measure in a slovenly manner. Dr. Hollopeter referred to Dr. Lindsay's remark about the warm application, and said that he believes we can reduce temperature as well with warm water as with cold. He never uses cold unless there is a very high temperature. In answer to a question, he said that before a physician gets a patient with typhoid fever he has his mind made up to use enteroclysis.

THE EXTRACTION OF UNCOMPLICATED IMMATURE SENILE CATARACT.*

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In a discussion of this subject it is appropriate to say that a cataract is designated as senile if the patient has reached the fiftieth year of age; uncomplicated, when not associated with any special disease; and immature, when the opacity does not extend throughout the entire lens substance.

While this designation is in accord with the generally accepted teaching of to-day, technically we probably are not warranted in associating cataract with senility in the sense that the opacity of the lens occurring after middle life is a symptom of senility; or in designating a cataract as uncomplicated simply because we fail to detect the co-existence of any other intraocular pathologic condition.

Numerous observers have asserted that there are good grounds for considering eyes in which cataract develops as otherwise diseased. Thus Becker¹ states that, strictly speaking, there is no such thing as a primary cataract, the expression "primary" simply hiding our ignorance. Foerster² evidently recognized the influence of a previous or general disease when he said, "If a cloudiness of the lens is just beginning, very severe bodily ailment may hasten the development of cloudiness," to which Stricker³ adds, "The constitutional disease manifests itself in its action on the lens in such a manner that it either first causes disease of other portions of the eye, thereby leading to a pathologic changed vitreous, which, in its turn, leads to a disease of the lens and cataract formation, or the lymph of the entire organism becomes changed, thus leading to cataract formation without any other disease of the eye having previously existed." Risley,⁴ in calling attention to the importance of choroidal disease as a factor in the production of opacity of the crystalline lens, makes the statement that "while opacity of the lens is a disease of advanced life, it does not in all probability depend on senile change, but is originated in local pathologic states involving the nutrition of the eye itself." It is probable, however, that functional decline of the tissues of the body, which mark the onset of senility, may, by lowering the resisting power of the tissues of the eye, be responsible for the development of pathologic conditions which disturb the normal sclerosing process in the lens and lead to opacity. We may have premature, as well as delayed senility, but that does not account for the cataracts which occur in persons just past middle age who may be prematurely in decline, nor does it explain why persons of great age in whom the signs of senility are exceptionally pronounced, and who have remarkably good vision, are exempt from cataractous change of the lens. It is reasonable to presume, therefore, that cata-

ractous change in the lens is either secondary to some disease, either local in the eye, or to some general disease of the entire organism, and that senility may or may not be a factor in the production of the pathologic state on which the development of the cataract depends.

The existence of marked choroidal and vitreous changes accompanying incipient cataract we are all familiar with, as such cases are frequently presented to us before decided clouding of the lens makes a satisfactory ophthalmoscopic view of the fundus impossible, and at a time when the vision is more impaired by the choroidal and vitreous changes than by the loss of transparency in the lens. But there is a class of cases in which a mild choroidal inflammation precedes the development of cataractous change in the lens, which may be undiagnosed unless the ophthalmoscopic examination is made early in the progress of the case, which frequently is not possible because the opportunity for such examination is not offered, or may be overlooked later, when the patient presents himself on account of failing vision from incipient cataract, unless the history of the case is carefully considered and unusual care is exercised in making the ophthalmoscopic examination with a fully dilated pupil. The fact that we do not find diseases of the eye ground after the extraction of the cataract does not indicate that such diseases did not exist in mild form at the beginning of the cataractous process, and subsequently disappeared as a result of the enforced rest of the eye occasioned by the clouded lens. From the fact that I have been able to detect these mild pathologic changes in the fundus frequently during the stage of incipency of cataract, I am inclined to believe, as Risley has pointed out, that diseases of the eye ground are the rule rather than the exception in cataract patients.

With a recognition of the diseased processes which constitute the principal factor in the causation of cataract we may hope, by applying the proper treatment at the proper time, to prevent the occurrence of cataract in a fairly large percentage of persons who present themselves to the ophthalmologist before cataractous change in the lens has set in, or at a time when the beginning cloudiness of the lens is so slight as to make its arrest entirely possible. In those cases in which the process of cataract formation has become well established I do not believe it is possible to cause a retrogression, and it is those cases, when unaccompanied by diseased processes which would contraindicate operative procedures, with which this paper deals.

But the very fact that many, and perhaps the majority, of immature cataracts are accompanied by at least a mild disturbance in the uveal tract is sufficient ground for hesitation in attempting extraction, even in the absence of other contraindications, for the reason that enforced rest occasioned by the increasing opacity of the lens is a measure required to produce a subsidence of the uveal disturbance, and the beneficial effects of which would be more or less destroyed by extraction of the protecting lens. As the existence of those mild vitreous and choroidal inflammatory or degenerative changes must necessarily alter the prognosis in extraction of immature cataract, it is of the utmost importance that the history of such cases be given careful consideration and the functional examination of the eye be carried out with utmost care. In many cases, again to quote Risley,⁵ to whom we are indebted for extensive study of this subject, a long history of asthenopia, pre-

* Read in the Section on Ophthalmology of the American Medical Association, at the Fifty-sixth Annual Session, July, 1905.

1. *Pathologie und Therapie des Linsen Systems*, 1877.

2. *Graefe-Samisch*, vii.

3. *The Crystalline Lens System*, 1899.

4. *University Medical Magazine*, March, 1889.

5. *THE JOURNAL A. M. A.*, Dec. 7, 1901.

ceding the failure of vision from incipient and immature cataract, a more or less discolored iris, sluggish in its action to light and shade, and to mydriatics, injected conjunctiva and swollen caruncles, associated with headache, furnish a group of symptoms which point to the existence of choroidal disease." These processes do not, in a large proportion of cases, present the gross ophthalmoscopic appearances which characterize the rapidly destructive diseases in which marked retino-choroidal inflammation, fluid and muddy vitreous, and floating opacities are conspicuous features, but they are attended by a characteristic group of objective symptoms which, if not demanding treatment, certainly demand the enforced rest secured by the gradual opacification of the lens. But in those slowly progressing cases in which the clouded lenses, even though semi-transparent, have practically incapacitated the individual for the ordinary pursuits of life, and in which the enforced rest of the eye ground for a greater or less period has resulted in quieting the objective symptoms present with the beginning of the cataractous process, the advisability of extraction becomes a question worthy of attention.

In considering the operative features of these cases of cloudiness of the lens in those persons beyond middle age it is essential that we differentiate the immature cataract from the loss of transparency, accompanied by impairment of vision, due to advanced sclerosis. The one is a diseased process, due to an interference with the normal sclerosing process and accompanying alteration in the transparency of the lens (Becker), whereas the other is purely a physiologic process due to a lessening of the transparency on account of the hardening of the lens and consequent greater absorption of light. In the immature cataract, particularly those occurring in persons under 50 years of age, there will generally be found a soft cortex, adding to the difficulties of extraction, whereas in the sclerosed lens the cortex will be found hard, thus making it possible to extract the lens in its entirety.

Until recent years it was the generally accepted teaching that immature cataracts were not favorable for extraction, owing to the difficulties encountered in the removal of soft cortical material, and in consequence nearly all operators followed the practice of waiting until maturity, or until the lens was entirely opaque, before attempting extraction. That policy is still followed by many experienced and competent operators, though not a few attempt, and with a considerable degree of success, to hasten the time when extraction may be performed by practicing artificial ripening of the cataract by one method or another.

Schweigger,⁶ in a paper published in 1890, was one of the first to advocate the extraction of unripe cataracts, and has asserted that he does not believe that it is necessary to cause an artificial ripening after the time when physiologic changes in the lens have done away with the act of accommodation; that is, toward the fifties and surely after the sixtieth year. He operates "all patients past the fiftieth year as soon as the senile cataract interferes greatly with the patient's vision, so that life ceases to be a pleasure to him, and he becomes unable to be self-sustaining, and the doctor may hope that by removal of the lens vision may be materially improved. It is immaterial whether a greater or less portion of the lens is still clear." This teaching of Schweigger, while not generally accepted and followed, has had the tendency to give many operators confidence in their ability

to secure satisfactory results from the extraction of unripe cataracts, and as a result the practice is growing more and more in favor, with its attending benefits to that large class of unfortunate persons suffering from immature cataracts who otherwise would be compelled to go without useful vision for months and perhaps years while waiting for the cataract to become "ripe," and thus best suited to extraction. (Since writing this paper, Professor Hirschberg informs me that he advocated, prior to the publication of Schweigger's paper, the extraction of immature cataract, and his views on this subject, expressed before the Berlin Medical Society, were published prior to the appearance of Schweigger's paper in 1890.)

The principal objection to the extraction of immature cataract has been that, in the attempt to remove a lens not entirely opaque, more or less of the cortex remains which adheres to the capsule and is difficult, if not impossible, to remove without subjecting the eye to trauma which later gives rise to inflammatory reaction and jeopardizes the function of the eye, and if allowed to remain will either produce secondary cataract, with attending impairment of vision, or inflammatory reaction, with danger of damage to the function of the eye, or both.

Concerning the age at which the lens is sufficiently sclerosed to permit of its complete removal from the capsule, Schweigger⁶ makes the following statement: "At sixty years of age the lens is hardened in its entirety, whether cataractous or not, and whether the cataract is complete or not. The cataract and the induration are phenomena absolutely different; the one is pathologic, the other physiologic. Thus, in persons of 60 years who have lost the faculty of accommodation, a cataract even incompletely developed may be removed without the opacities being reproduced, for it is certain that the lens can be removed entirely." To this statement I think we may take exceptions. Under the fiftieth year, or while there is still some accommodation present, the cortex of the lens still consists of a tenacious sticky mass, but I have frequently observed a soft tenacious cortex after the sixtieth year, and occasionally after the seventieth year, in lenses that were the seat of immature cataractous formation. While sclerosis may have progressed to that point where in some cases at sixty years, as Schweigger says, the lens may be easily extracted in its entirety, whether cataractous or not, generally speaking we are not warranted in assuming such a conclusion for every case, and the extraction of any unripe cataract carries with it the possibility of having to contend with soft cortical substance, with the chances of a lessened amount or none with increasing age of the patient.

