PROGRESS IN PEDIATRICS

PROGRESS OF OPHTHALMOLOGY WITH SPECIAL REFERENCE TO DISEASES OF THE EYE IN CHILDREN

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PHILADELPHIA

INTERSTITIAL KERATITIS

For many years it has been assumed that interstitial keratitis of children and young adults, that form characterized by slowly advancing and deep-seated opacity, beginning in or near the center as minute points, later joined to each other by streaks of opacity (the lymph-channels) and finally coalescing and spreading toward the limbus, accompanied by the formation of interstitial blood-vessels, was one of the symptoms of *inherited* syphilis. Recently it has been shown that this identical form of keratitis, differing not at all in its clinical manifestations except that the subjects had passed the period of puberty, can be caused by *acquired* syphilis.

Still more recently several authors, notably C. W. G. Brogan,¹ regard the diseases in some cases as tubercular in its origin. Brogan reports the case of a boy aged 11, who had suffered from tuberculous cervical glands and phlyctenular ophthalmia for eight years. Treatment by tuberculin (bacillary emulsion) was carried out for six months, beginning with a dose of 1/15,000 mg. and increased to 1/4,000 for the first two months; regular estimations of the opsonic index were made; afterward the treatment was regulated by clinical signs, an exaggeration of their intensity indicating a new dose. The cornea gradually cleared and vision improved. One who has treated many patients before the days of bacterial diagnosis may properly comment that the older therapeutics, atropin, hot water bathing, dark glasses, alterative tonics, fresh air, sunlight and attention to diet and other hygienic measures were frequently followed with equally good results both as to vision and duration of the disease, but in view of the causation, reliance on non-specific measures to the exclusion of tuberculin and salvarsan, is no longer justifiable. The injection of salvarsan, also, has shown much the same results as in other manifestations of syphilis in those cases in which the Wassermann test has been found positive. Yet too much confidence should not be felt

1. Brogan, C. W. G.: Ophthalmoscope, December, 1911.

in this remedy. It does not displace the old treatment but is only an adjunct to it.

Drs. Ziegler and deSchweinitz² commented favorably on its use in these cases. Dr. Ziegler's case is instructive. It was a typical example of hereditary lues in a boy 9 years old. The Wassermann reaction was strong + 4. He received an injection of 5 grains in 15 c.c. solution into the gluteal muscles. There was marked cellulitis with pain. The temperature rose to 102 F. and remained above normal for a week. The ocular improvement was noticable but did not meet expectations. One month later the Wassermann reaction was still + 4. An intravenous injection of 0.3 gram was given, and improvement was marked and rapid. In a month the Wassermann had fallen to a feeble plus, all local symptoms had disappeared, the corneal haze was clearing and vision had risen from *nil* to 6/200. He was then placed under the usual specific treatment.

Dr. de Schweinitz's patient had received three injections at intervals of a month with decided betterment of vision. He recommended that large doses of potassium iodid be given in the intervals between injections. "Prior to the use of the salvarsan, iodids and mercury had been given freely, without controlling the disease, for a period of nearly six months."

Seidel³ treated twelve patients by the intravenous method in doses of .45 gr. to .50 gram, regulating the amount according to weight and strength of the children, followed in four or five days by a subcutaneous injection of .50 to .60 gram and after three to five weeks a second intravenous injection with perfectly satisfactory results. Lohleim⁴ observed beneficial effects in nine cases, although he admitted that involvement of the other eye could not be prevented by the salvarsan.

Stoelp⁵ in a study of 470 cases of eye diseases, among which were many of parenchymatous keratitis, reports a favorable influence of a single injection of salvarsan in 28 per cent. and no result in 72 per cent. of the corneal cases. Fleming⁶ says in some cases of specific keratitis in children a decided influence was apparent in the rapid decrease of irritation but in others not the least.

L. Gersheimer⁷ demonstrated the presence of the *Spirochaeta pallida* in a piece of tissue freshly excised from a parenchymatously diseased cornea of a girl 14 years of age who was positively suffering from hereditary syphilis. He says that the disease remained unaffected by salvarsan.

2. Ziegler and de Schweinitz: Tr. Ophth. Sec. Col. Physicians, Philadelphia, March 16, 1911.

3. Seidel: Arch. f. Ophthal., 1911, lxxix.

4. Lohleim: Wien. klin. Rundsch., May 7, 1911.

5. Stoelp: Klin. Monatsbl. f. Augenh., 1911, xlix.

6. Fleming: Arch. f. Augenh., 1911, lxxviii, 197.

7. Gersheimer, L.: Wien. klin. Rundsch., Jan. 15, 1911.

The student of the ophthalmic literature of the past two years becomes confused by the conflicting opinions and by the contradictory testimony offered both as to the method of administration and the results.

