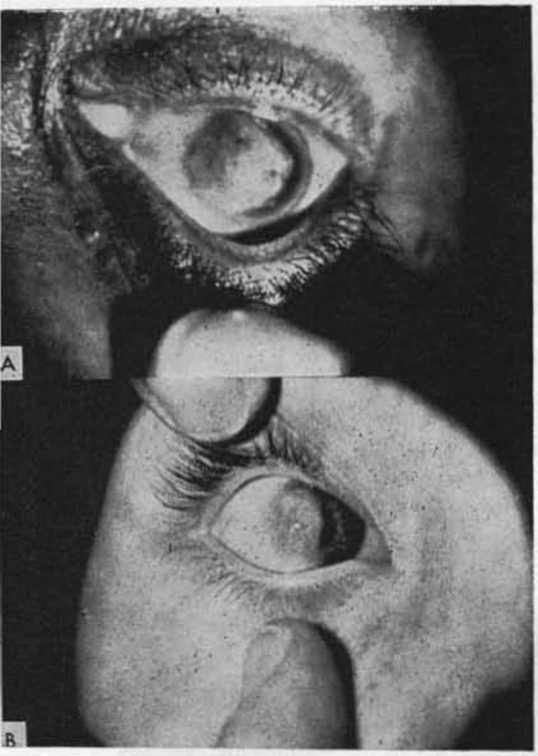

Fig 3-A-Malignant pterygium. B-Dermoid Cornea

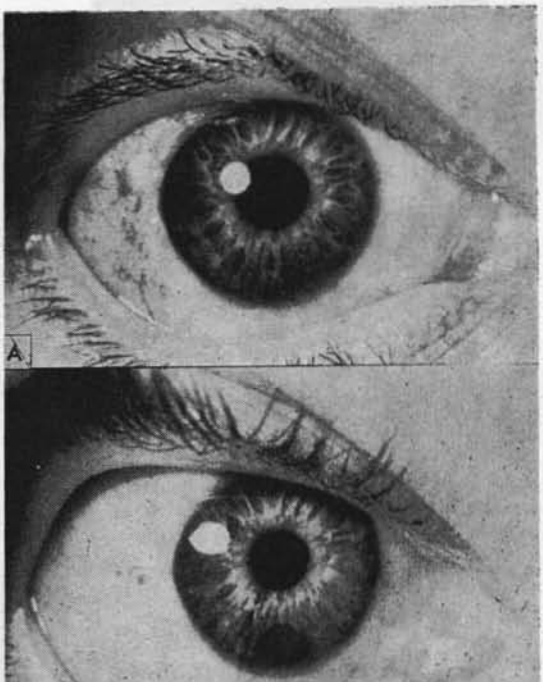

Fig. 4 Brick Fragments on endothe. lium. B.Solitary Iris Cyst.

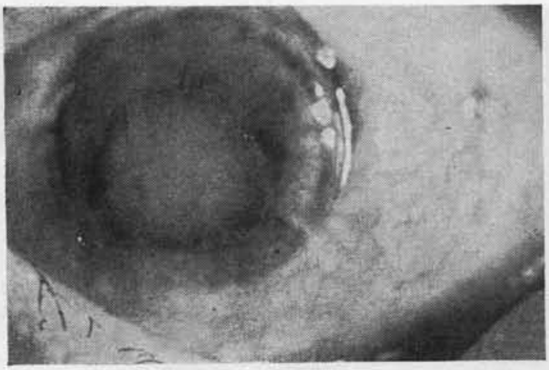

Fig. 5. Lamellar graft, 9 mm.