With a reasonable certainty that an unripe cataract, except in a person of advanced age, is accompanied by more or less soft cortex, the advisability of attempting extraction becomes a question for serious consideration. In making a decision several factors must be taken into consideration. First, what is the state of vision in the fellow eye; second, how rapidly is the cataract progressing; third, how seriously inconvenienced will the patient be if he waits for maturity; and, fourth, what contraindications are there to the extraction of the cataract, even though immature.

Those ophthalmologists who possess an unduly ambitious desire to operate on the slightest provocation, and who favor extraction of immature cataract, may advise operation, no matter if the fellow eye has ap-

6. Extraction of Unripe Cataract, Berliner med. Gessellschaft, 1890. Hirschberg's Centralblatt.

proximately perfect vision; but such advice is not good and should not be accepted. No extraction of an unripe cataract is warranted when the fellow eye has vision sufficient for the patient's needs, unless the first discernible signs of beginning cataract in the fellow eye warrants the belief that the increasing opacity will soon seriously interfere with vision and it is thought that extraction of the more pronounced cataractous lens will restore good sight before the failing vision in the fellow eye has had time to reach a stage where it will seriously inconvenience the patient. Even in such instances the needs of the patient, so far as earning a living is concerned, the general physical condition, the state of the eye as concerns irritation or swollen lens, and the progress of the opacity must all be taken into account before arriving at a final decision to operate. Particularly contraindicated is the extraction of a lens swollen by imbibition, attended with shallow anterior chamber and sluggish pupil from an irritated iris; for here, in addition to the difficulties of making a proper corneal section, must be considered the probability of the existence of a quantity of particularly tenacious soft cortical substance, the manipulations for the removal of which are almost sure to set up an inflammation of more or less severe character in the already irritated iris; and, furthermore, the swelling of the lens is an indication of rapid progress of maturity which it is unquestionably advisable to await in such case.

With immature cataracts in both eyes, the advisability of operation depends on the rapidity of progress of the more advanced cataract, and the amount of inconvenience to which the patient will be subjected if maturity of the cataract is awaited. At times the ripening process proceeds very slowly, while in other instances it is rapid. The history of the case, giving approximate date of onset of failing vision, will in many cases serve to indicate the rapidity of progression, though in most instances it is advisable for the ophthalmic surgeon to determine the progress of opacification by repeated examinations during a period of from one to four months. If it is determined that the process of opacification is progressing rapidly, it certainly is advisable to await maturity of the cataract before attempting extraction, for it must be admitted that, all things considered, the chances for an easy and complete removal of the lens in its entirety, with a minimum amount of trauma and attainment of the best possible vision, are better if the cataract is mature.

In the rapidly progressing cases it is seldom that a person can not afford to wait for a reasonable amount of maturity before having extraction performed. Such patients should be made acquainted with the fact that in those rapidly progressing cases that are accompanied by swelling of the lens the difficulties of extraction are greater on account of the shallow anterior chamber and impossibility of making a proper corneal section, and the tenacious soft lens substance requires more manipulation to remove it, thus increasing the liability of post-operative inflammation. As a result of all this, with consequent slow recovery, no time is saved by having the operation early, even though the ultimate results are as satisfactory as they would be by waiting for practical maturity of the lens before consenting to extraction.

In those rapidly progressing cases in which there is no swelling of the lens and attending shallowness of the anterior chamber, the recommendation of operative interference should depend on uselessness of the other eye and extraordinary physical or mental conditions which make it advisable to hasten the recovery of vision, and

in such instances I consider most persons who are unable to read Jaeger, No. 12, as proper subjects for operation.

In not a small proportion of cases the process of opacification is slow, while in some instances the cloudiness of the lens proceeds until useful vision has been lost, and then becomes practically stationary, with a portion of the lens still more or less transparent. Becker⁷ describes a form of premature senile cataract in which "cloudiness develops in the nucleus between the fortieth and fiftieth year after the normal sclerosing process in the lens is far advanced. This cloudiness gradually extends into the transparent cortical substance and has a peculiar white, almost milky, color. This cataract is exceedingly slow in its development, but finally becomes a total cataract. The individuals show in their general appearance that their health has been disturbed for a long time. They are people who have been reduced by disease, excessive bodily exertion, many and difficult labors, material want, grief and care." Becker further states that, without in such cases being able to demonstrate a diseased condition of the nutritive fluids of the body, we may look on the general premature senility of the entire body as a cause of the failure to form the nucleus, which is a feature of a lens which becomes diseased in this manner.

Cortical cataracts are usually progressive, but frequently the progress is so slow that a long period intervenes between the time when cloudiness of the lens interferes with vision and the time when opacification is complete and the cataract may be said to be mature.

In these cases of slowly progressing cataracts of both eyes which may require months or even years to reach maturity, it is an unnecessary hardship to await natural maturity of the lens before adoption of measures for the restoration of vision, and a recognition of this fact led some operators to the adoption of the practice of artificial ripening of the cataract. Several methods have been recommended for hastening the process of ripening, among which may be mentioned simple division of the anterior capsule with a knife needle, iridectomy combined with some form of trituration of the lens, or paracentesis of the cornea combined with external massage.

In my own experience I have found that a preliminary iridectomy alone is usually sufficient to hasten artificial ripening of the cataract, though I doubt the propriety of generally subjecting the eye to the risks of two operations, including the preliminary iridectomy, either with or without trituration of the lens, and the subsequent extraction, when the same end may be secured with equally good results by the single operation of extraction. So far as the value of a ripening operation is concerned, I believe, as has been stated by Weeks,⁸ "that the operation for hastening the maturation of the lens does not sufficiently increase the facility of removal of the cataract to warrant the extra risk and trouble to the patient."

The state of vision in slowly progressing senile cataracts of both eyes, which warrants operative interference, will vary in different individuals. In my judgment, when vision has been reduced so that ordinary type can no longer be read, both pleasure and business are suffering from the interference, and the deprivation, if long continued, usually has a more or less detrimental effect on the physical and mental condition of the individual. In such cases I do not hesitate if, aside

7. Zur Anatomie der Gesunden und Kranken Linse, 1883.

8. THE JOURNAL A. M. A., Dec. 15, 1900.

from the semitransparency of the lenses, there are no contraindications, and the patient has been made acquainted with the possibilities as to secondary cataract requiring discission and mild postoperative inflammation, with delayed recovery. I do not expect to encounter any greater difficulty in extracting a lens that is one-third opaque than one that is two-thirds opaque, for in both instances about the same amount of manipulation of one kind or another is required to free the eye of soft lens material, and no more lens substance is apt to be left in the one case than in the other, all things being equal.

The difficulties attending removal of the lens in its entirety have deterred many operators from attempting extraction of unripe cataracts, for no operator from choice will face certain dangers of iritis and secondary cataract which invariably follow if any considerable amount of soft lens substance is left in the eye; and every operator knows that efforts to tease out the cortical remains alone carry with them the possibilities of trauma, which may provoke irritation or possibly result in rupture of the zonule and loss of vitreous.

Successful results from the extraction of immature cataract must, therefore, come from the adoption of methods which make it possible to remove, at the time of operation, practically all the cortex, with a minimum amount of trauma and subsequent inflammatory reaction, and the employment of such postoperative treatment as will tend to limit the effects of inflammatory reaction and promote resorption of any retained cortical substance. In my judgment the operative essentials to bring about the result are: First, a large corneal section, embracing not less than two-fifths of the corneal circumference; second, an iridectomy with a fairly large coloboma extending to the ciliary border; third, a large opening in the capsule by two incisions at right angles to each other; fourth, gentle irrigation of the anterior chamber with a sterile normal salt solution, after the extraction of the nucleus, if much cortex remains; fifth, the early and free use of atropin, and, sixth, the use of dionin, after the corneal wound has closed, to promote resorption of lens debris.

The advantages of a large corneal section are embraced in the case with which the hard nucleus is removed without undue manipulation of the eyeball, and the increased certainty with which the irrigating fluid and soft cortical material pass out without provoking irritation from damming up in the anterior chamber.

The coloboma from the iridectomy not only facilitates removal of the soft cortical substance by furnishing a sluice-way for its escape and averts secondary iris prolapse, but tends to prevent the development of postoperative glaucoma.

The reason for the large opening in the capsule is obvious, for, with an insufficient opening, which may not be enlarged by the escaping small hard nucleus, the collapsing capsule may retain within its folds considerable quantities of lens substance which it would be difficult to remove. These enclosed masses of lens substance when cut off from the aqueous by collapse of the capsule are not resorbed, but remain to form a white membranous cloudiness or secondary cataract. If the opening in the capsule is sufficiently large, the cortex remaining after the extraction of the nucleus, even when in considerable amount, will swell up and become resorbed. This swelling of the retained cortical substance, however, with the production of an iritis, which even the liberal use of atropin does not always control, is one

of the complications which we should make an attempt to avoid, and indicates the necessity for the adoption of more effective means for the removal of the soft cortical substance at the time of the extraction than is accomplished by stroking and other manipulations ordinarily employed.

The most effective means for removing the cortical remains is irrigation of the anterior chamber. Several methods have been advocated, but the one preferred is that of Lippincott, in which a continuous stream is allowed to flow by gravity through a small specially constructed canula, into the anterior chamber, the force of the stream being properly regulated by the height at which the reservoir is held, and the flow being entirely under the control of the operator, who may stop or start the stream by the use of a suitable lever. To avoid trauma, only the tip of the canula should lie between the lips of the corneal wound, and the stream should have only such force as is given it by elevating the reservoir no higher than is necessary to establish a continuous current by gravity.

Until recently I have also used with great satisfaction the method advocated by Dr. Flemming Carrow, in which the anterior chamber is irrigated with a stream from a wash bottle designed something like an ordinary bulb atomizer and having a specially constructed tip for irrigation purposes. While excellent results may be secured with this apparatus when properly employed, the objections to it are that unless the operator employs unusual delicacy and steady pressure on the rubber bulb, the stream is apt to possess too much force, with consequent trauma to the tissues. Also, unless due care is observed, air is likely to be forced into the anterior chamber, and the bubbling, with its unpleasant sensations, cause the patient to make some unexpected move which may prove disastrous. The originator of the device, who has had a very large and very successful experience in cataract extraction, does not direct the stream directly into the anterior chamber, but allows it to flow across the lips of the corneal wound, thus creating a very gentle but continuous current through the anterior chamber, with the result that the bulk of the soft cortical lens substance is carried out.

