

that is not the case. Another point is that the hearing is supposed to be greatly diminished in serous labyrinthitis.

Dr. A. H. ANDREWS, Chicago: After having done considerable work along this line, it seems to me that one of these conditions merges into another, and we will have great trouble in differentiating clearly one from the other. Indeed, I do not know of its ever having been demonstrated pathologically that there is a separate and distinct hyperemic and a serous labyrinthitis. We only assume that such conditions must exist to explain the symptoms we find. Regarding the temperature I have had some cases of positively demonstrated purulent labyrinthitis without a rise of temperature. I am not ready to accept the statements regarding the importance of differentiating between a suppurative labyrinthitis and the other varieties for the reasons mentioned, that the suppurative cases should always be operated on, but the others never. I agree with the former, but not the latter.

Dr. C. F. WELTY, San Francisco: The important question is not the hyperemia, but it is the differentiation between simple labyrinthitis and acute purulent labyrinthitis. The serous labyrinthitis may go on to a suppurative labyrinthitis. Now, if you follow the Vienna school, you will not have so much difficulty in arriving at a proper interpretation of your case. This confuses the issue somewhat. Dr. Fletcher has made a beautiful picture. Such a table makes one feel that one could scarcely make a mistake. But in one instance, you will operate simply because you have fever in a serous labyrinthitis that has deepened, and in another you will not. The cochlear reaction and the hearing are also important. The putting in of Ménière's disease simply obscures the matter, and the hyperemic labyrinthitis also clouds the issue somewhat.

Dr. WELLS P. EAGLETON, Newark, N. J.: I think often we operate without sufficient examination. Dr. Fletcher has made an effort to induce us to be more careful in the preliminary examination. The point Dr. Fletcher brings out, as to the loss of hearing, is of the greatest importance. I have seen, in consultation with other pathologists, that the diagnosis may be very difficult. It is important to remember that in suppurative labyrinthitis the patients are totally deaf. If there is the slightest hearing, the case is not one of suppurative labyrinthitis, unless it is a localized form. It is possible to have a little hearing with serous labyrinthitis, but not in general suppurative labyrinthitis.

Dr. H. B. GRAHAM, San Francisco: I think the serous and the suppurative cases merge into each other. How do you know there is not serum there? Or, if you have a serous labyrinthitis, how do you know there is no pus there? We know sections have been taken in serous cases and pus has been found. We cannot say with certainty that a case is serous or that it is purulent.

Dr. J. R. FLETCHER, Chicago: My paper is a plea for clinical diagnosis. It has been suggested that we may leave out hyperemic labyrinthitis and diffuse hemorrhage into the labyrinth. That is true, but if you notice the difference between the initial symptoms, it is easy to mistake one for the other. As to whether we can come to any practical conclusions, I know that we cannot at the present time. I made dogmatic statements here to call attention to the importance of differentiating between serous and purulent labyrinthitis. I have seen a labyrinth operated on when it was perfectly well, in more than one instance, and that is sufficient to induce us to ask for greater care in the differential diagnosis in these cases. We are teaching our students to operate without this knowledge. Where are they to get it, without a knowledge of serous and hyperemic labyrinthitis? All through the history of medicine we have made clinical diagnoses of presumed conditions before their pathology was worked out. Here are two conditions very much alike—hyperemic and serous labyrinthitis. That there are differences between the cases that go on to recovery, as far as symptoms go, there is no doubt. I have examined a great many cases myself, and in the serous labyrinthitis, which almost completely puts the labyrinth out of working condition, we find some hearing left, on careful examination.

TUBERCULOUS CYCLITIS FOLLOWING NON-PERFORATING INJURY TO THE EYE*

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CLINICAL OBSERVATIONS BY DR. DODD

The following case presented some very interesting features. Two of the most unusual conditions were the rupture of the retina, which was present in the region of the ora serrata as the result of a contusion, and an anterior tuberculous uveitis manifesting itself several months after the injury, with negative results from the diagnostic use of tuberculin.

History.—The patient, T. L., aged 10 years, was first seen by me in March, 1908, and the following history obtained: The family had noticed a spot on the left cornea for about eight weeks, and although the eye at times was inflamed and at other times free from irritation, this spot remained. The child had been struck over the left eye with a baseball about ten months before; the lids became discolored and the eye-ball inflamed. A few months prior to that he had been struck near the eye with a stone, the injury producing severe epistaxis and great swelling and discoloration of the eyelids. He gave an indefinite history of not having seen so well with that eye as with the right, but could not say whether this reduction of sight followed either one of the injuries or not. His general health was good and no recent illness was reported, although his mother said that at about the time the eye trouble began he complained of headache and was drowsy and slept a great deal, even falling asleep when he came home from school at noon. As he complained of no other symptoms of illness, however, little attention was paid to this. He had had the usual diseases of children, also a suppuration of the ears when about two years old.

Family History.—No history was given of any trouble which could be considered tuberculous or syphilitic in any member of the family. The mother had delicate health as the result of a fall which injured her spine, when she was a small child. The patient had one brother older and two sisters younger than himself, and there was a stillbirth occurring about eighteen months previous to his birth.