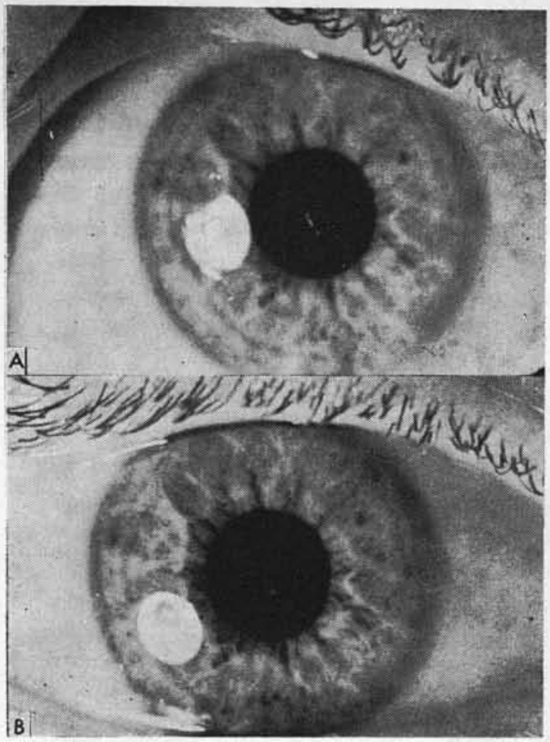

Fig. 6 Brick fragments on endothelium.

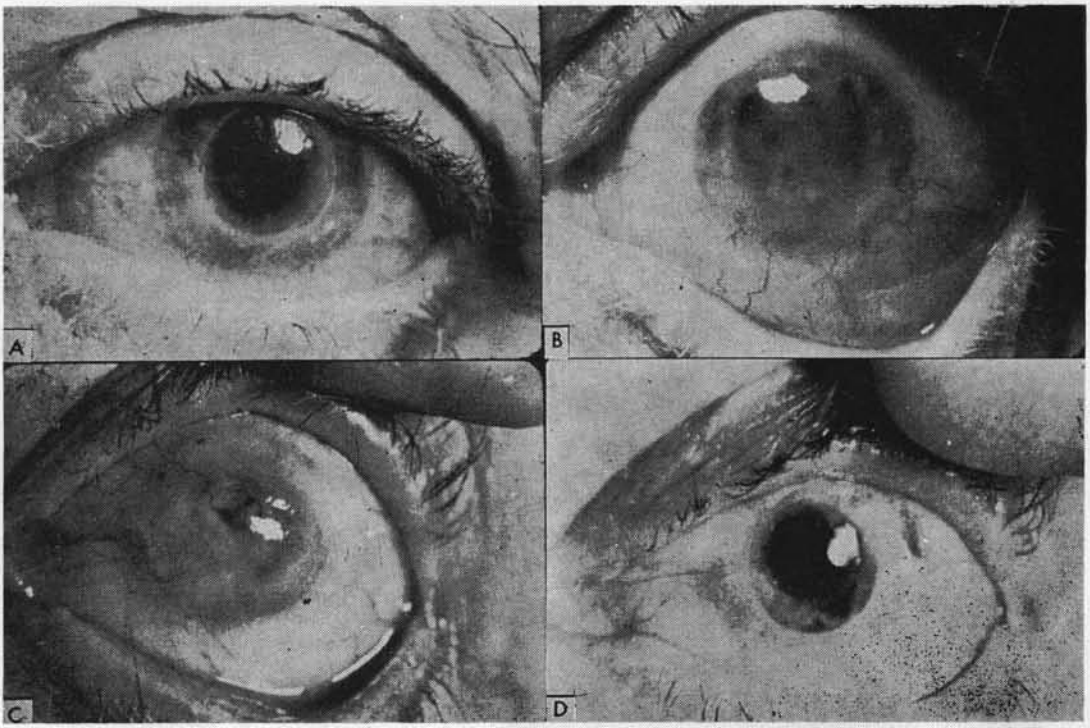

Fig. 7-A. Penetrating grafts. B. Chemical Burn of Cornea. C. Dystrophic Corneal Leukoma. D. Multiple intraocular foreign Bodies removed.

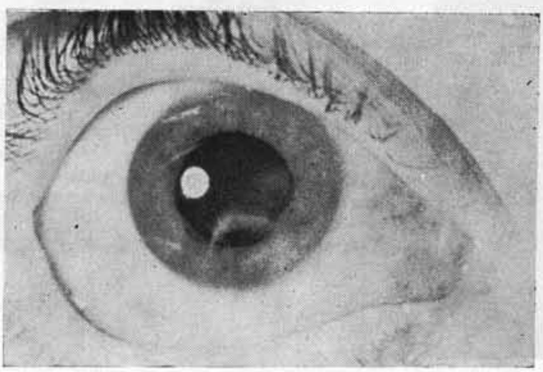

Fig. 7-E. Corneal laceration sutured.