Those who practice irrigation of the anterior chamber vary in their preference as to the solution to be used. Sterile water, boric-acid solution and physiologic salt solution are about equally employed. In my own practice physiologic salt solution is preferred as being less likely to produce irritation from its own qualities.

Irrigation, if it is to be accompanied by a minimum amount of irritation and yet be effective, should be carried out with the utmost delicacy. The stream should be continuous, but possess no more force than that obtained by gravity when the reservoir is just high enough to create a current; and less trauma is likely to result if the current is directed into the anterior chamber on a line with the corneal section. Prolonged irrigation should also be avoided, as it is entirely unnecessary and is apt to be attended with increased trauma. If the capsular opening is large, it is seldom that the bulk of the soft cortical substance is not removed, but, if not removed, prolonged irrigation is not warranted, as much of the remaining lens substance will be resorbed by the action of the aqueous, and if not resorbed had better be subsequently divided by a discission operation rather than removed by prolonged irrigation or other manipulations which increase the possibilities of trauma and resulting serious inflammatory reaction.

It must be admitted that, in spite of proper care exercised in the performance of this procedure, in nearly all of the cases more or less iritis is the rule rather than the exception. This is due to the slight trauma necessarily following the irrigation and the irritation produced by the swelling of the remaining soft lens substance. In the majority of instances this iritis produces no serious consequences if atropin is used early and continued until all signs of irritation have disappeared. In many cases the irritation of the iris is no more than accompanies the extraction of mature cataract, but it is well to anticipate it and to adopt the proper medical measures early in the progress of the case. It has become my practice to anticipate such trouble by using atropin at the time of the first dressing, 36 to 48 hours after the extraction.

A remedy that I have found of decided service in promoting resorption of lens débris following cataract extraction is dionin. This drug, as has been pointed out by Darier,⁹ possesses decided lymphagogue properties, and further experience in its use to promote resorption of cortical remains warrants me in reiterating a statement which I have previously made¹⁰ that "the remarkable results secured by dionin in clearing the pupillary space following cataract extraction has led to the belief that, with the more or less general employment of this drug, after cataract extraction, secondary operations will be lessened in number." It should be remembered, however, that some persons apparently do not react to dionin, and in such I have not been able to detect any favorable action in promoting resorption of lens débris, but it may be said in its favor that if it produced no favorable action it certainly has produced no unfavorable results.

Until the susceptibility of the patient to dionin has been determined it is best to begin with a 5 per cent. aqueous solution, and, owing to the active smarting produced, it is advisable to precede the application with an installation of cocain. Owing to the smarting, with involuntary tight closing of the eyelids, with attending pressure on the eyeball and the sneezing that is occasionally induced, it is also advisable to use dionin only after the corneal wound has been securely closed for a period of from five to seven days.

In susceptible persons dionin produces marked vascular injection, with edema and extravasation of lymph, and in my experience the more marked the reaction in this respect the more marked is the favorable action in promoting resorption of lens débris; in fact, the strength of the solution is increased to 10 per cent., or the pure powder is used, in an endeavor to produce such reaction in those who do not apparently respond to the usual effect of the drug. Unless there is decided reaction the applications are repeated from two to four times per day for a period of four days, at the end of which time a certain tolerance is established and no further beneficial effects may be expected until an interval of at least a week has elapsed. While there are a few cases in which this remedy seems to have no appreciable effect in promoting resorption of the cortical remains, in a larger number of cases the results secured in effecting a clearing of the pupillary space, even where a considerable quantity of cortical lens substance has remained, have been so strikingly favorable that I feel warranted in unhesitatingly recommending the employment of this measure as a routine practice after all cata-

ract extractions. I am still further influenced in giving this recommendation because of the fact that dionin has a marked favorable action in the treatment of iritis, in promoting the absorption of exudates and increasing the effect of atropin; and, as iritis accompanying swelling cortical lens remains follows cataract extraction, there is double reason for the employment of dionin.

The extraction of immature senile cataract may be attended with more complications and less favorable immediate results than the extraction of mature cataract, but the final results, when the cases are properly handled, should compare favorably with the extraction of cataract in any stage. In the extraction of immature senile cataract in persons of any age I have learned to expect a certain amount of soft lens substance, but with a large opening in the capsule and the employment of irrigation the greater portion of the lens débris is removed, and what is not removed is generally resorbed either with or without the assistance of the action of dionin. Discissions, while necessary in a fair proportion of cases, are not, in my experience, so frequently required as formerly or before dionin came into favor as an agent to promote resorption of lens débris. Iritis, frequently seen, either produced by trauma at the time of the operation or subsequently by the action of the swelling lens substance remaining, is controlled by the early and free use of atropin.

Admitting that the immediate results from the extraction of immature senile cataract are not as good as in the extraction of mature senile cataract, on account of the greater possibility of having to contend with iritis and secondary cataract, it is nevertheless a fact that the ultimate results are equally as good, and this opinion is attested by many of the most prominent operators of the United States, whose views on this subject are appended to this paper. That the complications arising are no greater than those accompanying the extraction of hypermature cataracts, which form a considerable portion of the number of cataracts presented to the average operator for extraction, is also accepted as a fact, for in both classes of cases the development of an iritis and the formation of a secondary cataract are the rule rather than the exception. The slow recovery in a few cases, due to inflammatory reaction directly dependent on the effects of the operative procedures, while seemingly indicating that the operation has not been to the best interests of the patient, are not generally detrimental to the extent usually supposed; for under such measures as herein advocated the iritis usually completely subsides in from two to six weeks, soon after which, if required, the discission operation may be performed. Even with more protracted recovery the patient is usually favored with the restoration of vision much sooner than could possibly be expected had maturity of the cataract been awaited, and this at a time when the general health has not been impaired by the enforced inactivity and the mental disquietude occasioned by a prolonged period of waiting for complete opacification of the lens before extraction.

My personal experience in the extraction of immature senile cataract, while not large, has been very satisfactory. During the past four years, or the period during which I have followed the practice, I have extracted twenty-five more or less unripe senile lenses, and ten of the number have been operated on within the past fourteen months. In all the cases the ultimate vision has compared favorably with the vision obtained in the cases of mature cataract operated on either during the same

9. *Ocular Therapeutics*, 1903.

10. *Ophthalmic Record*, August, 1904.

period or before. In eight cases the vision was 20/20; in ten, 20/30; in two, 20/40; in three, 20/70, and in two, 20/200. Nine of the cases required secondary operations, and six should have had secondary operations, but for one reason or another did not have them. In all but two of the cases in which vision was under 20/20, there was secondary cataract, and, as some of those were lost sight of soon after the operation, it is possible that vision improved in course of time as a result of resorption of a greater amount of the lens debris. A striking feature of the eight cases having 20/20 vision was the fact that but three had a secondary operation, and the remaining five, which soon after the extraction gave evidence of requiring a secondary operation, obtained excellent results under the effect of dionin. Three of the latter cases were under 60, and one but a little over 50 years of age. Practically all of the cases had irrigation of the anterior chamber and few escaped at least a mild iritis, though the inflammatory action had nothing to do with the failure to secure good vision in any of the cases. All of the cases had the combined operation. In only three cases was preliminary iridectomy performed, and in all three, following the extraction, a subsequent operation for secondary cataract was required. All of the cases were what would be called uncomplicated, in that they had no marked choroidal or vitreous changes, swelling of the lens, or external evidences of disease. In all of the cases vision had been reduced below the patient's requirements.

With a view of obtaining information from other operators as to the practice of extracting immature senile cataract, the following inquiry was sent to a large number of prominent ophthalmologists: (A) Do you extract uncomplicated immature senile cataracts? If so, what is your rule as to (1) Age of patient? (2) State of vision of eye to be operated on? (3) State of vision of fellow eye? (4) Form of operation to be performed, simple or combined, or preliminary iridectomy and extraction later? (5) Irrigation of anterior chamber, and, if employed, what solution used? (6) Use of dionin to promote resorption of debris? (B) Generally speaking, what have been your results in extracting uncomplicated immature senile cataracts as compared to extraction of uncomplicated mature senile cataracts: (1) As to vision obtained? (2) As to development of secondary cataract requiring operation? (3) As to inflammatory reaction from operation? (C) What difficulties have you encountered in extracting immature senile cataracts? (D) What objection, if any, have you to extraction of immature senile cataracts?

While some of the questions were not answered even in a general way and others were answered in such manner as to admit of no definite interpretation, I find by analyzing the reports containing specific answers that out of 65 who responded, 25 have no hesitation in attempting extraction of uncomplicated immature senile cataract, 22 perform the operation with some hesitancy but apparently not from choice, 9 have serious objections to the practice, but in certain apparently urgent conditions take what they term the "risk" of the operation, and 8 do not extract immature senile cataracts at all, because they consider the final results bad in the majority of instances.

All who operate have as a condition of the operation that the eye to be operated shall have sufficient failure of vision to interfere seriously with the pleasures and pursuits of the patient, and an equal failure or complete loss of vision in the fellow-eye. In no instance is

an operation advocated when there is vision in the better eye sufficient for the patient's needs.

In considering the advisability of operating, 32 do not consider the age, 3 place the age limit at 40 years, 3 at 50 years, 6 at 55 years, and 7 at 60 years. In nearly all instances, the form of operation selected is reported as varying with conditions presented, but the first choice is given as preliminary iridectomy by 27, combined operation by 18, and simple extraction by 10. Some say, and presumably all intend to convey the idea, that preliminary iridectomy is performed with the idea of artificially hastening the opacification of the lens before extraction. In a few instances mention is made of trituration of the lens at the time the preliminary iridectomy is performed.

Thirty practice irrigation as a routine measure or reserve it for those cases in which the soft lens substance does not come away easily by usual manipulations, and with four exceptions physiologic salt solution is the solution preferred.

Nineteen use dionin to promote resorption of lens debris, and out of this number nine report good results, the others reporting doubtful results or not referring to effect.

While nearly all report that secondary cataracts and mild postoperative inflammations, with slow recovery, are more frequent than in extraction of mature cataracts, they almost without exception report as favorable ultimate visual results as in mature cases.