Examination.—The patient's right eye was perfectly normal, with vision equaling 5/6, but he had not been able to use it in school for some time on account of the sensitiveness of the left eye. With the left eye, he could count fingers at 18 inches. There was some ciliary congestion, which was more marked at the lower part of the eye-ball, and a great deal of photophobia and lacerimation. The cornea had a triangular opacity involving its lower third and extending up to and covering part of the pupil. This was quite dense and the epithelium over this part was stippled as in interstitial keratitis. There were some small opaque spots in the cornea above this, and the pupil was small and did not dilate readily with atropin. The tension was normal, but no view could be had of the fundus on account of the corneal opacity. Atropin and dionin were used in the eye, mercuric inunctions applied, and iodids given internally. Under this treatment the irritation and inflammation of the eye subsided somewhat, and the pupil finally became fully dilated so that examination of the fundus was possible. At the extreme lower part was a whitish mass apparently extending forward to the ciliary body and ending near the meridian of the eye. This was glistening white, non-vascular, and was in front of the retina, no detachment of which could be seen. By the use of the transilluminator I found that light passed through it readily.

* Read in the Section on Ophthalmology of the American Medical Association, at the Sixty-Second Annual Session, held at Los Angeles, June, 1911.

Course of Disease.—Judging that the corneal trouble, as well as the condition involving the ciliary body, was tuberculous in origin, I used the ophthalmo-tuberculin test in the right eye, but got no reaction. By the latter part of May the eye was slightly improved, the cornea being less opaque and the sensitiveness to light about gone, but on discontinuing the use of atropin the eye would become irritated.

June 22: The patient went to the hospital for a thorough tuberculin test and, after having his temperature taken for several days, I gave him progressive doses of old tuberculin up to the final dose of 10 mg. His temperature remained normal and at no time was there any reaction, local or general.

July 30: By this time, the eye was much improved; there was less photophobia and the cornea was much clearer.

August 13. The patient came to see me before going away for a vacation. I found the eye quiet with only a slight opacity of the cornea. There was no change to be seen in the whitish exudate, the vitreous was clear, and there was no detachment of the retina, or anything to make one suspect a growing tumor.

October 20: The patient returned to-day, having noticed for two weeks that the sight of this eye was failing. The eye was irritated and would become greatly congested on handling, and the lens was becoming opaque at the lower part. The pupil was fairly well dilated, but the whitish mass could hardly be seen on account of the lenticular opacity. This opacity continued to increase quite rapidly so that by November 9 I could not see into the eye. The iris was pushed for-

keratitis. A slight diffuse infiltration in the stroma and some roughness and stippling of the corneal epithelium were present, which prevented the principal pathologic condition of the cornea—the endothelogenous membrane covering the posterior surface below—from being demonstrated clinically.

After the dilatation of the pupil and a partial clearing of the cornea the cyclitic mass became visible, and made me consider the history of traumatism of more significance. Later, when the pathologic examination revealed the rupture of the retina and the exudate at its site, the importance of the traumatism as a cause of the trouble was substantiated.

Rupture of the retina rarely occurs without being associated with rupture of the choroid. When it occurs alone it may be the result of a chorioidal hemorrhage which detaches the retina and finally breaks through into the vitreous chamber, or it may take place from an indirect blow in the same manner as a chorioidal rupture. When this occurs, the most frequent points are at the macula, or at the ora serrata, as in this case. The earlier exudate or organized hemorrhage, having its source at the site of the retinal rupture, was cicatrized and showed no characteristic tuberculous changes. The later tuberculous exudate was from the ciliary body and iris and was still fresh and in a cellular condition.

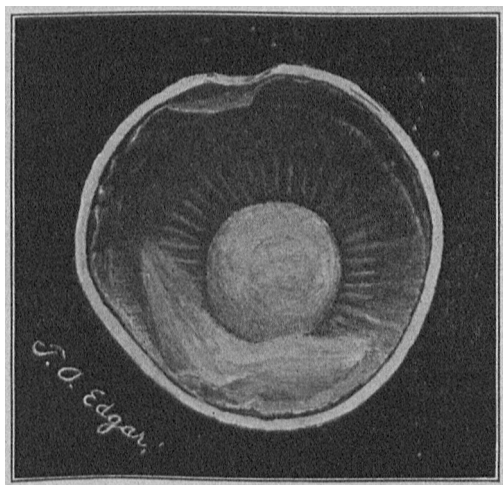


Fig. 1.—Drawing by Dr. T. O. Edgar, of anterior portion of eye, showing mass of exudate.

