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A CLINICAL STUDY OF LEPROUS IRITIS¹

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This paper is based upon observations made on 137 patients with leprotic lesions of the iris, out of a total of 800 lepers examined during a period of six years at the Sanatorio Padre Bento.

Division of cases.—From the clinical viewpoint the cases that have been studied may be divided as follows: (1) those with a diffuse form of iritis, serous or serofibrinous, and (2) those that show a localized involvement: miliary or nodular² leprotic iritis. The first group can be subdivided into: (a) those in which the affection presents an acute or superacute type, and (b) those in which it is subacute or chronic. This division is presented schematically as follows:

Leprotic involvement of the iris	{	Diffuse iritis	{ Acute or superacute Subacute or chronic
		Localized iritis, miliary or nodular	

ACUTE DIFFUSE IRITIS

Whether or not it is associated with an acute generalized exacerbation of the disease, the so-called lepra reaction, the acute form of leprous iritis is rarely of insidious onset. In the majority of cases it is characterized by a sudden, violent onset, with the development of intense inflammatory symptoms that rapidly reach an acme when pain is unbearable, photophobia is intense, and lacrymation

¹From a translation, supplied by the author and in places amounting to a radical revision, of an article which appeared in the *Revista Brasileira de Leprologia* 6 (1938) Special Number, pp. 3-12. The plates used to illustrate it, made from pictures done by Sr. Augusto Esteves under the supervision of the author, were supplied by the Leprosy Department of São Paulo.

²The word "nodular" refers only to a morphological formation, a rounded mass, sometimes of irregular shape, and is used without any histological significance.

and blepharospasm are very marked; these are the subjective symptoms of the condition. It is not common that both eyes are attacked at the same time. Sometimes the condition develops as a consequence of cauterization of lesions situated in the episclera, close to the limbus.

Symptomatology.—Pain generally extends throughout all of the periorbital area, and under pressure the region of the ciliary body is also sensitive. Visual acuity is affected, due to the marked edema of the cornea, clouding of the aqueous humor (tyndall phenomenon), etc. Other functional signs are those already mentioned: photophobia, lacrymation and blepharospasm.

Regarding the objective signs, not all of them may be seen clearly with the naked eye or by direct illumination and the use of a simple lens; the slit-lamp and binocular microscope are valuable methods for studying certain peculiarities to be described, though their use often presents difficulties owing to the disturbance caused by the light.

Ciliary injection alone (violet, pericorneal) is a rare finding; on the contrary there is usually an intense generalized hyperemia, together with ciliary injection. As in all cases of iritis the pupil is generally small, the iris blurred and hyperemic. The congestion is frequently very conspicuous.

Corneal edema, especially endothelial bedewing, is a constant finding. Its intensity is proportional to the degree of the inflammatory phenomena. Its distribution is diffuse throughout the cornea or limited to islets. In the latter case it occupies a well-limited portion, there being a straight line of demarkation from the neighboring tissue. This spot is generally located in the lower part of the cornea.

Exudates on the posterior surface of the cornea (endothelial precipitates, "K.P.") are very common. They are sometimes fine dots, or they have a more marked development, in which case their number is seldom large. Large white precipitates are seen rarely, only in cases with marked involvement of the eye; they are sometimes speckled with brown granules.

With regard to the characteristics of the aqueous humor, the acute iritis of leprosy is predominantly a serous affection—or, better, serofibrinous. The abnormality of the aqueous humor varies from a simple, more or less marked tyndallization to a condition in which there seems to be a total coagulation. In such cases there is a direct relation with the inflammatory phenomena and with pain. Threads

and coagula are present in the anterior chamber. The threads present various forms: sometimes there are more or less large tufts, with arborizations; at other times they assume the aspect of a cobweb. These formations are in direct contact with the anterior surface of the iris. In the most severe cases there is a total immobilization of the very turbid aqueous, constituting a coagulum. In these cases the ciliary pain is very marked and the ocular tension always increased.