It is quite possible that with an improved technic, including many if not all of the essentials herein advocated, that the development of secondary cataracts and postoperative inflammations will be reduced to the point where they will not occur more often than after extraction of mature cataracts. But even if this were so, the results obtained by the operators herein reported, as well as by myself, warrant me in recommending the extraction of uncomplicated immature senile cataract, irrespective of age, in all those persons who, on account of the clouding of the lens, have vision reduced to such a degree that the individual can not follow the ordinary vocations of life.

OPINIONS OF PROMINENT OPERATORS ON EXTRACTION OF UNCOMPLICATED IMMATURE SENILE CATARACT.

HERMAN KNAPP, New York City: Yes. Uncomplicated, unripe cataracts can be operated on with a good prospect of success when the general and ocular conditions are favorable and a large corneal section can be made.

F. C. HORTZ, Chicago: The question of extraction of unripe cataract can arise only if the vision of both eyes is so much impaired that the patient can not attend to his business any longer. As long as he enjoys fair vision in one eye, the operation is not warranted. If both eyes are affected I am guided by the condition of the lens whether to operate immediately. If the cataract presents an opaque nucleus enveloped in a cortex which, though not completely opaque, is sufficiently so that the pupil shows only a faint red reflex, I operate, and I find these cases yield generally as good results as the perfectly mature cataracts. But if the cortex shows sections of almost perfect transparency, I do not regard extraction advisable, because the transparent substance can not be gotten out cleanly, even by irrigation, and its subsequent swelling causes complications in the healing, iritis and dense secondary cataract. As in these lenses, the opacification usually progresses rapidly, I think it is wiser to let the patient wait a few months than to take any chances. But should the patient insist on having something done at once, I perform a preliminary iridectomy, and massage the lens to hasten the process of opacification. On the other hand, there is a kind of immature cataract, and I see them often, which I extract without hesitation, though the vision may be 20/100 or better and the ophthalmoscope shows good red reflex. These lenses show a rather uniform diffuse haziness without distinct nucleus, vary little in the course of a year, and never become completely opaque. When extracted, they come out as one semi-translucent yellow cake; there is no cleansing necessary; the pupil appears perfectly clear and black; and the results are excellent; in fact, I am almost inclined to say better than after extraction of the ordinary mature cataract.

JOHN E. WEEKS, New York City: Yes, in persons more than 55 years as a rule, who are unable to read ordinary primer type with the eye to be operated on and vision in fellow eye is lost or reduced so that the patient is unable to follow vocation. Preliminary iridectomy performed in many cases, combined operation in some, simple operation in a few. Irrigation with normal sa-

line solution if any cortical lens substance remains. Results as compared with mature cases, very little difference. Degree of vision, taking all cases, perhaps a little less. Maximum vision not reached so soon. Vision 20/20 in about 50 per cent. of the cases. Secondary cataracts more frequent than in extraction of uncomplicated mature cataracts. Seldom have subsequent inflammatory reaction. Cortex more adherent to capsule than in mature, but not more so than in hypermature. If lens is shrunken, nucleus amber colored, anterior chamber as deep or deeper than normal, I do not hesitate to operate. If lens is large, asbestos striped and anterior chamber shallow, I hesitate to operate. Maturity does not always mean complete opacification of the lens substance. I have abandoned the ripening operation for the reason that the facility of removal is not sufficiently increased to warrant the extra risk and trouble to the patient. Whenever in the development of cataract the vision is reduced to such a degree that the individual can not follow the ordinary vocation of life, provided there is any reason for not waiting until the cataract is matured, I do not hesitate to advise operation.

G. D. DE SCHWEINITZ, Philadelphia: I may say in general terms that I very frequently extract immature cataract, but that I do not extract it if the lens is in the stage of swelling, which I believe to be distinctly a contraindication, especially if associated with the swelling there is much shallowing of the anterior chamber. I do not believe that it is at all necessary to watch for what we used to call full maturity, especially if the patient is past the age of 55 or 60. I always make an iridectomy if I extract an unripe cataract, and preferably a preliminary iridectomy, which I believe to be far the safest way of dealing with these cases. I do not know how many unripe cataracts I have extracted, but the number is large. I have never had a serious disaster, although I have been obliged on some occasions to make more than one dissection subsequently to get rid of cortical remnants. My experience with washing out the anterior chamber is a very limited one, as at one time I was very positive that it was a bad procedure. I have begun to change my views, however, since seeing some very excellent results in the hands of some of my friends, and I think that hereafter, should I meet with cases in which it was difficult to remove remnants in extractions of unripe cataracts, I would certainly use irrigation. In general terms, I would say that my operations for extracting unripe cataracts have been quite as good as those which I obtained after extracting ripe cataract, although the procedure has been more trouble in some instances. I believe it is better to extract an unripe cataract than it is to do a ripening operation.

CHARLES H. MAY, New York City: Yes, in persons of any age if the vision in each eye is sufficiently reduced to interfere with the patient's usual occupation. The combined operation is generally preferred, but if the cataract occurs in an individual in whom the other eye is blind, preliminary iridectomy is performed. Irrigation with physiologic saline solution is employed if cortex is left. Dionin not used. Results compare very favorably in the end with results in extraction of mature cataracts. Secondary cataract relatively more frequent, and as a rule rather more inflammatory reaction. No special difficulties encountered in extraction of immature cataract and no objections to the practice.

EDWARD JACKSON, Denver: Yes, in persons of any age if the case presents the visual need, i. e., vision in each eye reduced so as to interfere with patient's usual occupation. The simple operation preferred, but in certain cases the combined. Irrigation rarely employed, but when used, physiologic salt or boric acid solutions preferred. Have not tried dionin. Results as satisfactory as in extraction of mature cataract and equally good vision ultimately. Secondary cataract more frequent, but by no means constant. No greater inflammatory reaction. Difficulties encountered are those connected with removal of cortex. My only objection to extraction of immature senile cataract is that the immediate result is not so good. This does not deter me from operating in suitable cases.

CHARLES H. WILLIAMS, Boston: Yes, in persons of any age having good or fair general health when vision in eye to be operated on is less than 1/10, and vision of fellow eye is reduced so that the patient can not do necessary work. Simple extraction preferred. Employ irrigation with one-half of 1 per cent. salt solution if much cortex is left. Do not use dionin. Results about the same as in extraction of mature cataract. Results sometime depend more on the general health and disposition of the patient than on the question of maturity of the cataract. Secondary cataract occurs more frequently than in mature cataract. Inflammatory reaction perhaps a little more frequent. Ultimate results as good as in extraction of mature cataracts.

H. D. BRUNS, New Orleans: I sometimes extract immature cataracts in persons of any age if there are no contraindications in the general health of the patient or the condition of the eye to be operated on. State of vision must be inability to read ordinary print with eye to be operated on and an equal disability in fellow eye. Operation preferred depends on circumstances. Unless there is some reason in the disposition of the patient, or unfavorable local conditions (rigidity of pupil, elevated tension, corneal opacities, etc.), I always do simple extraction. If the section has been too small, iris does not reduce well, and is bruised by manipulation, much cortex is left behind, or much opaque capsule, patient restless and causing prolapse after one or two successful reductions, I at once proceed to do iridectomy. If at end of forty to forty-eight hours, when dressing is removed for first time, there is prolapse, I do iridectomy then. All these reasons, circumstances and conditions incline me to iridectomy much more in case of immature than mature cataracts. I use irrigation sometimes, but prefer to do without it, and without anything that increases the amount of trauma and the number of instruments introduced into the eye. I do not use dionin. Results are practically the same as in mature cases. Have seen no striking difference in the ultimate vision. Nearly always there is denser secondary cataract, and usually more inflammatory reaction, owing to greater traumatism in getting away cortex and denser contracting secondary cataract. Difficulties encountered are those connected with removal of cortical lens substance left behind when nucleus delivered. I have no objection to the practice if indicated, i. e., patient so blind in both eyes as to be unable to read or amuse himself with near-work. So long as the patient can read and write and pursue ordinary vocation with one eye I decline to do any extraction in senile cataract. Patient

often dies before operation is necessary. Cataract extraction is surely a major operation. The shock is more than it seems the patient or we anticipate. I am convinced that it often hastens the breakdown and death of old people. Slight immaturity I totally disregard. When patient has but one eye I always do preliminary iridectomy, whether cataract is mature or not. In such cases I would wait for a greater degree of maturity than where the patient had both eyes operable, as the patient should have the best possible chances for the restoration of vision in his only eye.

VARD H. HULEN, San Francisco: Yes, in persons of any age. No rule, but prefer older patients. Vision of patient must be so poor in each eye as to interfere with ordinary pursuits, and cataracts of very slow maturation. Prefer the combined operation, but sometimes do simple extraction. Practice irrigation of the anterior chamber with normal saline solution if much lens matter remains. I have not tried dionin. Results about the same as in extraction of mature cataract and equally good vision. Secondary operations more often necessary than following extraction of mature cataracts, and expect inflammatory reaction more often. No special difficulties encountered, but more manipulation required in removing soft lens substance. Have no objections to the practice when patient's sight is so reduced as to incapacitate individual.

FRANK C. TODD, Minneapolis: I frequently extract immature cataracts, and am not governed so much by the age of the patient as by other conditions; i. e., the slow progress, with poor vision in the fellow eye. When the vision interferes with going about, or in a younger patient who would otherwise be able to follow some vocation, I extract immature cataracts or do a trituration, providing the vision in the fellow eye is poor enough to interfere with going about or with occupation. I prefer, as a rule, the combined operation, or preliminary iridectomy with trituration, and extraction later. I have had no experience with either irrigation of the anterior chamber or the use of dionin. As compared to the extraction of mature cataract, my results have been equally as good. There are a large percentage of secondary cataracts, except when trituration has been performed. The inflammatory reaction is not more than after the extraction of mature cataracts, though atropin should be used for a longer period or until the soft matter has had time for absorption. In general, I would say where a cataract has made good progress in ripening, I wait until it is mature or nearly mature; but when progress is slow and the patient is incapacitated by poor vision in both eyes, I extract the one that is most mature, and in case it is very immature and very slow in maturing I do a trituration. I am aware of the fact that this operation of trituration is frowned on by many, but I am convinced that it has its place, and I am further convinced that it makes a difference as to how the operation is done. When properly done it is better than to extract a very immature cataract, and after extracting an artificially ripened cataract I have never had to do a needling or secondary cataract operation.