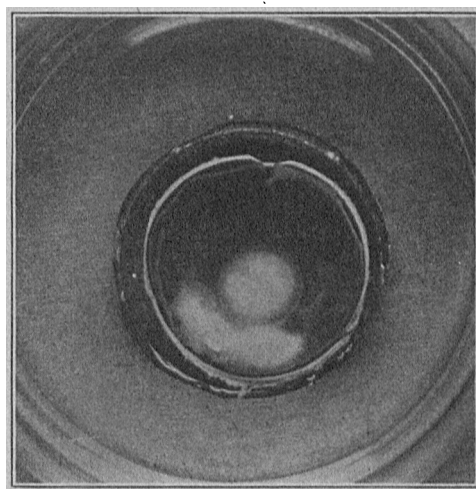


Fig. 2.—Photograph of anterior section of eye.

ward below apparently as the result of a rupture or dislocation of the lens at its lower part. The eye was greatly irritated. The possibility of an intra-ocular tumor occurred to me at this time, and I requested the family to consult another oculist.

November 12: Dr. Suker was consulted and expressed the opinion that a tumor had caused the rupture of the lens capsule and that enucleation should be done at once.

November 17: I enucleated the eye, following which the patient made a good recovery.

Result of Operation.—The irritation of the right eye which had been so marked, especially toward the latter part of the trouble, making it impossible for the patient to use it for reading or school work, subsided as soon as the left eye was removed. I have seen him from time to time since and he continues in good health and his vision is normal in the right eye.

Dr. Lane has made a thorough examination of the enucleated eye and his report of the pathologic findings forms a part of this paper.

When the patient was first seen by me the clinical appearance of the eye was that of beginning interstitial

The long period of time—nine months or more—between the last injury and the time when the inflammation was first noticed is worthy of consideration. Did the infection occur at the time of injury and remain dormant, or did it occur later and become localized at this point of lessened resistance? Either may have happened, for we frequently see cases of tuberculous inflammation which remain quiescent for several months and then suddenly take on new activity due to the lessened resistance of the patient or some local irritation. In one of my patients who had a severe tuberculous sclero-keratitis, healing took place under treatment with tuberculin and the eyes remained well for over two years. On account of working under poor hygienic conditions her general health became affected, she lost weight, and had a recurrence of the same local inflammation for which I had previously treated her. Stock, by his experiments, proved that large tuberculous foci may exist in the ciliary body for a long period without producing any symptoms of cyclitis, and also that tubercle bacilli may be found in the iris months after apparent healing.

The absence of reaction to the tuberculin test is very difficult to explain, as in every case of ocular tuberculosis, in my experience, the reaction was well-marked both locally and generally. Not considering the negative ocular tuberculin test as sufficient, I had a thorough subcutaneous test made in the hospital where the patient's temperature could be taken frequently and the condition of the eye noted. Old tuberculin was given in progressive doses until 10 mg. were given, the largest amount I ever use for the test. No reaction was obtained. After learning the pathologic condition of the enucleated eye I again gave him a thorough tuberculin test, with the same negative result. To eliminate hereditary syphilis I had a Wassermann test made and it also was negative.

Localization of the trouble in one segment of the eye is no diagnostic help in the differentiation between intra-

process began again, I concluded that it must be some form of ciliary tumor.

PATHOLOGIC REPORT BY DR. LANE

GROSS FINDINGS

Left Eye.—Laboratory No. P. 283. (24x23x23 mm.) There is no evidence of a penetrating wound. The entire cornea is superficially hazy, and deep in the lower quadrant is a triangle of fairly dense uniform opacity. The anterior chamber appears a trifle shallow below. The pupil is horizontally oval and measures 5 mm. in its long axis; a thin gray exudate lies in its lower part, and a 1 to 2 mm. broad spindle-shaped opacity, apparently just behind the lens capsule, runs diagonally from axis 60° to 240° through its center.

When sectioned coronally, the anterior half shows the following: The lens is somewhat opaque and is displaced a trifle downward. On the equator of the lower outer third there lies a dense, glistening white, flat exudate, resting principally on the inner surface of the middle and anterior portions of the corresponding part of the ciliary body. The exudate spreads up along the equator of the lens both temporal and nasalward like two wings, the tips of which reach the level of the horizontal meridian. It rapidly converges posteriorly and continues backward and to the temporal side as a short, 3 mm. thick, round stem; its posterior end is attached to the anterior part of the detached retina 1 to 2 mm. behind the ora. The optic nerve is 8 mm. long. The posterior half of the bulb shows no special changes.

Both halves of the eye were fixed in Zenker's solution, imbedded in celloidin, and sectioned parallel to the plane of the meridian passing through the axis 105°. Four hundred and thirty serial sections were made of the anterior half in order to exclude the possibility of a penetrating wound or the presence of a foreign body, and also with the special object of studying the large exudate and the adjacent structures. Eighty-six sections, every fifth one, were stained with hemalaun and eosin, forty-one with carbol-fuchsin, a few by the van Gieson and Mallory methods, and some stained for iron.

MICROSCOPIC FINDINGS

Unless otherwise stated, the following description has reference to the lower half of the bulb, inasmuch as the most important anatomic changes are found here.