Stephenson⁸ ably and judicially sums up the latest conclusions thus:

The gist of the whole matter appears to me to be that, when properly given, salvarsan presents no particular danger either as regards the body in general or the eye in particular. It has proved itself to be well-nigh a specific remedy in primary and secondary syphilis, and, furthermore, to act speedily and satisfactorily in some diseases of the eye, particularly in those of the uveal tract. There is no reason, therefore, why its employment in ocular maladies should not be extended and multiplied. Recent experience shows that it is best given by injection into the veins, and that the former one-time injection of small doses is not so efficacious as a series of from two to four injections, each of a maximal dose. In order that the action of one remedy may be supported and reinforced by that of another, Ehrlich's principle of so-called "combined therapy" should be adopted in diseases of the eye. In other words, each intravenous injection of salvarsan should be followed by a series of mercurial inunctions, the whole process extending over a period of from six to twelve weeks. The serum reaction should throughout remain our touchstone as to the efficacy of treatment and the permanence of cure. The continued absence of clinical manifestations has, it would seem, less value.

Tobias⁹ believes that should parenchymatous miliary infiltrations develop, a tuberculous affection of the eye exists, even if other symptoms of local reaction, such as increased hyperemia, precipitates and opacities of the vitreous are lacking.

Another hypothesis, advanced by Columbo,¹⁰ is that eczematous kerato-conjunctivitis is caused by the exudative diathesis, which may be considered to be a syndrome of symptoms characterized by intestinal troubles, affections of the skin, catarrh of the air passages, which in turn are produced by auto-intoxication from the intestines. This latter assumption must not be overlooked in determining the diagnosis of many eye affections, as well as general disturbances in children and in adults. The presence of urorosein or indican in the urine is almost a sure indication of auto-intoxication and indeed it may be frequently found in acne, eczema and the affections of the cornea and conjunctiva associated with them. As Bruns¹¹ says:

It may not be always possible to get from these patients a history of gastro-intestinal derangements; but neither is it easy to elicit from the majority of them an account of any but the most striking illnesses. Disorders of the gastro-intestinal functions are perhaps with them so constant as to be regarded as a natural state of things and entirely normal. That a brisk purgation, preferably with a mercurial, and subsequent regulation of the bowels, is the measure favoring most the safe and rapid resolution of an attack, and that recurrence may be prevented by regulation of the diet and the withdrawal of certain articles of food, speak of the almost universal prevalence of gastro-intestinal derangements among phlyctenular patients.

8. Stephenson: Ophthalmoscope, Oct. 1, 1912.

9. Tobias: Klin. Monatsbl. f. Augenh., August, 1911.

10. Columbo: Klin. Monatsbl. f. Augenh., August, 1911.

11. Bruns: Tr. Sec. Ophth. Am. Med. Assn., 1912.

An interesting legal problem is presented by the traumatic origin of interstitial keratitis. A young person with inherited syphilis meets with an accident or receives a foreign body in the cornea and in the course of a few days' time parenchymatous keratitis—that form that has for years been considered as a characteristic of congenital, inherited or acquired syphilis—develops in that eye, runs its regular course and later, without traumatism or known outside cause, the same inflammation attacks the other eye. Several cases of this kind have recently been reported, and are authentic. Two occurred in 1912 among the patients of the out-patient eye department of the Jefferson Hospital, but fortunately no question of damages was raised in either case.

Von Hippel in 1906 contended that no positive proof had thus far been brought forward that traumatism could light up an interstitial keratitis.

Marx, in his Inaugural Dissertation, Zurich, 1909, collected from the German literature twenty-five cases.

Wicherkiewicz¹² adds three striking examples:

A boy of 4 with well marked stigmata of syphilis, inherited from the father, struck the right eye against a hanging lamp. A diffuse interstitial opacity accompanied by small epithelial blebs followed; recovery after usual treatment. Two months later typical inflammation of left cornea occurred.

A girl of 7, subject of inherited syphilis, had parenchymatous keratitis in both eyes following in second eye several weeks after an injury to the one eye.

In the third case the affection was lighted up in a tuberculous patient by an operation for congenital cataract.