J. A. WHITE, Richmond, Va.: Yes, but only in cases of very slow development. No rule as to age of patient. I never operate as long as patient has good vision in one eye, but when vision is no longer useful in either eye, and the cataracts have been long developing, I operate whether they are mature or immature. Prefer preliminary iridectomy, or iridectomy at the time of extraction. Sometimes use irrigation with normal salt solution. Have never tried dionin. Results nearly the same as in extraction of a mature cataract, and vision secured practically the same. Secondary cataract or cloudy capsule is more frequent, and iritis more common. No difficulties encountered, except that the cortex is more sticky, especially under 60 years of age, and is harder to remove. Do not object to extraction of immature cataract if the other eye is failing rapidly, otherwise prefer to wait. I sometimes, however, under 60 years of age, hasten maturity by trituration the lens. I have removed about 600 senile cataracts, and among them a number of immature ones, but can not say exactly how many.

WILLIAM ZENTMAYER, Philadelphia: Yes. Age not a factor. Am guided by circumstances of the patient as to vision at time of operation. If necessary to earn a livelihood, would operate as soon as the patient is incapacitated for that work. If independent, would advise him to await maturity. Prefer either combined operation, or preliminary iridectomy and extraction later, depending on the amount of unripe cortex. Irrigation of the anterior chamber with physiologic salt solution employed occasionally, but not invariably. Dionin used to promote absorption of debris. Results, so far as vision is concerned, about as good as in mature cataract. Secondary cataracts more frequent and inflammatory reaction more marked. The difficulties encountered are principally those connected with removal of the soft cortical matter. The objection to extraction of immature cataract is that it does not afford the patient the best condition for a successful result, for the reason that the eye is usually subjected to a larger number of operations with attending risks.

SWAN M. BURNETT, Washington: I prefer not to operate on an immature cataract, as I think the risk is greater, but if both eyes are affected and total blindness in both eyes is near, I take the chances to gain one eye for use. I seldom do an iridectomy for any kind of extraction, and have not tried irrigation of the anterior chamber. I have had some experience with the use of dionin to promote resorption of debris following cataract extraction and am pleased with the results. As compared to extraction of mature cataract, the chances for success are not so great, and the healing process is longer, with greater liability to complicating inflammation. My objection to the extraction of immature senile cataract is, therefore, the greater danger from postoperative complications.

LEATUS CONNOR, Detroit: Yes. Age is not considered a factor, only the reparative power. Vision must be useless for any work. Prefer preliminary iridectomy and extraction later, though sometimes do the combined operation. Irrigation with weak boric acid solution sometimes employed, and dionin used to promote resorption of any lens debris remaining. Results not greatly different than in mature cataract. Secondary cataract not much more frequent, but slightly more inflammatory reaction. There is nearly always greater difficulty in removal of all clear lens. The objection to extraction of immature senile cataract is that it is impossible to know when all of the cortical matter has been removed, and unless removed there is apt to be greater reaction and perhaps the development of secondary cataract requiring further operative attention. This does not deter me from operating in suitable cases.

F. B. EATON, San Francisco: I have records of the extraction of a number of traumatic cataracts in patients 40 and above, in which the conditions were about the same as in an immature senile cataract, and the principle of treatment essentially the same. The combined operation was performed, with irrigation of the anterior chamber with normal salt solution for the removal of soft cortical material. For irrigation, I have used a device of my own, consisting of a piece of small glass tubing with soft rubber bulb at the end, the nozzle being appropriately tapered. I irrigate the anterior chamber freely, or until the pupil is perfectly black. I have never had a bad result which I thought could be attributed to the irrigation, and this is probably because the nozzle is so large that it produces a gaping of the wound, thus preventing the pressure of the fluid in the anterior chamber. I have not tried the use of dionin, but believe it indicated in certain cases. My objection to the extraction of immature cataract is that there is increased risk from inflammatory reaction and secondary cataract.

WILLIAM H. WILDER, Chicago: Yes. Age is not a consideration. Vision must be so low as to prevent following occupation. Usually perform preliminary iridectomy, but sometimes the combined operation. Rarely use irrigation of the anterior chamber. Have used dionin to promote absorption of debris, and consider it entirely proper. Results not quite so satisfactory as in mature cases, for not so good vision recovered and usually a secondary operation is necessary. Iritis is also more common as a result of swelling cortical remains. The cortex comes away with difficulty, and what is left is not always readily absorbed. I would not hesitate to operate on immature cataract if the sight of both eyes is affected to the degree of helplessness. If the patient has one good eye I should advise waiting for the cataract to mature, or become nearly mature, and would content myself with a preliminary iridectomy.

C. R. HOLMES, Cincinnati: Yes, in persons over 40, having vision 50 per cent. or less in both eyes, or 50 per cent. in the one eye, the other being blind or at least useless. Prefer combined operation, or preliminary iridectomy and extraction later in certain cases. I do not use irrigation, and have not tried dionin. Final results as satisfactory and vision as good as in extraction of mature cataract, though secondary cataracts requiring operation are more frequent, and there is usually slightly more postoperative inflammatory reaction. Have encountered no particular difficulties, but there is more soft cortical substance to be removed than in a mature cataract. Do not object to performing the operation in proper cases.

W. C. POSEY, Philadelphia: I believe that immaturity of a lens is no contraindication for its extraction, my rule being to remove the ripest lens in all cases of cataract, irrespective of age, as soon as vision is so low in the best eye that the patient is unable to get about or perform the ordinary duties of life—in other words, when the test-cards show the vision in the best eye to be reduced to about 3/60. Under such circumstances I do one of three things, according to the circumstances of each case: First, a ripening operation; second, a preliminary iridectomy; third, extraction with iridectomy. If the most affected lens is very unripe, I open the anterior chamber and triturate the anterior capsule of the lens directly, removing the lens at the expiration of a few days or several weeks, according to the effect of the operation in ripening the lens. If there is no need for haste, preliminary iridectomy is done, it being found that the performance of this operation frequently aids in the ripening process as well as facilitating in the removal of the lens later. If a ripening operation or a preliminary iridectomy is not indicated, the lens is removed by the combined operation, the simple operation being reserved for mature cases only. After the removal of an immature lens the anterior chamber is frequently irrigated with a McKeown irrigator. Dionin in the strength of 4 to 8 per cent. has been found of value in promoting absorption of the debris, and has been used in many cases during the past year. I am convinced that my results in operating on immature cataracts in the manner described have been fully as good as those on mature lenses. I should say that fully 80 per cent. of the cases obtained practically full visual acuity, but I think a dissection for secondary cataract was required in at least 70 per cent. of the cases. Inflammatory reaction has followed the operation in many instances, but not oftener I should say than after the removal of a mature lens. I know of no difficulties or objections to the removal of an immature lens. If possible, I think it best to avoid operating in the stage of greatest swelling, as in such cases the cortex shows a greater tendency to adhere to the capsule than when the cataract has proceeded further toward maturity.

E. E. HOLT, Portland, Maine: Yes, in persons above 50 years whose vision has been so reduced that they are unable to count fingers. Formerly I did a preliminary iridectomy or the combined operation, but now do simple extraction. Irrigation used when thought necessary for the removal of soft cortical material, and dionin also used to promote resorption of any lens substance remaining. Final results good and vision not different than following extraction of mature cataracts. Do not believe that there have been any more secondary cataracts, or that I have had more secondary reaction than occurs with mature cases. In some instances the lens was more difficult to start out of the capsule. I have no serious objections to the extraction of immature senile cataract, and am willing to abide by the decision of the patient when it is made after due consideration of the facts. I do not remember of a single instance in which the patient or I regret that the operation was performed.

ROBERT L. RANDOLPH, Baltimore: Yes, in persons over 60 who have loss of reading power. Perform combined operation always, and some of my best results followed preliminary iridectomy. Do not use irrigation or dionin. Ultimate results satisfactory; in fact, I do not recall a failure. Final vision about the same as in extraction of mature cataract. In nearly every case there was secondary cataract requiring dissection, and a mild iritis in every case. I do not object to performing the operation in such cases as mentioned.

S. D. RISLEY, Philadelphia: I believe that while opacity of the lens is a disease of advanced life, it does not in all probability depend on senile change, but is originated in local pathologic states involving the nutrition of the eye itself; that hence in the stage of incipientity it is amenable to treatment by such measures as are calculated to remove the choroidal disease on which it depends; that if treatment fails to arrest the progressive degeneration in the lens, by virtue of the treatment adopted, the eye will be in a better condition to submit to the trials of operative interference. I never attempt extraction by the simple method in a dark gray or

amber-colored homogenic lens that has ripened slowly, or on one that is translucent. In such cases secondary capsulotomies are almost invariably required, and there is a tendency to an inflammatory reaction from the slight traumatism. In these cases a preliminary iridectomy is performed, and from four to six weeks later the extraction. If after delivery masses of gray cortex remain, either free or adhering to the capsule, their removal by irrigation by a sufficiently free employment of a warm salt solution is preferable to the introduction of a spoon or considerable rough manipulation for its extrusion. Secondary capsulotomies are almost without exception required in these cases. If inflammatory reaction follow without evidence of infection, the great liability to local manifestations in those of rheumatic or gouty diathesis should be borne in mind as indicating the general therapeutic measures to be adopted. The value of salicylic acid in these cases I have many times seen demonstrated.

FLEMING CARROW, Detroit: Yes, in persons of any age when reduction in vision prevents transaction of ordinary business. Do the combined operation in nearly every case. I always irrigate with a device of my own, using saturated solution of boric acid, whenever any lens substance is left in the anterior chamber. I do not use dionin. Results as satisfactory and vision secured is as good as in extraction of mature cataract. About 50 per cent. of the cases require a dissection of secondary cataract, and the same percentage of cases have postoperative inflammation. I do not object in the least to extraction of immature cataract under conditions mentioned. I am forced to express the opinion that any method of irrigating the anterior chamber after cataract extraction is productive of iritis unless used in the most delicate manner. This I state with great positiveness; but with a lot of lens debris left in the anterior chamber which can not be removed by spoon, stroking the cornea or any other manipulation, irrigation seems the best procedure for accomplishing the desired result. This applies to cases of hypermature cataract as well as those which are immature. I know that I am stating it properly when I say that the results are just as good if the senile cataract is removed while the patient is still able to read Jaeger No. 14 or Snellen 20/200. A man with this vision is practically put out of business, and there is no use waiting. This is not stated on the experience of ten or twenty cases, but on hundreds. I not only operate on these cases now and then, but it is my rule. I have operated on fourteen cases recently, eleven of which were immature, and the results were better in the immature cases than in the three which were mature. I do, however, expect a little postoperative iritis, which is probably due to irrigation of the anterior chamber. This, however, does not interfere with good results if atropin is early and persistently used.