A foreign body is not present. Three distinct, quite superficial, spindle-shaped nodules of round cells are found in front of the perforating vessels in the superficial layers of the sclera (10 to 12, 65 to 70, and 76 to 80)* (Scleritis). Files of cells run off from the anterior ciliary vessels and the marginal loops. A few scattered wandering cells are seen, especially between the basement cells of the corneal epithelium, and, moreover, they are increased throughout the interlamellar spaces of the corneal stroma (5).

Near the end of Descemet's membrane the posterior lamellæ are slightly spaced apart and many cells with deeply staining oblong nuclei lie in the narrow fissures (1 and 56). A cellular membrane is found on the posterior surface of the cornea and is worthy of detailed description. It begins at the center, spreads downward and gradually increases in thickness until its superimposed layers reach a maximum of from 12 to 15 strata just above the periphery of Descemet's membrane (1). In some sections this deposit is arranged in particularly definite lamellæ (1, 56 and 57 v. G.), whereas in other sections (10 and 20) lamellation is less regular; here more cells abound, some have large faint-staining oblong nuclei, others have smaller, deeper staining, curved and irregular-shaped nuclei (endothelogenous cuticular deposit). Between Descemet's membrane and this new-formed tissue an interrupted layer of compressed endothelial cells is found. This same arrangement of cells and tissue prevails between the new lamellæ to a lesser extent (1 and 56).

In Section 20, alternating areas are present where the endothelial cells are irregularly grouped, and absent between

2. Arabic numerals in parentheses refer to the serial section number.

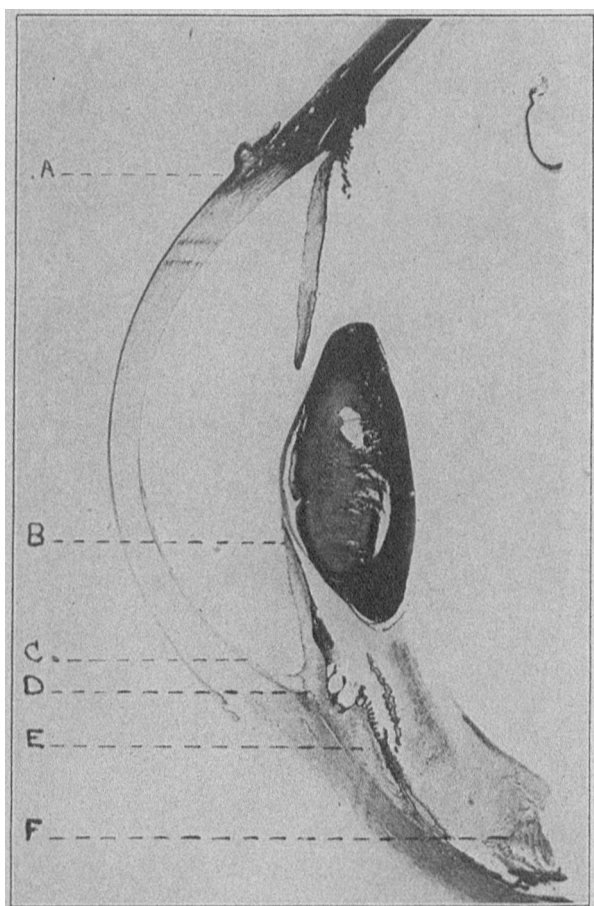


Fig. 3.—Vertical section through the anterior half of the eye, showing the miliary tuberculous iridocyclitis, etc., in the lower portion. (a) Upper limbus region; (b) posterior synechia; (c) endothelogenous cuticular membrane; (d) anterior root synechia; (e) active tuberculous cyclitis; (f) old centralized exudate and end of ruptured retina.

ocular tumors and tuberculosis. The whitish mass which was present in this case might have been a non-pigmented sarcoma, although in so young a patient this would have been very unusual. Solitary tubercle of the chorioid, occurring far forward, is usually of far more rapid growth, and would have produced detachment of the retina visible with the ophthalmoscope at an early date. Tuberculous cyclitis is frequently localized in one section of the eye and may remain so for months before other portions of the eye are affected. The negative tuberculin reaction, however, made me discard the diagnosis of tuberculosis in any of its phases, so that when the extension of the

the new tissue and Descemet's membrane (endothelial degeneration). Between the layers of the deposit a few scattered pigment-bearing cells and free pigment granules can be made out (3) (old precipitates). The cuticular deposit extends a short distance beyond the peripheral margin of Descemet's membrane, overlapping the anterior end of the inner lamellæ of the corneo-scleral trabeculæ (1). Aggregations of leukocytes and plasma cells laden and interspersed with pigment lie in a delicate network of fine fibrin on the posterior surface of the deposit (3) (fresh precipitate).