This condition is comparable with that described by some authors as pathognomonic of the gonococcal iritis. Butler (1) has stated:

Threads and coagula in the anterior chamber.—These are not associated with cyclitis or choroiditis, but with gonococcal iritis. Devereux Marshall taught that the presence of a coagulum in the anterior chamber was pathognomonic of a gonococcal infection. This may be somewhat dogmatic, but we can say that every patient in whom we have found this condition has been suffering from gonococcal iritis, and we are personally in entire agreement with Devereux Marshall.

I have found this condition in a fairly large number of cases in which the possibility of a gonococcal inflammation as a cause of error could be eliminated. It cannot, therefore, be a pathognomonic sign of either gonococcal or leptotic infection; it is a finding common to both, and perhaps to other infections as well; and it is not a solitary condition since frequent relapses may occur in both infections. This exemplifies well the care that must be taken in establishing pathognomonic signs in medicine.

Evolution and complications.—This condition is of a variable duration. It may or may not be influenced by treatment, and is often in direct relation to the general condition of the patient: in good cases the external inflammatory signs clear up in a variable period of time, lasting from two or three weeks up to two months or more. Corneal edema lasts a little longer, and that is true of the exudate, flocculations, etc., in the aqueous. There are cases in which these late signs remain almost indefinitely, the iritis then assuming the subacute or even the chronic type. In some cases with marked hypersensitivity—always in cases of the highly bacilliferous leptomatous form—the acute attacks relapse frequently.

The formation of posterior synechiae is almost always in relation with the severity of the attacks. Cases in which the inflammation is of long duration, with abundant exudation in the aqueous, are most liable to the occurrence of synechiae, which as a rule are very strong. It should be added that quite often it is difficult to

prevent their formation, since as in every kind of iritis dilatation of the pupil is difficult to accomplish because drugs are only slightly absorbed, if at all, by the inflamed tissue. This fact is aggravated by the weak effect that mydriatics show in many leprosy patients, even in an apparently normal condition. In the routine examinations carried out at leprosaria it is a common thing to come across patients who present only moderate or slight dilatation with repeated instillation of 1 or 2 percent atropine. This explains the fact that an attack of iritis sometimes causes only a low degree of diminution of visual acuity.

Also to be mentioned in connection with the evolution of the iritis is the pigmentary disintegration that exists in every kind of iritis. Only twice have I observed hemorrhage (hyphema).

With the frequent relapses of iritis, and consequent accumulation of exudate and pigment in the pupillary area of the lens, the visual acuity decreases with every attack. Atrophy of the iris appears, sometimes in spots, where exudate accumulates and becomes organized; the mesodermic layers become ragged and "moth-eaten" (Plate 26, fig. 6). We may find ruptures near the pupil and concentric to it, as well as detachment of the pupillary border. The iris becomes flattened, without crypts (Plate 27, fig. 8), and the communication between the posterior and anterior chambers is difficult or impossible, due to the papillary occlusion, and thus the symptoms of secondary glaucoma may originate. In some cases atrophy of the eye (phthisis bulbi) has subsequently occurred, due to the localization of the disease in the ciliary body.

In cases with advanced atrophy of the iris, resulting from frequent relapses of the acute phase of the iritis, the retinal pigment epithelium may retract the pupillary margin outward, constituting an ectropion acquisitum of the uvea (Plate 27, fig. 8). There are cases in which the accumulation of exudate in the lower angle of the anterior chamber produces a formation that looks like a hypopyon.

Sometimes cauterization of episcleral lesions located close to the limbus causes an attack of iridocyclitis. The exudate then has a tendency to accumulate in that portion of the angle of the anterior chamber that is in the immediate vicinity of the lesion, which has a preferential localization in the temporal part, mainly in its lower portion. Later, organization of the exudate leads to the pulling off of the iris and the pupil may become ectopic, constituting what may be called acquired pupillary ectopion.