The evidence is sufficiently strong to prove the sequence of traumatism and parenchymatous keratitis in a tuberculous or syphilitic patient. The important question at law is the responsibility and liability for damages.

The prevalence of syphilis as an underlying cause is shown by Beauvieux.¹³ Among twelve cases he found positive Wassermann reactions in ten.

The diagnosis of hereditary syphilis cannot be complete according to Jopka¹⁴ without ophthalmoscopic examination. Changes in the eye-ground are found in about two-thirds of the cases. They consist in haziness of disk and adjoining retina, scattered spots of exudation and a gray discoloration of the foveal region. Other common ocular signs are bluish discoloration of the sclerotic coats (affecting twenty-one out of

12. Wicherkiewicz: *Klin. Monatsbl. f. Augenh.*, January, 1912.

13. Beauvieux: *Arch. d'ophth.*, October, 1910.

14. Jopka: *Deutsch. med. Wehnschr.*, No. 12, 1911; *Wien. klin. Rundsch.*, April 16, 1911.

thirty-two members belonging to four generations of one family examined by Stephenson) interstitial keratitis, and affections of the uvea (chronic iritis and chorioiditis).

KERATOMALACIA

The cornea receives its nourishment from surrounding blood-vessels, having no vascularity of its own except pathologically. In impoverished states of the system it is one of the first tissues in the body to break down. Necrosis of part or all of the cornea means partial or total loss of vision. The affection is not infrequently found among infants when the food supply is insufficient or cannot be digested. That this disease exists only among children is disproven by several writers. One, Gann Labo, describes a similar destructive process of the cornea among negroes in Brazil under the name of *Ophthalmia Brasiliana*; among the Japanese as *Kamme*; and Wicherkiewicz¹⁵ reports a case in an insane weaver aged 31, who suffered from religious delusions. He imagined himself to be a great sinner and as a sort of atonement for his crimes, ate only dry bread and potatoes and drank only water, although he worked hard during the day and spent whole nights in praying. From the resulting extreme emaciation of the body the right and then the left eye showed marked keratomalacia. Forced nutrition in the hospital arrested the destructive process of the less affected cornea. This improvement showed that the malnutrition was the most important etiologic factor of the disease.

EYE-STRAIN

Eye-strain is a comprehensive title for a group of symptoms originating in the application of a pair of normal, or nearly normal, eyes under conditions which increase the effort; for example, time, type, light or health or ametropia or heterophoria. It is not, as Bates¹⁶ says, a disease, but is correctly stated by him as induced by a conscious (more frequently unconscious—H.) effort to maintain distinct vision. It manifests itself by more or less indistinctness of vision and by concomitant headache, dizziness, increased laceration, sensory symptoms, smarting, burning, itching or aching, a mildly inflamed condition of the conjunctiva and eyelids and various nervous disorders. Technically it is not a symptom of any form of inflammation of the eye. Symptoms which arise from inflammation are more or less characteristic of the disease and need not be mistaken for asthenopia.

PHLYCTENULAR CONJUNCTIVITIS

This easily recognized and usually non-dangerous disease of the conjunctiva is largely a disease of childhood, although it is not limited to

15. Wicherkiewicz: *Postet. Okalist*, 1910, No. 1.

16. Bates: *Ophthalmology*, January, 1912.

young people. It seems an indication of the general health, since it is seldom a purely local affection, or indication of eye-strain from an error of refraction. It is found most commonly in the so-called strumous or scrofulous children in association with gastro-intestinal disorders, enlarged tonsils, adenoids or chronic catarrh. At present it is generally believed to be due to the bacillus of tuberculosis or to its toxins, and in addition to the hygienic measures commonly resorted to is treated by tuberculin and bacillary emulsion. As Elschmig says, "In keratitis profunda (interstitial) one must always think of tuberculosis."

Stephenson and Jamieson¹⁷ have tested twenty cases by the von Pirquet method and obtained a reaction in every case. Fifty per cent. showed obvious signs of tuberculosis and 75 per cent. gave a tuberculous history (Year Book).

TUBERCULOSIS OF THE CONJUNCTIVA

The recognition of this disease is attended with difficulties. Even the inoculation of guinea-pigs or rabbits by introduction of material taken from the conjunctival growths and the development of an inflammation (termed tuberculous) is not conclusive. While the severest laboratory test may not be absolutely reliable, clinically the signs resemble in one patient, trachoma, in another vernal catarrh, or Parinaud's conjunctivitis, in a third chalazion, so that there is ample excuse for divergent diagnosis. The tubercle bacilli have often been sought for but rarely if ever discovered. Dependence must be placed on enlargements of the glands, submaxillary or cervical, and the discovery of signs of tuberculosis of the lungs.