In Section 35 these precipitates consist almost exclusively of plasma cells. Many lymphocytes and wandering cells of various types are seen in both the angle of the anterior chamber and its bordering walls (1 and 4). In Section 10 an unusual number of eosinophils are present in this location. The canal of Schlemm is completely hidden (6) (partial impermeability of the infiltration angle). Delicate fibrinous strands, in the meshes of which are leukocytes and plasma cells, stretch across the angle (3 and 4) and pull the thickened iris root forward until it is actually approximated to the cuticular deposit $1/3$ mm. above the end of Descemet's membrane (local peripheral anterior synechia). The canal of Schlemm is here completely blocked. The anterior chamber is free from exudate except at the angle; yet a few plasma cells and leukocytes lie on the anterior surface of the iris, and not a single section shows open stomata of the crypts (cellular exudate on iris surface). The iris stroma, particularly its posterior portion, is thickened by a diffuse infiltration of leukocytes, plasma and mast cells and a few scattered hyaline globules (Russell's bodies) (4). The chromatophores have mostly lost their graceful branches and have become transformed into shapeless conglomerations of pigment. Along with this diffuse infiltration are found many large, fairly sharply circumscribed nodular aggregations of lymphocytes. Several of these nodules reach a size equal to the thickness of the iris and can easily be detected macroscopically (32, 61 and 72) (nodular iritis). Epithelioid cells are present in the center of a few of these nodules (33 and 34), but in none of them can giant cells be found. Vessels are seen inside the nodules in a few sections (32 and 60), yet for the most part they lie at the periphery or entirely outside the nodules. Time was not taken to determine the exact number of nodules present, but their distribution, frequency and characteristics, were closely studied. Fifty-one, or two-thirds of a total of 86 sections studied, show that each section passes through from one to four nodules. In all, 94 cross-sections of such nodules can be counted.

From the observations made one can conclude that (1) the greater number of nodules are located in the lower half of the iris; that (2) they are situated principally in the vicinity of the circulus arteriosus minor; and that (3) they are poor in vessels. These three findings agree with those described in typical miliary tubercles of the iris, and indeed the condition coincides with it entirely except for the fact that giant cells could not be found in a single section.

Attached to the lower pupillary border of the iris is a moderately cell-rich inflammatory exudate. It extends upward for a short distance and tapers off in the pupillary region of the anterior lens capsule (pupillary membrane) and below and behind the pupillary border of the iris and binds the tunic to the lens capsule. This latter portion of the exudate contains a few clumps of pigment (3 and 57). It can be traced downward as a thin pellicle along the posterior surface of the pigment epithelium as far as the ciliary zone of the iris (3) where it suddenly becomes one-half the thickness of the iris (5). The succeeding twelve sections show that the exudate extends, indeed, almost to the ciliary body, and that markedly proliferated pigment epithelium separates it from the posterior surface of the iris; also that it drags narrow bands of pigment toward it and that the exudate fuses with some of the displaced ciliary processes (12 and 13) (posterior synechia).

The traction set up by this exudate membrane pulls the pupillary border of the iris backward and downward so that the sphincter is bent on itself in the shape of a hook (3). A thin stratum of connective tissue separates the two somewhat

broken-down pigment layers near the outer edge of the pupil (59). The intima of the vessels is often surrounded by small round cells and plasma cells and occasionally a lumen is obliterated (71). The same diffuse cellular infiltration described in the iris prevails in the ciliary body and thickens it proportionately. The ciliary processes are most extensively and very densely infiltrated. Some of them are swollen and elongated (8 and 29), others are pushed forward and grown fast to the posterior surface of the iris (26). Still others stretch upward as far as the equator of the lens and lie on the anterior fibers of the zonula (4). In the vascular layer of both the corona (24 to 29) and the orbiculus (36 to 38) a number of round-cell nodules are present. Just behind the corona the pigment epithelium is split and separated from the ciliary epithelium by cicatricial tissue (11 and 27). The ciliary muscle itself has to a large extent escaped infiltration (56). A few sections, particularly No. 6, show the radial bundles widely spaced apart by the same kind of cells that infiltrate the vascular layer, while in others nodules of round cells with