SUBACUTE OR CHRONIC DIFFUSE IRITIS

The subacute or chronic cases are those in which the acute inflammatory symptoms are absent, or almost so. Not infrequently they are discovered only by means of the slit-lamp examination; at other times the patient comes to the clinic complaining only of slight dullness of vision. The examination then reveals a very discrete ciliary injection, which sometimes may be almost imperceptible. Corneal edema is always present, but is of less intensity than in cases of the acute type. The Tyndall phenomenon of the aqueous is not very marked, there sometimes being merely an increase of its normal flare; at other times floating corpuscles are visible, pigmented or not, in limited numbers. Sometimes the pupil is a little dilated, showing less reaction to light than the opposite one. Very commonly in these cases there is involvement of both eyes. The exudate persists much longer than in the acute type, but with less tendency to the formation of synechiae.

In ordinary cases iritis of this type may have been unrecognized by the patient. Only later, in a routine examination, are there detected granules of pigment on the anterior capsule, small synechiae, accumulation of exudate near the angle of filtration, mainly in the lower part—findings that bespeak the development of an iritis which leads to no complaint. At other times there may be found an exudation in the aqueous, indicating a condition still in evolution.

The exudate on the posterior surface of the cornea (K.P.), when it exists, is in the form of very fine points. More frequently, however, an exudate may be found in the angle, round or otherwise; and, progressively accumulating, it constitutes larger masses which may adhere firmly to the base of the iris. Further organization leads to retraction of the iris, and this structure may come into contact with the posterior surface of the cornea. Sometimes the condition alters the shape of the pupil and the filtration angle, which becomes round or obtuse (Plate 28, figs. 10 and 11).

The exudate may accumulate near the lower, the temporal, or the nasal portion of the filtration angle, assuming gradually an annular shape and becoming very thick (Plate 25, fig. 3). Little by little the mass grows, appearing from behind the limbus; vessels are seen crossing it, and a process of organization takes place, the mass becoming transparent. Its free margin presents nodules of later formation, as well as others which may be seen between the membrane and the base of the iris (Plate 25, figs. 3, 4 and 5).

Sometimes these rounded exudates lie on a synechia, and when this ruptures one may find a mass of pigment on the anterior capsule, with the nodule upon it. The cornea suffers an injurious effect from the exudate, as previously described; at the point of contact it becomes opaque, and a keratitis secondary to an iridocyclitis is thus produced.

In two of our cases the attack of subacute iritis was related to a traumatism, a blow being apparently the cause of the onset of the condition. In both cases the iris was full of pearl-like nodules, which we shall meet again later.

MILIARY AND NODULAR IRITIS

The main characteristic of this type of iritis is the appearance of pearl-like granulations, most frequently observed near the sphincter in the deep mesodermic layer, between the frill and the pupillary margin. There are myriads of nodules in the clear-colored iris, detectable first by the use of indirect illumination. Very often there is no sign of inflammation (tyndall of the aqueous, etc.), and the nodules may remain unchanged for years (Plate 24, fig. 1), which indicates that the eyes tolerate them well. Nodules are detected easiest and earliest in blue eyes, as in such cases we can see alterations in the thickness of the iris. Both eyes are generally involved. These miliary nodules do not interfere with the vision; the pupil reacts to light more or less normally, though sometimes sluggishly. At times atropine is unable to provoke full widening of the pupil, which nevertheless is round.

Physical signs.—As indicated, the characteristic feature of this type of leprotic iritis is the appearance of granulations on the iris, in the absence of any sign of inflammation; that is, one cannot see clinically any evidence of a previous attack of iritis, and there is no tyndallization of the aqueous, no corneal bedewing, and no flocculation. Detection of this condition is very simple when it is fully developed and the nodulations numerous, but sometimes it is difficult to decide upon a positive finding. In that case the microscope must be used, with ocular 4 and objective 4, or with the orthoscopic ocular 12.5 and objective 4, the lamp being overloaded and indirect illumination employed.

The preferential localization of the miliary nodules is, as described, in the deep mesodermic layer near the sphincter; sometimes they surround the pupil, looking like a necklace. When very numerous they fill the crypts, and later they are found over the whole iris (Plate 24, figs. 1 and 2). Sometimes, by using retroillumination

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from the crystalline lens, it can be seen that, in connection with nodules of the deep mesodermic layer, there is atrophy of the *pars iridica retinae*, forming holes which allow the reflected light to pass outward through the iris.