The peculiar flat non-pedunculated tumors of the tarsal conjunctiva, separated by apparently healthy tissue, of long duration, and subject to slight changes, are practically unmodified by any local treatment except excision. The recent reported cases include the following varieties: The flat outgrowths¹⁸ inflamed chalazia and, in the lower lid, a small wedge near the free border of the tarsus protruding beyond it like a pouting lip in which small nodes could be seen;¹⁹ chronic blennorrhoea with scattered granulations in a girl who had been treated six years for trachoma;²⁰ ulcer on posterior half of the free border of the lid;²¹ large cheesy ulcer involving the tarsus, miliary tubercles scattered over the conjunctiva of both lids and an isolated node at the limbus.²²

17. Stephenson and Jamieson: Brit. Med. Jour., April 16, 1910.

18. De Schweinitz: Ophth. Rec., xix.

19. Koller: Arch. Ophth., xxxix.

20. Fainitzk: Viestnik. Ophth., xxvii.

21. Brown: Ophth. Rec., xix.

22. Proeller: Klin. Monatsbl. f. Augenh., April 10, 1912.

The affection is not a rare one when we consider that some cases may escape observation altogether and others are classified under other names. We believe the affection is more common than is usually supposed. In primary tuberculosis the importance of early recognition is of great value. By treatment metastasis may be prevented and the local disease cured. Just how long after the appearance of tuberculosis in the conjunctiva or in the eye-ball other organs of the body may be affected is not known. If one may judge of the history of primary and secondary syphilis, the incubation period is a short one, which statement warrants the opinion that every patient, promptly and energetically treated, both locally and generally, may be cured.

OPHTHALMIA NEONATORUM

The prevention and treatment of ophthalmia neonatorum are subjects of perennial interest. The Credé method of prevention—the instillation of a drop of 2 per cent. solution of silver nitrate into the conjunctival sac of the infant before infection has had a chance to get in its deadly work—that is, as soon as the head is born—and its many modifications, have been efficacious, and in all large hospitals and lying-in institutions have been adopted. In private practice it has never been popular and is frequently omitted, the physician trusting to the usual antiseptic cleansing. The disease has not been eliminated even in the hospitals where the Credé method is the routine practice, either through neglect of the attendant or the virulence of the poison. Among the very poor, and particularly when the infant is born out of wedlock, cases of ophthalmia are not infrequently seen in spite of the laws enacted by many of the states for its prevention.

Feingold²³ assumes for the average of the whole population a percentage of morbidity for ophthalmia neonatorum of at least 0.5 to 1 per cent. (*Ophthalmic Year Book*, 1911).

Of the substitutes for silver nitrate in the prevention, argyrol and protargol have had strong advocates and have been extensively used, principally because of the assumed damage to the cornea and the inflammation of the conjunctiva induced by the silver nitrate solution. The chemistry of these remedies has been studied by Pitzman²⁴ who says:

We have two possible silver nitrate albumin mixtures. First, those in which silver nitrate is present in less amount than is required to satisfy the albumin affinity. Second, those in which silver nitrate is present in excess of the amount required to satisfy the albumin affinity. The first class, without excess free silver nitrate, are very poor germicides, killing staphylococci only at the end of twelve hours, but are antiseptics. The second class, with excess free silver nitrate, are powerful germicides. In the list of the silver albuminates at present in use

23. Feingold, M.: *New Orleans Med. and Surg. Jour.*, May, 1910.

24. Pitzman: *Tr. Ophth. Sec. St. Louis Med. Soc.*, Dec. 6, 1911; *Abstr. in Ann. Ophth.*, April, 1912, p. 431.

we have both classes represented. Argyrol and collargol are silver albuminates without excess free silver nitrate, hence are antiseptics but poor germicides. Albargin, ichthargan, novargan, etc., and most of the newer preparations, are silver albuminates plus excess free silver nitrate, hence are good germicides. As the second group contains excess free silver nitrate it does not appear reasonable that its members can have any real advantage over the simple solution of the nitrate of silver.

Bruns,²⁵ who has had a long and large experience in the principal eye hospital of New Orleans, adheres to the use of a 2 per cent. solution of silver nitrate. As to the value of argyrol as a prophylactic, his experience leads them to hope that it may prove its worth, but the statistics at hand are too small to be conclusive.