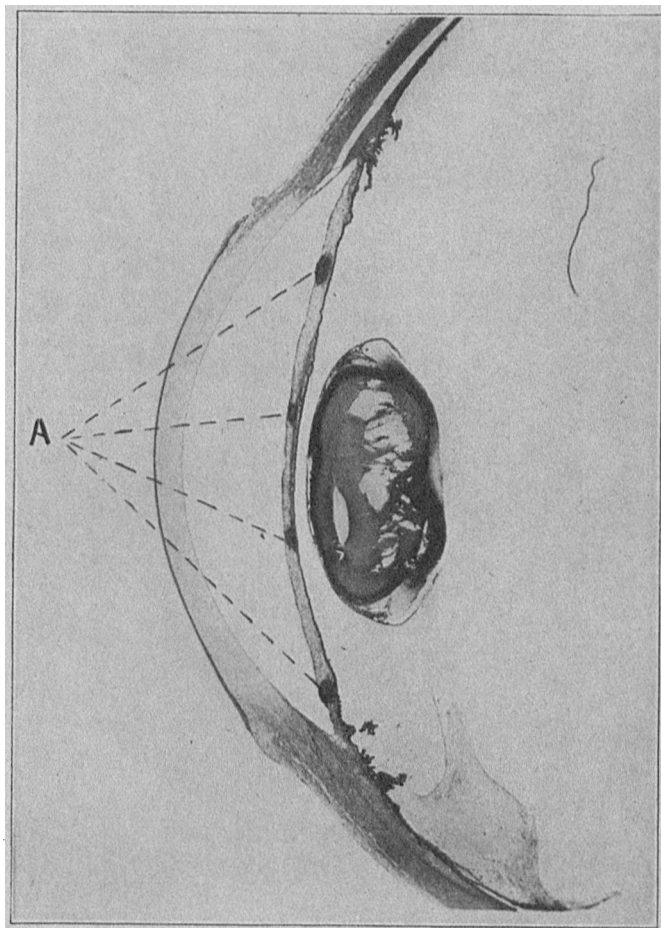


Fig. 4.—Miliary iris tubercles (a).

numerous eosinophils are found in the immediate neighborhood (24). A diffuse infiltration is present in the lower quadrant (36). Two typical giant-cell systems with central degeneration lie in the muscle opposite the middle and posterior parts of the corona (36 to 40). The stratum pigmentum is broken through in the same sections.

In all, 41 specimens were stained with carbol-fuchsin and a close search made for tubercle bacilli, but bacilli were found in only one section (40c). Morphologically, the bacilli are a little shorter and possibly a trifle thicker than typical tubercle bacilli. A single bacillus having all the morphologic characteristics of the tubercle bacillus was found in smear made from those sections taken from the giant-cell areas and treated by the alkaline-hypochlorite (antiformin) tissue-dissolving method.

A 2 to 3 mm. thick organized exudate lies on the inner surface of the ciliary body and on that (periphere)

portion of the retina which is pulled forward as far as the middle of the orbiculus (2) (cyclitic exudate). It extends upward and imbeds the processes and equatorial zone of the lens, and sends fine filaments up behind the posterior lens capsule, fusing it to the anterior limiting layer of the vitreous. A cellular exudate is pouring out through the broken apices of the swollen processes; it takes a centripetal, axial course (15 to 19) (active exudate). This mass has only a moderate number of vessels (4 and 11), is irregularly infiltrated with the same types of cells found in the ciliary body, and, as in the ciliary body, shows areas where nearly all the cells are eosinophils (15 to 17) (less recent exudate).

While some connective tissue network permeates the more cellular portion, the inner and posterior parts of the exudate are by far the richer in a connective tissue which has become more or less laminated (15 and 27 v. G.) (old organized exudate). Here and there pigment is seen (10). In fifteen of the sections giant cells are to be found (15 and 24). The oldest or most posterior part of the exudate, and the connective tissue

packed closely together and does not differ essentially in appearance from ordinary connective tissue (57 and 57 v. G.) (anterior capsular cataract). Fragments of broken-up cortex are imbedded in the capsular cataract. Clefts in the lens substance are filled with fluid and globules of Morgagni (55 and 57) (consecutive cataract).

The peripheral part of the chorioid is infiltrated with lymphocytes, leukocytes and plasma cells.

Anatomic Diagnosis.—1. Rupture of the retina following trauma; (2) chronic plastic iridocyclitis limited to lower part and consisting of two stages: (1) An old affection resulting in the formation of cicatricial tissue. (2) A recent affection of the ciliary body which has spread out in all directions, invading the iris and episcleral tissue, evidently along the perforating vessels and characterized by the formation of nodules of round, epithelioid and giant cells with central degeneration—a formation which can be considered miliary tuberculosis.

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ABSTRACT OF DISCUSSION

DR. B. F. CHURCH, Redlands, Cal.: I have had such results in the treatment of tuberculous keratitis in a patient with tuberculosis by means of injections of guaiacol in 5 to 10 minim doses, that I wish to report it. I think it is a much shorter route than resorting to tuberculin, and is certainly much easier.

DR. JOHN E. WEEKS, New York: There are two or three features in this report which have interested me very much, and which I think can be discussed with benefit. The appearance of the slight exudate, mentioned in the paper just read, is, so far as I have observed, quite characteristic of tuberculous infection. This exudate occurs in cases of tuberculosis of the iris, and in cases also of tuberculosis of the uveal tract further back. It is a very white exudate, fairly limited and not accompanied by hemorrhage or the appearance of vessels in the exudate. When we have tuberculosis of the iris, of course the iris is thickened in addition. These masses of exudate have the appearance sometimes of tufts. There will be perhaps one to three in the pupil when the iris is affected with tuberculosis. I would like to emphasize as forcibly as I can this typical exudate in the interior of the eye. Another point is that there was no reaction after the subcutaneous injection, as I understand it, of 10 mg. of T. O. Was the sample of tuberculin used reliable? I have observed quite a number of cases of intra-ocular tuberculosis, and I have never failed to get a local reaction by the subcutaneous injection of 3 mg. I have failed in using 1 mg., and in or two cases 2 mg., but 3 mg. has never failed in tuberculosis of the eye, whether of the sclera and cornea alone or of the conjunctiva or in intra-ocular tuberculosis. The