Such nodular formations must be distinguished from those always found after the acute or subacute eruptions of diffuse iritis. The latter, as described, are serofibrinous; they are whiter and are generally located near the angle of filtration (between 5 and 7 o'clock). These pseudonodular formations, which appear to be rounded masses of exudate, may as stated be seen agglomerated in the vicinity of the pupil—i.e., in the preferential region of the miliary nodules—where they may assume, among other forms, that of a cauliflower; but they are more superficial, seeming to be laid upon the iris (Plate 26, fig. 7). It should be added that a histological study of these lesions is necessary for a thorough elucidation of the matter.

True miliary nodules, on the contrary, are located in the depth of the iris. There, in an early stage, they are discerned by use of indirect illumination; only later can they be seen by focal light. With time they are more easily seen, as they become more superficial. The vessels of the iris are seen better then. These lesions persist as such for years, and I have not observed their transformation into more conspicuous ones (i.e., lepromatous nodules), which change seems possible, however, since they are considered to be miliary lepromata.

DIFFUSE AND LOCALIZED IRITIS

Localized and diffuse iritis may occur together in a patient. The serous type may appear alone, or in cases in which miliary nodules have previously been found. Cases have been observed in which, for a fairly long time, the eye demonstrated good tolerance to the miliary nodules, but ultimately there was superimposed an acute or subacute eruption of diffuse nature.

REFERENCE

- (1) BUTLER, T. H. *An Illustrated Guide to the Slit-lamp*. Oxford University Press, 1927.

DESCRIPTION OF PLATES

PLATE 24

FIG. 1. Miliary nodules of the iris (right eye, patient P.G.). Very numerous minute nodules are present, predominantly in the temporal portion, filling the crypts; others may be seen deep in the mesodermal layer. There is no sign of inflammation, demonstrating the perfect tolerance of the eye to the condition. (Slit lamp, ocular 2, objective 2-5.2 \times 2X, diffuse illumination.)

FIG. 2. Miliary nodules of the iris (right eye, patient D.S.). Numerous nodules are seen forming a necklace around the pupil in the deep mesodermal layer. (Slit lamp, ocular 2, objective 2-5.5 \times 2X, diffuse illumination.) Later there developed a chronic diffuse iritis, with rather slight exudation in the anterior chamber. Three masses of exudate formed in the lower part, underwent organization and retracted the neighboring fibers of the iris.



FIG. 1

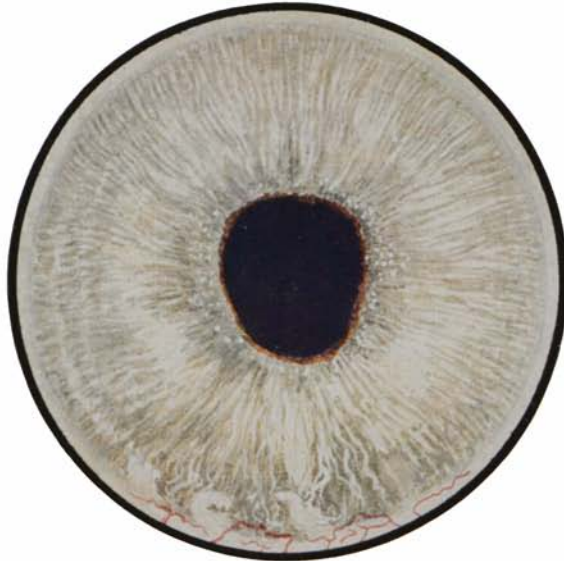


FIG. 2

PLATE 25

FIG. 3. Annular exudation in the anterior chamber, after subacute diffuse iritis (right eye, patient A.C.). After an attack of subacute diffuse iritis that did not produce posterior synechiae but that was characterized by a long-persisting exudation in the aqueous, there has developed behind the limbus an apparently homogeneous mass which can be seen by the naked eye. This lesion was also studied by the slit lamp (see Fig. 4).