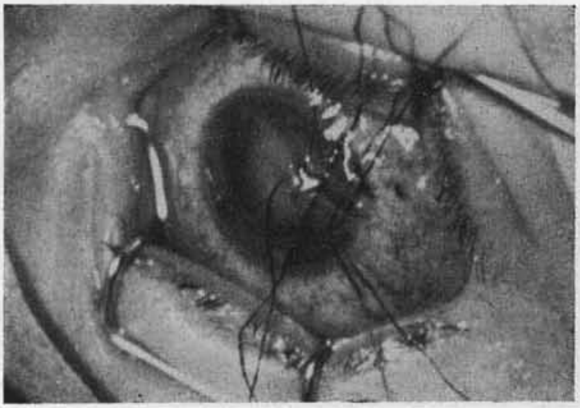

Fig. 7-F. Corneal Laceration being Sutured.

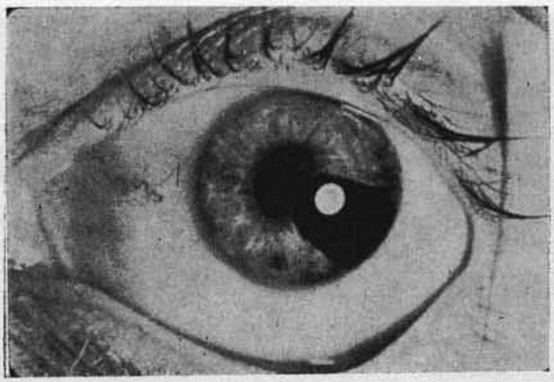

Fig. 8. Malignant melanoma of iris.

Separation of Vitrous Face (with wide sweeps of the spatula, one can actually see the vitreous strands separate.

By this means, we also have at our command, accurate, precise but conservative approach to tumors of the eyeball, making enucleation unnecessary.

Opthalmic surgery has attained a high level of efficiency. It is probable that with present instrumentation little further improvement in technique is likely to occur.

The ophthalmic surgeons as a group, however, have been slow to take advantage of one of our greatest assets and advantages — our experience and facility with magnifying devices. We use the slit lamp, automatically for diagnostic purposes, but few indeed make full use of its' potential. I would like to propose that the real future of ophthalmic surgery, from a technical standpoint at least, lies in the development of micro-surgery.

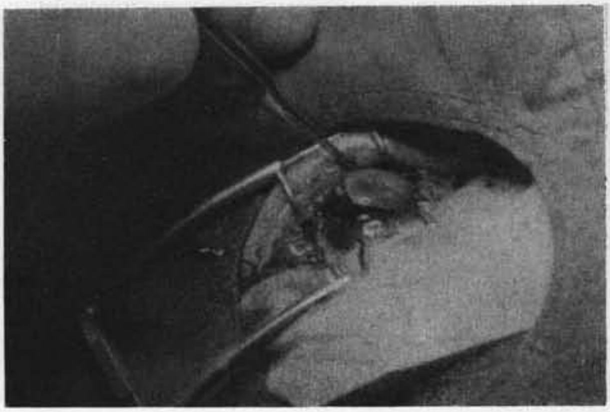

Fig. 9-A Corneoscleral Graft.

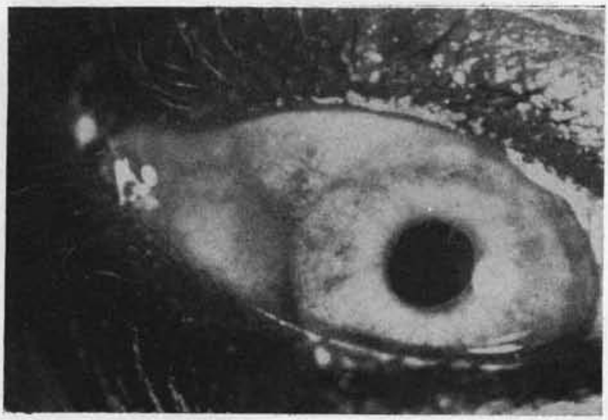

Fig. 9-B. Glass on Endothelium.