Calmette and the von Pirquet tests are, in my opinion, of no consequence unless we are introducing into the circulation or into the system more than 0.5 mg. T. O. With the von Pirquet test by using the old drug undiluted we may introduce into the system 1 mg. or more than 1 mg. of tuberculin that may produce a general reaction, and with the general reaction we may get a local reaction in the eye when tuberculosis is present. The objection is that the reaction in the conjunctiva, or the reaction on the skin with the von Pirquet, is of no particular consequence, as we get the reaction when the tuberculous lesion is in some other part of the body. Unless in connection with these tests we get a local reaction, we cannot say the condition in the eye is tuberculous. So the test that is of value is the local reaction as obtained by the subcutaneous injection of a diagnostic dose of tuberculin. Now 10 mg. of preferred T. O. will often produce a reaction in the normal individual who has not had tuberculosis, and it seems

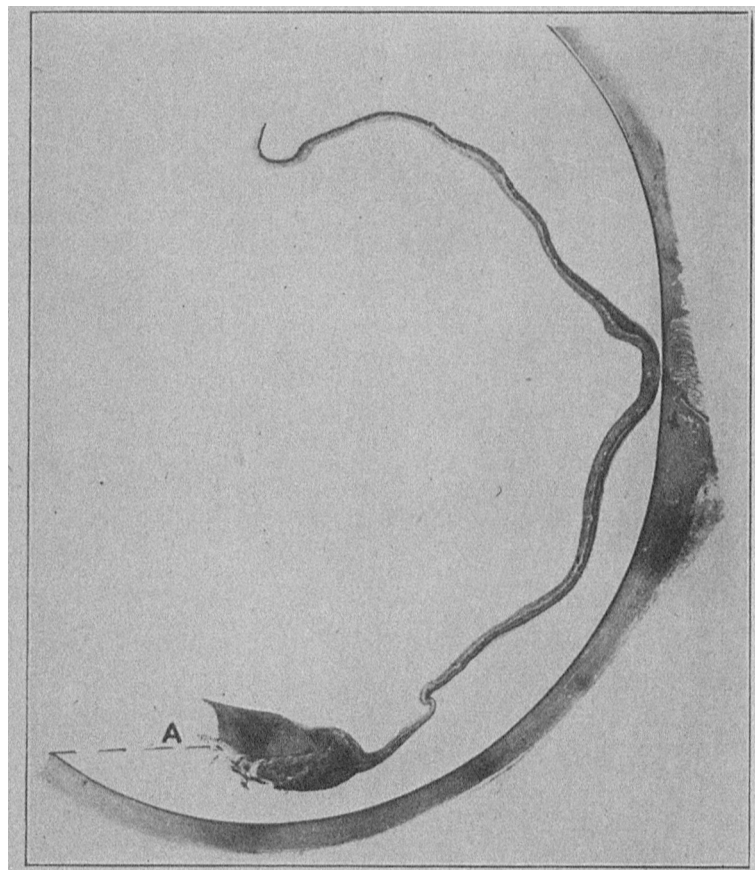


Fig. 5.—Vertical section through the posterior half of the eye, showing the tear in the retina and the old organized connective tissue "callus." A, tear in the retina.

which separates the slanting ciliary epithelium from the pigment layer, lie on the inner surface of the back part of the orbiculus, while the more recent cellular exudate is situated opposite the corona. The mass extends for a short distance behind the ora and is attached to the folded and degenerated, severed retina. These facts furnish conclusive evidence that this mass originated from the region of the ora and not from the corona ciliaris. The lens is slightly subluxated downward. The equatorial zone of the lower half is completely ensnathed in the cyclitic "callus" of organized exudate (15) (cataracta accreta). A thin delicate film of connective tissue with a few pigment-bearing cells, and some free pigment, covers the lower part of the anterior capsule. The capsule is wrinkled at the lower equator, probably from hardening. A thin fibrous tissue with spindle-shaped nuclei lies behind the capsule and extends over the entire pupillary surface of the body of the lens. This tissue consists of layers of imbricated spindle-shaped cells

to me incredible that this preparation of tuberculin was a reliable preparation because of the fact that no reaction whatever was obtained, either general or local, in this case. I may say in regard to another feature of this case, that improvement seemed to follow the introduction of the tuberculin. If I read the report right, after this diagnostic dose was given the eye seemed to improve somewhat. Is that not so?

Dr. OSCAR DODD, Chicago: I was giving other treatment and the patient had considerable improvement before.

Dr. JOHN E. WEEKS, New York: It seemed to me that the patient, even though no general reaction occurred, showed little improvement after the tuberculin was used and had a relapse of his tuberculous process and became worse afterward. In the treatment of tuberculosis I have had two or three relapses because the tuberculin was discontinued too early, but a resumption of its use brought about recovery. In quite a number of cases—I think about eighteen—the results have been quite satisfactory by the subcutaneous use of tuberculin, using only T. R. for therapeutic purposes. But the ordinary T. O. also possesses marked therapeutic value, as has been demonstrated in a few cases in which I have used it purely.