FIG. 4. A part of the lesion shown in Fig. 3, as seen with the slit lamp and corneal microscope (ocular 4, objective 2, illuminating lens of 10 cm. focus). In the inferior portion of the chamber can be seen a group of small round nodules, which composes the mass described above. The drawing shown in Fig. 5 was made later.

FIG. 5. This drawing, made sometime after the one shown in Fig. 4 was made, shows that the nodules lost their shape, fusing and becoming transformed into a membrane, the surface of which is crossed by vessels. In the portion of the structure that faces the anterior chamber some nodular formations can be seen, as well as between it and the anterior surface of the base of the iris. Some fibers of the iris adhere to the membrane, producing an anterior synechia.

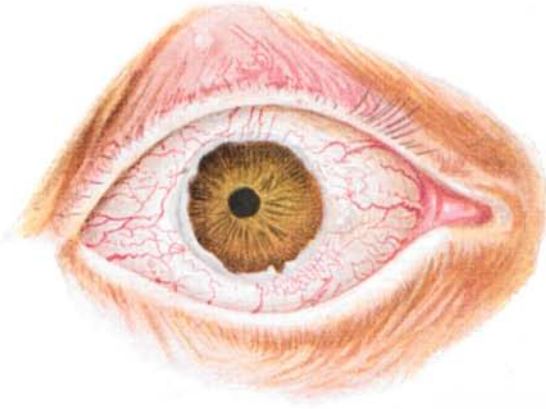


FIG. 3



FIG. 5



FIG. 4

PLATE 26

FIG. 6. Mesodermal atrophy resulting from acute diffuse iritis (right eye, patient P.C.). Large plaques of atrophy can be seen, with organized exudate in some of them. There is a posterior synechia at 11 o'clock. The aspect is the one called "moth-eaten" by English authors. (Ocular 2, objective 2, diffuse illumination.)

FIG. 7. Effect of subacute diffuse iritis (patient G.C.). After long persistence of an exudation in the anterior chamber, nodular agglomerations of cauliflower appearance have occurred around the pupil. There is also a thick collection of exudate, mainly in the temporal portion of the chamber, that has caused opacity of the cornea at the point of contact. (Ocular 2, objective 2, diffuse illumination.) These nodules, it is believed, and those of Fig. 3, 4 and 5, are different from those of Fig. 1, which developed gradually from the depth of the tissue of the iris, without any sign of inflammatory reaction and could be seen only by indirect illumination.



FIG. 6



FIG. 7

PLATE 27

FIG. 8. Marked atrophy of the iris after acute diffuse iritis (patient A.M.). The evolution of the condition in this case has resulted in severe posterior synechiae, which have modified the shape of the pupil, and marked atrophy of the iris, which is smooth and without crypts. Nodules, probably composed of the exudate, can be seen on its surface. (Ocular 2, objective 2, diffuse illumination.)

FIG. 9. Exudate in the angle of the chamber in a case (patient A.M.) of subacute diffuse iritis with floating corpuscles in the aqueous that persisted for several months. In the lower part of the angle of filtration there were formed nodules that at times disappeared, to be substituted by others which enlarged to form larger masses, or that underwent organization, causing retraction of the iris. In the figure is seen a recent mass, and an older one which has organized and affected fibers of the iris. (Ocular 2, objective 2, diffuse illumination.)