Gratkowski²⁶ states that in two years 1,519 infants were treated by sophol, 5 per cent. solution, and in only one instance was there ocular infection and this was late and due to maternal carelessness.

Moran²⁷ considers sophol the most convenient and satisfactory prophylactic yet produced.

Von Herff²⁸ has employed it on seventy-five hundred infants. In eleven hundred the mothers were affected with vaginal gonorrhea. There was not one case of early infection and but one of late. With sophol the reviewer has no experience. At a conference of the ophthalmic surgeons to the Philadelphia General Hospital it was agreed that the Credé method should be adopted and enforced. The result has been extremely satisfactory. Mild cases are very occasionally met with and severe ones almost never. Post²⁹ strikes the keynote of the whole subject when he says that the prophylactic treatment should be given by educating our boys and girls to lead clean, moral lives from their youth up; that women should demand of their husbands, not only that they are, but that they always have been, moral men, and that men should demand the same thing of those whom they will make the mothers of their children.

But little difference of opinion exists as to the efficacy of the following remedies: Cold compresses, potassium permanganate, argyrol 20 per cent., atropin or eserin, according to the condition of the cornea, and applications to the everted lids of silver nitrate, grains 1 to 10 to the ounce. Cold is to be substituted for heat after corneal involvement.

CONGENITAL CATARACT

The causative connection between rickets and the lamellar form of congenital cataract has been known for some years, but the relation of the so-called "blue sclerotics" to the same constitutional dyscrasia is new.

25. Bruns: New Orleans Med. and Surg. Jour., May, 1910.

26. Gratkowski: Year Book Ophth., 1911.

27. Moran: Va. Med. Semi-Monthly, April 22, 1910.

28. Von Herff: München. med. Wehnschr., xxxvii; Ophthalmology, lx, p. 432.

29. Post: Am. Jour. Ophth., xxvii, 257.

Two authors, Burrows³⁰ and Rolleston,³¹ have described noteworthy illustrations. The former speaks of a family of twenty-nine persons in which thirteen, representing four generations, were afflicted with both abnormalities; the latter of a child 5 months old, a subject of hereditary syphilis, whose sclerotics were always blue, but variable in intensity.

Calhoun³² calls attention to a cause for cataract in young people that has hitherto not been exploited, or at least has not received the attention it deserves. In 1904 his father, Dr. A. W. Calhoun, had two young patients from Florida who had serious "pernicious" anemia, were stunted in mind and body, and who had cortical cataracts. Their stools were loaded with the eggs of the *Ankylostoma duodenale*. The younger Calhoun reports two new cases. The first was that of an ignorant country lad aged 20 years, who stated that the left eye had gradually gone blind in the previous three months. He had been afflicted with hookworm for years. He was stunted in his growth, very pale, mentally dull and gave the appearance of a child of 12 years. He had a partial cataract in the right eye and a complete cataract in the left eye. After treatment for both affections, he developed mentally and physically and regained useful vision (20/70). The second and third cases were much the same. The hemorrhages from the retinal vessels observed and noted by other writers were also present in Calhoun's cases, and in one the conjunctival and not the retinal vessels were the source of the recurring hemorrhages.

MUSCLES

The importance of the early recognition and investigation into the causes of paralysis of the ocular muscles becomes apparent when we remember that these affections are not isolated or local but point with no uncertain finger to the involvement of the central nervous system. As a positive indication of general disease it is not inferior or of less value than hemiplegia, for example. The idiopathic or unexplained paralysis assigned to rheumatism or cold may be purely local and not symptomatic of any general trouble, but observation of the patient for months or years will often enable one to determine that they are the antecedents of spinal disease, particularly locomotor ataxia or of cerebral syphilis.

As sequels of diphtheria, paralysis of the ciliary muscle and of the sphincter iridis have long been known. The lesion, however, is not known. The nucleus may be the site of a minute hemorrhage or edema, or the radiating fibers from the ciliary and iris nucleoli may be in a state of inflammation from the action of the toxin.³³ Sydney Stephenson³⁴ has

30. Burrows: Brit. Med. Jour., January, 1911, p. 16.

31. Rolleston: Brit. Jour. Child. Dis., May, 1911.

32. Calhoun: Tr. Sec. Ophth. Am. Med. Assn., 1912.

33. Hawthorne: Ophthalmoscope, November, 1911.

34. Stephenson, Sidney: Clin. Ophthal., 1911, xvii, 573.

seen a number of cases of strabismus in infants and young children in polioencephalitis from which it is difficult to diagnose the ordinary functional internal strabismus.