M. H. POST, St. Louis: Yes, in persons of any age when cataracts reduce vision so that magazine type can not be read. Combined operation preferred. I do not irrigate the anterior chamber, and have not tried dionin. Ultimate results as good as in extraction of mature cataract. In my experience secondary cataracts are no more frequent than in mature cases, though there is possibly a little more inflammatory reaction. No objections to the operation if state of vision warrants interference.

J. M. RAY, Louisville: Yes. Age not considered if patient is in good general health. Would operate as soon as the patient is unable to follow vocation. Combined operation performed, but sometimes a preliminary iridectomy. Irrigation with normal saline solution when necessary for the removal of soft lens substance. Dionin not used in this class of cases. No greater reaction than in mature. No difficulties beyond leaving too much soft lens substance in the anterior chamber which takes a long time to absorb, but which does absorb without trouble in time. Prefer to have an opaque lens, but have no great objection, in suitable cases, to removal of a semitransparent lens.

ALVIN A. HERBELL, Buffalo: Yes, in persons over 55, with vision in eye to be operated on 10/60 and vision in fellow eye nearly as poor. Usually perform preliminary iridectomy, followed by extraction later. Employ irrigation when there is much soft cortex. Using sterile normal salt solution and Lippincott irrigator. Do not use dionin. Results much the same as in mature cases with vision good in fellow eye never operate on the cataract. Prefer more frequent, and a little more reaction in a small proportion of cases. No particular objection to the practice. There is a little more danger of iritis.

G. C. SAVAGE, Nashville: Yes, and regardless of age, other conditions being favorable, when vision is too low to be useful. When vision good in fellow eye never operate on the cataract. Prefer combined operation. I never irrigate and I never use dionin in this class of cases. Results just as good as in mature cases with vision from 20/50 to 20/20, greater number about 20/30 finally. In nearly all cases I do a secondary operation in from one to twelve months. Only occasionally is there any reaction. Have lost only one eye from secondary operation. Have no objection whatever to practice of extraction of immature cataract.

J. H. CLAIRBORNE, New York City: Yes, age not considered, provided patient in good condition. Vision in eye to be operated on, fingers at 1 foot to 20 feet. Vision in other eye not useful. Combined operation performed. As a rule, do not use irrigation, but when employed use boric acid or normal saline. Do not use dionin. Results not quite so good as in mature cases. Useful vision, but not so good as in mature cases. Secondary cataracts in nearly all cases, but no more reaction than usual in any extraction. More difficulty in removal of the cortex that remains. Prefer to wait unless the patient is impatient or the conditions of his life demand extraction. Best results are obtained in sclerosed immature cataracts.

C. A. VREASEY, Philadelphia: Yes, in persons over 55 years of age approximately, if patient is in good health, and when vision of eye to be operated is reduced so as to make it difficult for patient to get around, and there is advancing opacity of lens in fellow eye. Combined operation performed. If one eye has been lost, always a preliminary iridectomy. I seldom irrigate; if I do I use normal saline solution. Had little experience with dionin, but in three cases it certainly seemed to assist. Results as good as in mature cases, with equally good vision. A large percentage of my cases required dissection of capsule, but so do mature cases. Postoperative inflammation not frequent if lens matter is removed by gentle manipulation. Practically no more difficulties attending extraction than in mature cases, providing cortex is removed by stroking cornea through closed lid or in rare cases removed by irrigation. Have no objections to operation. Have been doing it for ten years.

H. F. HANSELL, Philadelphia: Yes, in patients 55 and over who have lost vision in both eyes for pleasure and business. The order

of preference in the form of operation to be performed is: First, preliminary iridectomy, with extraction later; second, extraction with the combined operation; and third, simple extraction. Various circumstances and conditions guide me in the selection of the operation. Irrigation when employed is with normal salt solution. Dionin is not used. Generally speaking, the results in extracting immature senile cataracts have been equally as good in every respect as the results in extraction of mature senile cataracts. Secondary cataracts requiring operation are present in perhaps 90 to 95 per cent. of the cases. There is also a greater tendency to iritis unless preliminary iridectomy has been done. The difficulties in extracting an immature cataract are those concerned in the removal of all of the lens. I have no objection to the extraction of immature senile cataracts if loss of vision warrants the operation.

WÜRDENANN & BLACK, Milwaukee: Yes, in patients over 45 whose vision in both eyes is below 6/60. Preliminary iridectomy and secondary extraction is preferred, and the anterior chamber is irrigated with normal salt solution. Dionin to promote absorption of debris is used in powder form. Results as satisfactory as in the extraction of mature cataracts. About 50 per cent. of our cases require secondary operations, and about the same number exhibit inflammatory reaction. Extraction of immature lenses usually requires larger corneal incision, and it is more difficult to complete the toilet properly. There is also a seeming greater predisposition to glaucoma following these operations. We have no objection to the extraction of immature cataracts when the vision is reduced as stated.

J. E. COLBURN, Chicago: Yes, in patients over 60 with vision reduced below the patient's needs in both eyes. Have operated successfully at 48, 51 and 54. The form of operation to be performed depends on conditions presented. Sometimes preliminary iridectomy, sometimes the combined operation, and occasionally simple extraction. Irrigation of the anterior chamber is not employed, but dionin has been used in some of the later cases. The results in the extraction of immature cataracts have been as good as in the mature cataracts, other conditions being the same. Secondary cataracts are frequent, though inflammatory reaction from the operation is no more frequent than in the mature cases. No particular difficulties have been encountered, but it is important that the opening in the capsule be carefully and freely made. I have no objections to the operation other than those that would hold in any other form of extraction at any time.

J. T. CARPENTER, Philadelphia: Yes, in persons past 50 years of age, whose vision in both eyes has been reduced so as to interfere with vocation. Preliminary iridectomy is always performed, usually with trituration of the lens. Irrigation never used except such as occurs with the use of the ordinary dropper and normal saline solution. Believe that dionin is useful in promoting absorption of the debris. Results are rather less favorable in extraction of immature cataracts than in the mature. Operations for secondary cataracts are almost invariably necessary, while iritis is much more frequent than in the mature cases. The difficulties encountered in the operation are the failure to get rid of the transparent sticky cortex. Objections to the operation are that there are greater difficulties connected with the operation, and a greater risk of inflammatory sequelae. These, however, should not deter one from operating when vision has become so poor as to prevent the patient from getting around easily.

J. L. THOMPSON, Indianapolis: I do not like to operate on immature cataract if I can possibly put the patient off, but have been compelled to do so in a number of cases on account of the impatience of many of my patients who have become tired of waiting from year to year. In the cases of nuclear cataract in elderly persons, I extract without an iridectomy if the pupil dilates nicely, but in those which do not, I make a small iridectomy. I find that I can press out more of the cortical substance when an iridectomy is made than I can in simple extraction. The pupils look clear immediately after the operation, and moderately so at the first dressing, but soon begin to look hazy, and in most instances months elapse before the pupil clears up. I never now resort to any ripening process except in complicated and doubtful ones, when I make a preliminary iridectomy at least two months beforehand. In these cases the lens generally ripens of itself in a very few weeks without any further interference. Occasionally in these cases I have seen an acuity of vision of 20/20, but that is rare, even though a beautiful clear central pupil was obtained. My experience teaches me that a preliminary iridectomy is the safest of all procedures for ripening the lens, even though the capsule has not been touched. I used to irrigate the anterior chamber, but have abandoned the practice, as I did not find much benefit therefrom. I have had no experience with dionin. I have not found inflammatory reaction after the extraction of immature cataracts more than in cases of ripe cataract. The only objection I have found to operations of this kind is the great length of time it takes for the eye to clear up. I have had cases last nine months, supposing that the operation on the capsule would have to be made, but as the patient could see to go about with the other eye I put the operation off from time to time, dreading as I do secondary operations after extraction, when to my surprise the patient would later come in smiling and with the exclamation "I can see," and on examination I have found a perfectly clear pupil.

A. R. BAKER, Cleveland: Yes, in those of any age when useful vision in both eyes has been lost, and the operation is not otherwise contraindicated. Preliminary iridectomy is always preferred. Neither irrigation nor dionin have been used. Results have been almost as good as in mature cases, but secondary operations are more frequent. Inflammatory reaction is no greater than in the mature cases. No special difficulties have been encountered, and I have no objection to the operation.

ROBERT SATTLER, Cincinnati: I make it a rule from which I rarely deviate not to extract immature cataract so long as the fellow eye has a fair degree of vision. I do not hesitate, however, if the fellow eye is defective, and there is an advance of the amblyopia, to do the operation with a preliminary iridectomy. Irrigation is not used, and I have had no experience with dionin. As compared to extraction of mature cataracts, the results are equally favorable, though ultimate good vision requires dissection of secondary cataracts. I have no objection to the operation if the other eye is lost and functional examination and health of patient offers no contraindications.

EUGENE SMITH, Detroit: Yes, in persons 65 and upward whose vision in the eye to be operated has been reduced to counting of fingers, and vision in the fellow eye is useless or rapidly becoming so. The combined operation is preferred, though in suitable cases

the simple operation is performed. Irrigation is not practiced, and experience in the use of dionin is too limited to pass an opinion as to its efficacy. Results as compared to mature cases are about the same, though secondary cataracts requiring operation are more frequent, as also inflammatory reaction from the operation. Some cortex usually remains, but this is usually absorbed in the course of time. I have no objection to extraction of immature lenses in suitable cases.

OSCAR DODD, Chicago: Yes, in persons of any age when the vision in both eyes gets so low that business is interfered with. Preliminary iridectomy is preferred, but in many the combined operation is performed. Occasionally in selected cases simple extraction is done. Irrigation of the anterior chamber is not practiced, and while dionin has been used, its effects in my practice have been questionable. Results as compared to mature cataracts are equally good, though secondary cataract requiring operation is more frequent, and inflammatory reaction is also usually greater. Operation in these cases is more difficult, because it is hard to remove all of the soft cortex. I have no particular objections to the operation, but expect a longer time in obtaining satisfactory results.