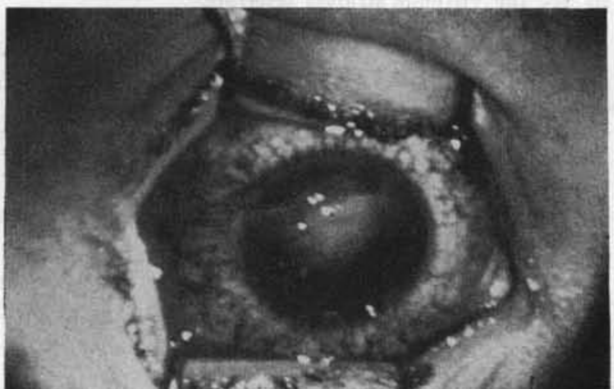

Fig. 9-C. Laceration of Cornea.

Fig. 10.A Tumor of Ciliary Body.

Fig. 10.B. Cyclectomy.

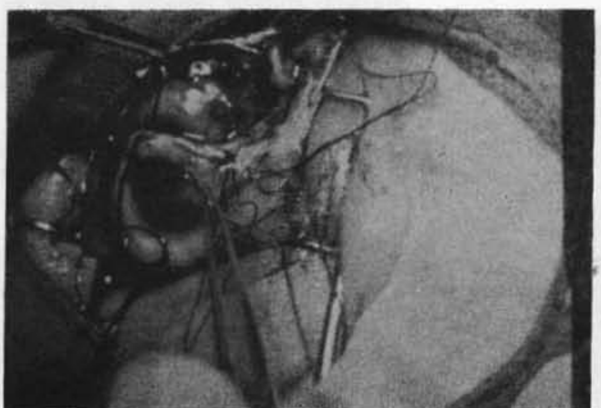

Fig. 10.C. Cyclectomy.

Fig. 10.D Cyclectomy.

Fig. 10.E. Corneoscleral Graft.

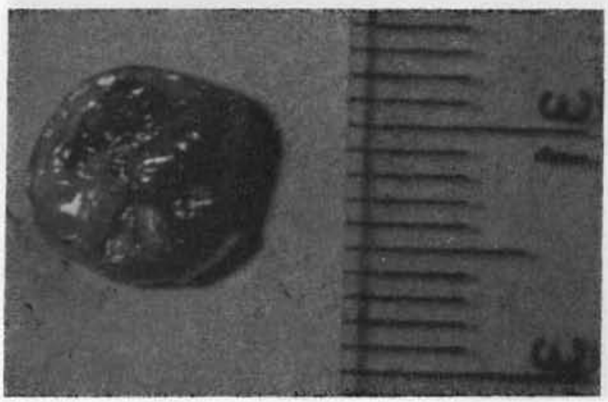

Fig. 10.F. Corneoscleral Graft. Corneoscleral Button - Endothe. lial.

It is only common sense to assume that if a surgeon can see tissue in more detail, he can do finer work. It is most reassuring to see the exact level at which a needle is placed in keratoplasty or corneal section, to see the capsule forceps actually grasp the lens capsule, to see the Cryostat congeal and the point of spreading adhesiveness on the lens capsule, to aspirate lens cortex under direct observation, and to see the position of a scissors blade while dissecting out an anterior chamber cyst.

Such detail enables the surgeon to perform procedures which he would otherwise consider impossible. For example: it was possible for me to dissect the fibrous membrane from the lens in a child with retrolental fibroplasis, it was possible to restore some modicum of sight only because of this technique.

I agree with Dr. Arthur DeVoe when he says, "the use of the needling and aspiration method, under microscopic control, has to my mind made all other treatment of congenital cataracts obsolete."

After a thorough stirring of lens material, one can observe cortex as it is drawn to the needle, see it aspirated and note the relative position of the posterior capsule and anterior face of the vitreous.