Dr. J. A. DOXOVAN, Butte: Dr. Weeks introduced an innovation about the reaction of tuberculin that I thought about in connection with this case. I had a series of cases—in fact, they are under treatment now—of six patients whom I had been treating with one of the local tuberculins. In two of these cases in which I was not getting as much results as I expected I switched to a German preparation. One woman and one man in whom I got practically no reaction at all before, were put in bed sick, with an elevation of temperature. A laboratory man said that tuberculin was not standardized at all and that I should not have done it. I treated one patient in St. Paul some years ago with tuberculin with apparently beneficial results, but in two or three instances I had to go back to guaiacol. I got the suggestion of guaiacol (2 per cent. in glycerin) from Dr. Darius, and in every case I have had that gives immediate reaction, and it is very much more positive, so far as improvement is concerned, than tuberculin.

Dr. OSCAR DODD, Chicago: The appearance of the exudate, as mentioned by Dr. Weeks, to me was suggestive of tuberculosis; so much so that I could hardly believe the fact of not getting a reaction. As to the reliability of the tuberculin, it was the preparation used in the hospital which they had obtained results with. I should have made tests with other patients in order to control it. As to the improvement after the use of the tuberculin, the tuberculin test was not given until after the eye was really rather quiet. Under atropin and dionin the eye would quiet down and remain so until I stopped the atropin again. The tuberculin test was not given until the latter part of June, on account of the fact that the patient would not consent to go into a hospital until that time, and the eye made no particular change, so far as I could see, following that. About August 13 the patient went away on a vacation and did not return again until October 20. The eye remained quiet until about two weeks before he returned, when the rapid changes in the lens and eye necessitated removal. Another point which I do not speak of in the paper was the fact of the irritation of the other eye. It was very much irritated, and after the pathologic examination the specimen was carried by Dr. Lane to Professor Salzman, who said at once that the patient must have had irritation of the other eye, a fact that was true throughout the case. He was unable to use his other eye to any extent.

Barbers and Surgery.—The barber of the present day is not expected to do surgical work, although his sign still gives notice that accidents may happen. The bloody pole with its white bandage reminds us of the day when the barber was the surgeon. The family of Poisson decided for him in his youthful days that the work of a notary required greater intelligence than he possessed, and advised him to become a surgeon. It was not until 1745 that the "barberous" work of the surgeon and the surgical work of the barber were, in England, eliminated by law, says F. E. Nipher in *Science*.

PLASTIC SURGERY OF THE EYELIDS, USING THE WOLFFE GRAFT*

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Plastic surgery has always impressed me as being the height of all surgical skill. For obvious reasons plastic surgery about the face, about the eyelids particularly, not only requires good judgment on the part of the operator, but his technic is put to the severest test.

The operation for the restoration of the lids and of the cul-de-sacs in contracted orbits, in the complete ectropions, especially from burns, and many other conditions, makes the deep cutaneous graft of Wolffe the ideal one to be used in such cases. My experience in twenty-five cases in which this cutaneous graft was applied has been so satisfactory and the method employed is so simple that I present the subject with the hope that it will be of interest. No claim is made to originality in the operation to be described, for my ideas were obtained from observing other operators.

There are two important steps to be remembered: First, the surface to be grafted must be denuded and must have sufficient blood-supply to nourish a healthy graft; second, a graft must be obtained of sufficient size to more than cover the area.

The ideal case is a complete ectropion of the upper or lower lid, and the one I now report, in which the result was most brilliant, was that of a farmer who, eighteen years before the first operation, had fallen into an open fire, burning the left side of his face and forehead. In time there was a complete distortion of that side of the face from the cicatricial contraction, and the ciliary margin of his upper eyelid occupied the position of his eyebrow, which had been destroyed, and the margin of the lower eyelid was pulled well down on the cheek. The conjunctival surfaces of the lids were completely everted and exposed, and from prolonged exposure they had become much thickened, resembling a velvety type of trachoma. The picture he presented was horrible. Fortunately the man had excellent vision, the globe in no way being injured. Two operations, at six months' interval, were required, the upper eyelid being first operated on.

After cleansing the face with ivory soap and water, then irrigating with a normal saline solution, I made a superficial incision above the ciliary margin, then little by little I undermined the whole lid, as one would in an ordinary integument dissection, preserving the muscular structure. This flap of the lid, when folded down over the globe, nearly covers the entire exposed conjunctival surface of the lower lid. Bleeding is of no consequence, but should this be troublesome a small artery clamp applied for a few moments would control the annoying vessel. After this part of the operation is completed, and the operator is sure that the eyelid will remain in place from its own weight, a pad saturated with hot saline solution is applied and gentle pressure made by an assistant, while the graft is obtained from the inner surface of the arm, forearm or thigh. I have never obtained a graft except from the inner arm, and in one case I removed, at intervals, five grafts from the two arms. The left arm is generally prepared, after the usual manner of shaving, cleansing with green soap, bichlorid of mercury and a saline dressing applied some hours before the operation, so that the graft will be as little irritated as possible at

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