The knowledge that such cases are not uncommon and may so readily be mistaken for those in which improvement if not restoration of binocular fixation may be brought about by treatment and operation, puts one on his guard before forming an opinion as to the value of glasses, atropin and operation. A little girl recently under my care is a case in point. When a few weeks old she had acute hydrocephalus and was in danger of death, or in the event of recovery, of paralysis. She recovered promptly and apparently perfectly after lumbar puncture. Internal squint was noticed at 6 months of age, too young for treatment. Recently the external rectus was advanced with improvement in her appearance, but with little prospect of her ever having binocular fixation.

In the treatment of the common form of internal strabismus, that due to the effort of accommodation to overcome hyperopia, the method advocated for years is successful and needs only to be emphasized. Prolonged therapeutic paralysis of accommodation by atropin, the wearing of as nearly a full correction as can be borne, and finally, and not until the other measures have been tried for months, advancement of one or both internal recti. For monocular squint, or those cases in which fixation is always made by the same eye, the other eye always squinting, the exercise of the amblyopic (squinting) eye by means of Worth's or other forms of amblyoscope is strongly recommended. Knowing, as we do, that destruction of the fixing eye will be followed by the development of the seeing power of the hitherto amblyopic eye, exercise and training of the retina and cerebral center of vision are sound in principle. It must be remembered, however, that the desired result can be attained only by the exercise on the part of the physician of great patience and perseverance.

SERUM AND VACCINE THERAPY

The progress of ophthalmology during the past year is nowhere better shown than in the valuable contribution to the subject of serotherapy made by Mayou.³⁵ For three years he has been studying on his own patients and on those of his colleagues in the Moorfield's Hospital, London, the effects of the injection of serum and vaccines on many ocular diseases. His paper is scientific and thorough and his conclusions represent the impartial testimony of an accurate observer. It must be read in its entirety to be appreciated. After an explanation and definition of the many terms used to designate the various bodies he gives his experience in brief as follows:

Styes.—Recurrent attacks due to infection of the glands about the lid margins, for which the vaccine treatment has been most frequently used,

35. Mayou: Ann. Opth., October, 1912.

were most successfully treated. In all, thirty cases, the staphylococcus was found. The vaccine was a mixed cultivation of albus and aureus and as a rule three injections were given.

Acne Vulgaris.—Staphylococcus vaccine will frequently cure, although some cases recover only after injection of a vaccine made from a pustule on the face of the patient. Four cases associated with phlyctenular and corneal ulceration did not improve under the treatment any quicker or more certainly than they would have improved under local treatment with atropin and boric lotion. Multiple and recurrent chalazion should be treated by vaccine prepared from a cultivation made from the secretion rather than by a mixed stock vaccine.

Acute conjunctivitis of gonococcic or Koch-Weeks origin is as promptly relieved by the usual remedial measures as by vaccine. In these cases the sera are peculiarly suitable. The serum is injected into the tissues, usually the buttock and is also dropped into the conjunctival sac every hour.

Diphtheritic Conjunctivitis.—The beneficial results of the treatment by antitoxin are now placed beyond all doubt. The change becomes apparent in twenty-four hours, the temperature and pulse drop to normal and although there is some discharge from the eye the membrane shows signs of separation and it finally comes away piecemeal. If after another twenty-four hours the symptoms do not abate another dose of antitoxin should be given.

Staphylococcal Corneal Ulceration.—Four patients were treated by two injections of vaccine, five hundred million, eight days apart, with perfectly satisfactory results. In *pneumococcal* ulceration, if the serum contains the right strains of bacteria the results are brilliant. Four cases of tuberculous scleratitis were cured by tuberculin. This is usually an intractable and recurring disease and the result in these cases pretty clearly demonstrates both the etiology and the therapy.

Uveitis.—The organisms causing inflammation of the iris, chorioid and ciliary body, demonstrated to be present in the aqueous, are the tubercle bacillus, the staphylococcus and the *Spirochaeta pallida*. Of thirty cases, fifteen were tuberculous, ten staphylococcal and five syphilitic. "To summarize the results of treatment I should say that the method (injection of the tuberculin and sera) is a distinct advance in treatment, as yet far from perfect; that most of the cases are much benefited and occasionally brilliant results are obtained."

The abstract of Mayou's paper is incomplete, but is sufficiently long to convince the reader of the great value of his investigations and to instigate clinicians to take advantage of the microscopists' painstaking labors.

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