CHARLES W. KOLLOCK, Charleston, S. C.: Yes, in patients of any age in whom vision in both eyes has been sufficiently impaired so as to prevent going about, attention to business, or to seriously affect the nervous system. Preliminary iridectomy and extraction later is preferred, but the form of operation selected is the one that in each individual case seems best for obtaining good results. Irrigation of the anterior chamber is not practiced. Have had no experience with dionin. Results as compared to extraction of mature cataracts are satisfactory. Secondary cataracts requiring operation are not more frequent in my experience, though inflammatory reaction is probably a little greater. I have no particular objection to the operation.

MARK D. STEVENSON, Akron, Ohio: Yes, in patients of any age, and particularly those over 55 when there is need of the operation to restore useful vision. In those over 55 the vision in each eye should be reduced below 6/60. The combined operation is preferred, although occasionally a preliminary iridectomy is done. Irrigation of the anterior chamber is seldom practiced, but if so sterile water or physiologic salt solutions are employed. Have had no experience in the use of dionin. Results have been just as good as in extraction of mature cataracts, though secondary cataracts requiring operation are more frequent, and inflammatory reaction from the operation somewhat greater. The difficulties encountered are those concerned in the removal of the lens in its entirety. My objection to the operation is that secondary cataracts are more frequent, with attending risks of the secondary operations. I advocate the operation in those in whom the vision of both eyes is poor. If the vision of the other eye is good I do not operate unless the cataract has remained in the same state of maturity for a long time, and there is special reason for doing the operation.

C. D. WESCOTT, Chicago: Yes, in persons over 60, and have even operated on persons but little over 50 when vision in the eye to be operated on is no longer useful and vision in the fellow eye is failing rapidly. Preliminary iridectomy and extraction later is practiced in all cases of immature cataract. Irrigation is not employed, and two experiences with dionin have given doubtful results. As compared to extraction of mature cataract, results have been equally good, though dissection has to be performed a little more frequently, and inflammatory reaction is also a little more frequent. I have no objection to the operation if the patient's necessities make it desirable.

F. T. ROGERS, Providence, R. I.: Yes, in patients of any age if the general health is good, and when the vision in both eyes is so poor that the person can not go about easily or safely. Preliminary iridectomy is preferred and irrigation with normal saline solution is employed when indicated. Have had no experience with dionin. Results are quite as good as in the extraction of mature cataracts, though secondary operations are more frequent, as also inflammatory reaction. The difficulties encountered are those concerned in the removal of the soft lens material. Do not object to extraction of immature senile cataracts under conditions named.

GEORGE F. SUKER, Chicago: Yes, in persons beyond 50 who count fingers faintly at 4 feet with the eye to be operated, and have about the same vision or a trifle better in the fellow eye. Preliminary iridectomy is preferred, though other forms of operation are sometimes selected, depending on circumstances. Irrigation of the anterior chamber with normal saline solution is employed, as also the use of dionin to promote absorption of debris. Results are as good as in extraction of mature cataract, though there is a greater tendency to the development of secondary cataract, and a tendency to greater inflammatory reaction, though this is not to be feared. The soft cortex is somewhat more difficult to remove. From a purely surgical standpoint I have no objection to the operation; it all depends on whether the patient is willing to wait for maturity or not, or on the time it takes the cataract to mature, even though the patient be willing to wait. Social environment is also a determining factor.

E. A. SHUMWAY, Philadelphia: I prefer to wait until the cataract is mature unless social conditions are such as to make speedy restoration of vision a prime necessity. In such cases preliminary iridectomy is of great importance. Where much cortex remains, irrigation of the anterior chamber with boric acid solution should be used, with the precaution, especially in case of deeply set eyes, that the wound does not remain submerged in the fluid, as it collects in the conjunctival cul-de-sac. I have seen one case at least in which I thought infection took place in this way. I believe that dionin has a very decided influence in the absorption of lens debris, just as in the absorption of exudates, and that its action depends largely on the local reaction which it produces.

W. A. FISHER, Chicago: Yes, in patients of any age when the vision in both eyes is too poor for ordinary pursuits. The simple operation is invariably performed. Irrigation is not employed, and experience in the use of dionin for the resorption of lens debris has been limited. Results are just as good as in extraction of mature cataract, though secondary operations are slightly more frequent, as also inflammatory reaction. No particular difficulties have been encountered, and I have no objection to the operation.

WENDELL REBER, Philadelphia: Yes, in patients over 50 who have less than 5/25 vision in each eye. Preliminary iridectomy is invariably performed. Irrigation of the anterior chamber is not employed. The use of 10 per cent. solution of dionin is invariably a rule. As compared to mature cases, my results show a trifling

advantage in favor of the mature cases. Secondary cataracts are probably a little more frequent, and low iritis is the rule in almost all cases after extraction of immature cataracts. The presence of large quantities of cortex after the removal of the nucleus forms the element of difficulty in the operation. I have no objection to the extraction of immature senile cataracts that would not apply to any other cataracts.

E. C. ELLETT, Memphis, Tenn.: I am much in favor of operating on unripe cataracts in one-eyed people, and people with double cataract when the vision of the best eye is so reduced as to interfere with safe locomotion and keeping the patient from working generally. I always do the combined operation in all cases, and in immature cataracts, if there is no objection to operating twice, I prefer to do a preliminary iridectomy. I do not find vision much of a guide as to maturity, as some eyes with a small central opacity see very little, while others with considerable peripheral opacities see very well. I operate when the patient is seriously inconvenienced by the cataract, no matter what the age. I irrigate the anterior chamber with normal salt solution, and by the practice have usually succeeded in removing practically all the cortex, thus making it unnecessary to use diionin. I have never had any trouble arising from the extraction of immature cataracts, and unhesitatingly recommend the practice. My views on this subject have already been briefly stated in an editorial which appeared in the *Ophthalmic Record* about one year ago.

PETER A. CALLAN, New York City: Yes, in persons over 40 whose vision in the eye to be operated on has been reduced below 20/70, and whose vision in the fellow eye is reduced to 20/40. Preliminary iridectomy and extraction later is invariably preferred. Irrigation of the anterior chamber with normal salt solution is performed when indicated, and diionin to promote resorption of debris is employed two weeks after the operation. Results have been as good as in the extraction of mature cataracts, though it is longer until the eye is free from irritation. Secondary cataracts are more frequent. I have no hesitation in operating on any immature lens, providing the needs of the patient require interference.

ALLEN GREENWOOD, Boston: Yes, in persons of any age when the vision in both eyes has been so reduced that coarse print can not be easily read. The combined operation is preferred, though the simple is preferred in suitable cases. Irrigation with normal salt solution is practiced, but I have had no experience in the use of diionin. Results have been equally as good as in extraction of mature cataracts, though secondary operations were required in about 50 per cent. of the cases. There is usually somewhat more inflammatory reaction, probably due to irrigation, but this promptly subsides under proper treatment. I have no objection to the operation in suitable cases.

MELVILLE BLACK, Denver: Yes, in those cases in which the progress of the lenticular opacity in each eye is such as to cause lowering of vision beyond the useful point. If the patient has no occupation and is much inconvenienced by not being able to read, I should consider operation warranted. If a man with an occupation is no longer able to follow it because of poor vision, then his condition would warrant operation. I do not believe we are justified in requiring old people to wait for cataracts to mature if the opacification is advancing equally in each eye, because such persons may have wasted the only remaining months or years in which they might have been able to enjoy the fruits of vision obtained by operation. I prefer the simple operation, and employ irrigation of the anterior chamber with physiologic salt solution. Diionin is used a few days after the extraction to promote resorption of the debris. Results have been as good as in the extraction of mature cataracts, with about the same number of secondary cataracts requiring dissection. Have not had inflammatory reaction, as a rule.

C. J. KIPP, Newark, N. J.: Yes, but not from choice, in persons of any age who as a result of lowered vision are unable to pursue occupation. The combined operation is generally preferred, though preliminary iridectomy is occasionally performed. Irrigation is not practiced and diionin has not been used. Results have been less satisfactory than in the extraction of mature cataracts, for secondary cataracts requiring operation are nearly always to be expected, and the imperfect results as to vision form a decided objection to the practice.

J. S. KIRKENDALL, Ithaca, N. Y.: Yes, in those persons whose vision has been so seriously reduced as to inconvenience them in ordinary pursuits. The combined operation is performed, with large corneal section. Irrigation is not employed, and I have had no experience in the use of diionin. In all my cases of immature senile cataract I have had good results. Have had no inflammatory reaction of any consequence, but have always been obliged to do a dissection. I do not hesitate to remove an immature cataract, all things being equal, but I prefer a mature cataract if patient will wait.

H. B. YOUNG, Burlington, Iowa: Yes, in persons whose vision has been reduced so that it is difficult to get about safely. The simple operation is preferred, but combined operation sometimes accepted, depending on the nature of the case. Irrigation with physiologic salt solution is employed, but have had no experience in the use of diionin. Ultimate results compare favorably with results secured in mature cataracts. Dissections are generally required, for I prefer peripheric capsulotomy. The inflammatory reaction is no more serious than in the extraction of immature senile cataracts if conditions are otherwise good.

L. D. BROSE, Evansville, Ind.: Yes, in persons of any age when the vision in both eyes is insufficient for the patient's needs. Preliminary iridectomy is preferred, otherwise the combined operation. Irrigation is not employed, and experience with diionin is limited. Results have not been quite as satisfactory as in the extraction of mature cataracts. Secondary operations are more often required, and inflammatory reaction is more frequently encountered. The objections are that such operations not infrequently require a secondary cataract operation; are more liable to be followed by inflammatory reaction, and hence apt to have a more prolonged recovery period; and the shallow anterior chamber requires greater care in making corneal sections.