In spite of my firm belief in the future of ophthalmic micro-surgery, there are formidable obstacles. First, the instrumentation is quite expensive. Second, the instruments currently available are crude, clumsy, awkward and difficult to handle in a sterile fashion. To use them effectively would require the operator to have three hands. At best, their use necessitates a certain amount of learning before the operator is comfortable and before his proprioceptive sense has been educated to the point where he can localize the pips of his instruments without looking to the side of the microscope in order to see them. He will also find that many of the instruments to which he is accustomed are not suitable for use under the microscope because of their customary application which blocks the field of vision. Bayonet and angulated instruments are frequently necessary. At the present time, ideal tools are not available for such work. It also soon becomes apparent to any surgeon using magnification that instruments which we now currently consider rather fine, are quite gross and inaccurate when viewed under magnification. The instrument makers have only recently become aware of this problem and are now beginning to provide us with effective tools. Dr. Richard Troutman is well on the way to solving this problem.

Most important, however, is the fact that we do not have a thoroughly satisfactory microscope with which to work.

The ideal operating scope should have zoom optics, a slit, and a wider field with greater depth of focus than is currently available.

It should have some mechanical system of positioning which the operator can control without removing his hands from the surgical field, either foot or head control, and an arm for a movie or still camera. The mechanical problems involved are certainly not overwhelming. The manufactures are all now convinced that such an instrument is necesary and the need is now essential for surgery on a more sophisticated level and plateau.

BIBLIOGRAPHY

ANDERSON, S. R.: Congenital Fibroma of the Cornea, Acta Ophth. 26: 331-336, 1948.
ASH, J. E.: Lepibular Tumors, Am. J. Ophth. 33: 1203-1219, 1950.
ASH, J. E. and WILDER, H. C.: Epithelial Tumors of the Limbus, Am. J. Ophth. 25: 926-932, 1942.
BECKER, B.: The Zeiss Operating Microscope, Am. J. Ophth. 42: 302-303, 1956.
BIETTI, G.: Une forme interessante d'epithelioma Primitif de la Cornée, Boll. d'ocul. 11: 154-176, 1932.
BISCHLER, B.: Congenital Sclerocorneal Cyst, Ophthalmologica 144: 371-376, 1947.
BOVERI, T.: The Origin of Malignant Tumors. London: Bailliere Tindall and Cox, 1929.
DE FERRARI, G.: A Rare Case of Congenital Sclerocorneal Cyst, Boll. d'ocul. 29: 223-233, 1950.
DEKKING, H. M.: Use of the Binocular Microscope In Eye Operations, Arch. Ophth. 55:114-117, 1956.
DUKE-ELDER, W. S.: Text-book of Ophthalmology. St. Louis: The C. V. Mosby Company, 1940.
GARNER, L. L.: Dermoid of the Limbus Involving the Iris Angle and Lens, Arch. Ophth. 46:69-72, 1951.
HARMS H. Prof.: Micro-ophthalmic Surgery, in German, Personal Communication, August 1966. English Translation in Press.
HEATH, P.: Ocular Lymphomas, Am. J. Ophth. 32:1213.1223, 1949.
LOEWENSTEIN, S. and FOSTER, J.: Two Unusual Sclero.Corneal Neoplasms, Brit, J. Ophth. 32:1-12, 1948.
LOEWENSTEIN, A., and FOSTER, J.: Malignant Melanoma of the Limbus and Spontaneous Cyst of the Pigmented Layer of the Iris in the Same Section: A Contribution to the Histogenesis of Tumors, Arch. Ophth. 37:8-17, 1947.
McGAVIC, J. S.: Intra-Epithelial Epithelioma of the Cornea and Conjunctiva (Bowen's Disease), Am. J. Ophth. 25:176, 1942.
REESE, A. B.: Pigmented Tumors, Am. J. Ophth. 30:557-563, 1947.
REESE, A. B.: Tumors of the Eye. New York: Paul B. Hoeber Inc., 1951.
SAMUELS, B.: Tumors of the Conjunctiva & Lids, Arch. Ophth. 26:789-796, 1951.
SWAN, K. C., EMMENS, T. H. and CHISTENSEN, L.: Experiences with Tumors of the Limbus, Tr. Am. Acad. Ophth. 31:458-466, 1948.
TROUTMAN, RICHARD, C. Personal Communication, Aug. 1966.
WILDER, H. C.: Eye Tumors in Soldiers. World War II, Mil. Surgeon 99:459-490, 1946.
WISEN, G. N.: A Case of Bowen's Disease of the Cornea, Am. J. Ophth. 26:167-171, 1943.

30 North Michigan Ave.
Chicago 2, Illinois 60602
U. S. A.