FIG. 8



FIG. 9

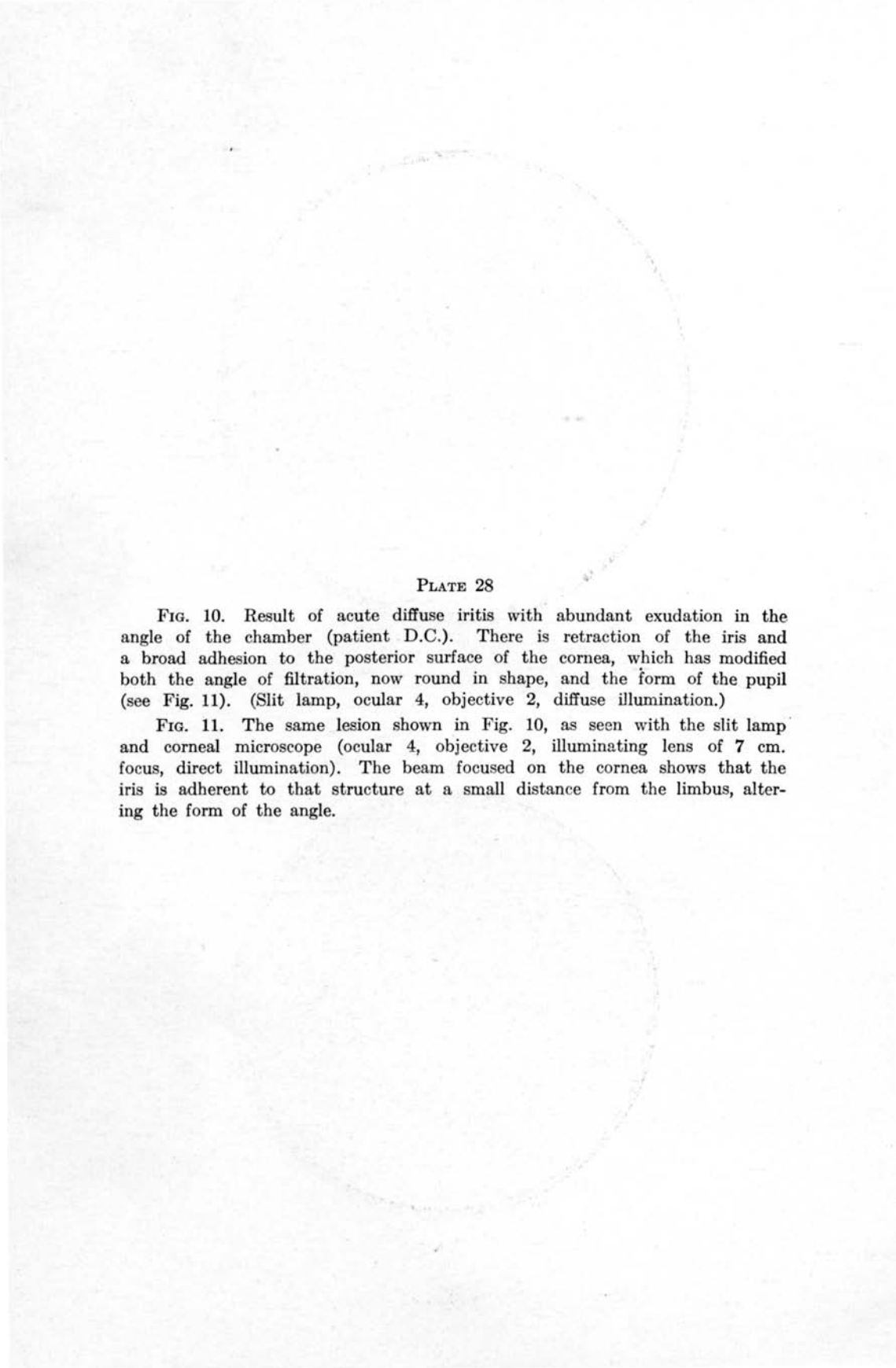


PLATE 28

FIG. 10. Result of acute diffuse iritis with abundant exudation in the angle of the chamber (patient D.C.). There is retraction of the iris and a broad adhesion to the posterior surface of the cornea, which has modified both the angle of filtration, now round in shape, and the form of the pupil (see Fig. 11). (Slit lamp, ocular 4, objective 2, diffuse illumination.)

FIG. 11. The same lesion shown in Fig. 10, as seen with the slit lamp and corneal microscope (ocular 4, objective 2, illuminating lens of 7 cm. focus, direct illumination). The beam focused on the cornea shows that the iris is adherent to that structure at a small distance from the limbus, altering the form of the angle.



FIG. 10



FIG. 11