CHARLES S. BULL, New York City: Sometimes operate immature cataracts in patients over 40 years of age in whom the vision of the eye to be operated on has been reduced two-thirds or more, and vision in the fellow eye lost or practically so. Preliminary iridectomy and extraction later is preferred, and irrigation with normal salt solution is employed. Diionin is not used. Results are not quite as satisfactory as in mature cases, owing to less acute vision. Secondary cataracts develop in about 40 per cent. of the

cases, though inflammatory reaction has seldom occurred. In these extractions the difficulties are in removing all of the soft lens matter, and the manipulations increase the danger of loss of vitreous. I never extract an immature senile cataract except to help the patient's physical or mental condition, as, for instance, when the other eye is blind or useless.

HAROLD GIFFORD, Omaha: I extract immature senile cataracts only when I have to do it, i. e., when the patient needs sight and the cataract fails to mature after dissection of the capsule. Age is not regarded. If the vision of the best eye gets so poor as to make life a burden, I urge a preliminary iridectomy, and in from two to eight weeks make a dissection of the capsule, followed by extraction in from two to ten days. I seldom irrigate, but believe it worth while in some cases. I have not used diionin in this class of cases, but believe the indication is clear and shall try it. Results as compared to the extraction of mature cataract are not quite so good, as the vision is less acute, development of secondary cataract requiring operation, as also inflammatory reaction after the operation, are more common. My objection to the operation is the difficulty of expelling the cortex, or at least telling when all of the cortex has been expelled; hence the uncertainty as to when attempt at expulsion should cease. The cortex remaining favors infection and secondary cataract.

LUCIEN HOWE, Buffalo: I very seldom extract immature senile cataracts, as the risk is usually unnecessary, and the results from any standpoint are not very satisfactory. When I do operate on these cases I prefer preliminary iridectomy when possible to get consent for it, with irrigation with 1 to 10,000 sublimate solution if indicated. Diionin is not used. The development of secondary cataract and inflammatory reaction from the swelling of the clear lens fibers are sequelae which form a contraindication to the operation.

MYLES STANDISH, Boston: I have had comparatively little experience in extracting immature senile cataracts, as I never operate under such conditions unless the case imperatively demands it.

GEORGE C. HARLAN, Philadelphia: I do not operate on immature senile cataracts by choice, as in these cases there is an increased liability to the development of secondary cataract, inflammatory reaction from the operation, and occlusion of the pupil. I am more inclined to do the operation in those of advanced age in whom the vision in both eyes has been reduced so that the individual is unable to read. In these cases preliminary iridectomy is preferred. Have had but little experience with irrigation, but consider physiologic salt solution the best for the purpose. Have had no experience with diionin. General results as compared to the extraction of mature cataracts are not as good.

CHARLES A. OLIVER, Philadelphia: No, for the reason that the final results are nearly always sooner or later more or less bad. In a very limited number of cases, for peculiar sociologic reasons, I sometimes operate these cases at any age, when the vision in the eye to be operated on has been reduced to finger counting, and in the fellow eye has been practically lost. In these cases combined operation is usually performed, though occasionally preliminary iridectomy followed by extraction. Irrigation, with normal salt solution through a McKeown irrigator is employed, as also the use of diionin to promote resorption of lens debris. These extractions are nearly always followed by the development of secondary cataract requiring operation, as also inflammatory reaction from the operation. The permanent ultimate vision is always better after the extraction of mature cataract.

L. WEBSTER FOX, Philadelphia: No, I do not extract immature senile cataracts, for I do not believe in taking the risk of serious secondary complications which nearly always take place and render the ultimate results unfavorable.

D. E. WELCH, Grand Rapids, Mich.: No, as there is a greater liability for secondary conditions necessitating operative work and the ultimate results are poor.

S. C. AYERS, Cincinnati: I do not extract immature cataracts if I know it. In cases where the lenses are both about equal I triturate and then extract. In cases where I have extracted lenses slightly immature I have had trouble with the cortex. I avoid this either by waiting or by trituration one of the affected eyes.

GEORGE H. KEIFER, Lafayette, Ind.: Have had no experience in the extraction of immature cataracts.

DISCUSSION.

PROF. J. HIRSCHBERG, Berlin, said that uveitis, a complication of cataract not mentioned by Dr. Bulson, is very difficult to diagnose, not only in the affected eye, but in the other as well. The views regarding operation on unripe cataract, Professor Hirschberg stated, are poetical but wrong. Physicians are told that the mature cataract is like a pea in a pod, and that when opened it pops out entire, but Professor Hirschberg's experience is that some of the cortex will remain. In unripe cataract he always advises a large opening. If the patient is more than 50 years of age cataract comes out easily. In lamellar cataract in individuals of 30 or 40 he operates without any preparation.

DR. S. D. RISLEY, Philadelphia, asked Professor Hirschberg if he would consider it justifiable to operate on a ripe cataract, traumatic or otherwise, with the other eye good, if the patient had to work among machinery, for example, where his life might be endangered because of the blind side, to which Professor Hirschberg replied in the affirmative.

DR. J. A. BACH, Milwaukee, stated that in his experience in unripe cataracts the removal of the anterior capsule is much to be preferred to the simple tearing or large section. With a good capsular forceps it is a simple matter to remove most of the anterior capsule, and by so doing we are assured of a cleaner result than can be obtained by simple section. The curling up of the anterior capsule is not always so ideal as

one could wish, and then again, lens substance often adheres with great tenacity to these curled up portions of the capsule. A gentle washing out of the anterior chamber after removal of the lens is often of great advantage and dislodges particles that otherwise would remain.

DR. WILLIAM CAMPBELL POSEY, Philadelphia, declared that ever since he has had patients to operate on he has followed Dr. Hirschberg's teachings and removed cataracts as soon as the vision in the good eye fell so low that the patient could not perform the ordinary duties of life, for he could not convince himself from what he had seen in his practice and in that of others, that it was desirable to wait until the lens had become thoroughly ripe before attempting its removal. His results have been equally as good in the removal of immature cataracts as in the removal of mature ones; indeed, he believes that if by waiting until the lens is thoroughly ripe, the cortical substance is more apt to adhere to the capsule and to occasion secondary cataracts and iritis than when the operation is performed in the immature stage. The corneal section must be large and iridectomy should be performed.

DR. EUGENE SMITH, Detroit, said in regard to operating on immature cataracts that he believes that there is altogether too much fear on the part of the operators derived from textbook teaching. When the exigencies of the case require it, there is no more objection to operating on a cataract three-fourths ripe than on one fully ripe, and not as much on those overripe. He has been in the habit for years of doing it. The question of removal of the capsule, he said, is interesting, because he always removes the anterior capsule, and for fifteen years he has advocated that procedure. There is less danger from cortical matter and better chance for absorption when the anterior capsule is removed.

DR. C. R. HOLMES, Cincinnati, substantiated what has been said with regard to removal of unripe cataracts. It has been his practice for twelve to thirteen years to remove cataracts when the exigencies of the case demanded it, even if they were only one-half ripe. He has yet to find a single case where he regrets having operated on a partially ripe cataract.

DR. ALBERT E. BULSON, JR., declared his regret that he did not have time to complete the reading of his paper, so that the part dealing with the technic of the operation, including irrigation of the anterior chamber, use of dionin, etc., could enter into the discussion by members of the Section. There is a difference of opinion as to the advisability of operating for immature senile cataract, and the manner in which the operation shall be performed when indicated. Generally speaking, the majority of the ophthalmologists whose opinions were solicited, do not hesitate to operate in these cases, and they report satisfactory results. A few prominent ophthalmologists refuse to operate for immature cataract of any description. Dr. Bulson agreed with Professor Hirschberg that it is difficult to recognize mild uveal disturbance when the lens is clouded sufficiently to make an ophthalmoscopic examination unsatisfactory, and for that reason some poor results are due to the existence of mild pre-existing intraocular disturbances rather than to any ill effects directly associated with the operative procedures. Dr. Bulson confessed that he has learned to expect a certain amount of iritis following the extraction of immature cataract. The inflammatory reaction is undoubtedly due to trauma, more especially that accompanying irrigation of the anterior chamber, but with early and continued use of atropin and dionin he has not had any difficulty in controlling the inflammation. He considers dionin a valuable remedy in the postoperative treatment of cataracts. While the effect of the drug is questionable in some cases, in the majority it has a remarkable effect in promoting resorption of the cortical remains, thus reducing the possibility of necessity of secondary operations.

Educate.—All government by the people is made better when the people come to know and feel its deficiencies. No abuse can survive long when the people have located it. When the masses know what hurts them, that particular wrong must cease.—David Starr Jordan.

A PRELIMINARY REPORT ON CELLS FOUND IN YELLOW FEVER BLOOD, WITH REFERENCE TO THEIR ETIOLOGIC AND DIAGNOSTIC SIGNIFICANCE.

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NEW ORLEANS.

A careful study of yellow fever blood has shown the regular occurrence of certain cells hitherto either unnoticed or not described, which seem to be undergoing developmental changes and which can be demonstrated in the stomach of a recently infected-stegomyia. These cells are entirely extracellular, though occasionally some are seen lying on the red cells; on one occasion one was distinctly seen lying within the protoplasm of a polymorpho-neutrophilic leucocyte. They occur, as a rule, alone, though two or more may sometimes be noticed lying indefinitely grouped. They vary in size from twice the diameter of a pneumococcus to one-fourth the diameter of a red cell, and vary in shape from an ovoid to a sphere, and oft times come to a focus in a higher plane than the surrounding red cells. When stained they show, as a class, a highly granular neutrophilic protoplasm surrounding a nucleus which contains one or more deeply staining chromatin granules; the proto-

Fig. 1.—Type A, young form, surrounded by a pseudocapsule (1,300 diameters).

plasm is limited by a capsule which is of considerable thickness in the older forms.

The following forms, with minor variations, have been observed:

A. Small, deeply staining neutrophilic bodies about twice the diameter of a pneumococcus and often lying in pairs; sometimes fine chromatin granules can be made out within these; again none can be seen. This form is found chiefly and in greater abundance within the first twelve hours of the disease, and is difficult to detect, as they can be easily confused with various artifacts (Fig. 1).

B. An ovoid or pear-shaped form, with a diameter about one-sixth to one-fourth the diameter of a red cell and a width of about one-third its own length. This has a well-marked nucleus, containing chromatin granules and a narrow rim of neutrophilic protoplasm. This form has been seen in what is taken to be a budding process; again it has been seen in dumb-bell form (Figs. 2 and 3).

C. This has been found in blood taken at any time in the first three days. This form is circular or sphere-shaped and approaches in size that of a microcyte; it