tained, osmotic pressure of a body fluid be subnormal to a certain degree, and if the deficiency is to be corrected by sodium chlorid, exactly the amounts of sodium chlorid necessary for the correction of the osmotic pressure are to be injected. Too little of the sodium chlorid may not effect any material alteration of the condition, too much of this salt may be followed by untoward phenomena.

The performance of cryoscopy is indispensable, when equilibrants of this category are to be employed. By its aid we are enabled to determine the osmotic alteration of the body fluid, the osmotherapeutic correction for its restoration, and the specific equilibrizing value of every osmotherapeutic agent.

The specific equilibrizing value of an equilibrant consists in the faculty of modifying a pathologic condition or a symptom by means of its purely physical properties, as molecular weight, dissociation and concentration.

In case two or more equilibrants are used in combination or alternately the osmotic partial pressure of each has to be taken into consideration.⁸ According to Zikel² the concentrations of two specific injection-osmo remedies must be like the products from their molecular weights and the mutual dissociating coefficients.

Besides, the influence exerted by these equilibrants on the osmotic conditions *per se*, their dissociated parts, the ions, which are the conductors of electricity, may alter the electrical conditions in the organism. While there is no doubt that the mediate and individual action of the ions is of a chemical nature, their ability to conduct electricity is a purely physical property. The ions are conductors of ectogenous as well as of endogenous currents of electricity. Their ability to conduct the intrasystemically generated electricity stamps them as one of the most potent factors in the vital processes. It is evident that, if ionization is deficient, or if the electrolytes are interfered with by non-conductors,⁹ the electrical conductivity of the body fluids, as I have shown elsewhere, will be diminished or entirely suspended. Among the equilibrants, hypotonic salt-solutions (or water) are often the most important, as first pointed out by me.¹⁰

Among the equilibrants with combined action, distilled water, under certain conditions, stands at the first place. In cases of hypochlorhydria, on the basis of chronic gastric catarrh, occurring together with renal insufficiency, for instance, distilled water acts primarily as an irritant, casting off the degenerated epithelium and establishing a more normal state of partly permeability of the gastric membrane. Subsequently, when lodged in the intestines, it exhibits its other equilibrizing qualities by withdrawing salts from the organism, by diminishing molecular concentration of the serum and by permitting or effecting increased ionization.

Osmotherapy is as yet in its very infancy. Of its rationale—if the premises, the theories of osmosis and dissociation be well founded—there is not the shadow of a doubt. But how well are these conceptions founded? Do we not conceive of Nature and her forces a little differently every few years? Will these conceptions en-

sure sufficiently long to impress their mark on all the branches of medicine, as the bacteria have done?

I have briefly sketched the relation of osmology to pharmacodynamics in the light in which I see it. The picture, I know, is incomplete, and, perhaps, too tersely drawn in some respects. Succinctness, however, was compulsory on this occasion.

SOME PROBLEMS OF PRESBYOPIA.*

GEORGE M. GOULD, M.D.,

PHILADELPHIA.

When I began practice I did as I had been taught regarding the correction of presbyopia. Text-books, teachers, and general custom agreed that presbyopia began sometime after forty, and that no mydriatic was needed in such patients. There was a rough rule wandering about that plus spherical lenses of one diopter were needed in forty-five-year-old patients, twos at fifty, threes at sixty. This was about the time of the "Punch, Brother, Punch with care, a blue slip ticket for a five-cent fare, etc." Actual dealing with presbyopic patients soon brought me up sharp. Rules like those of the street car conductors would not work out in the oculist's office. If any rules at all were admissible they had to be of a different kind from those of the text-books; in some ways far more definite, in others more indefinite. Some of these cautions I have brought to clearness are as follows:

1. In oncoming and progressive presbyopia, cycloplegia is generally necessary to obtain the static refraction on which the presbyopic correction is based.

Precisely in eyes whose accommodation powers is being narrowed and lessened is the mydriatic most needed in order that eyestrain may not be increased by the close limits in which function is being compressed. When there is youth and a high range of accommodation the refractive error may not produce the injury taking place in the presbyopic. This is a truth so self-evident that it is astonishing to find it utterly ignored in Europe and too commonly ignored in our country.

The slightest misplacing of the axis of astigmatism, the failure to get the accurate amount of the error of refraction, the least imprecision in correcting the slight anisometropia, insure more trouble in the presbyopically lamed eyes than in others with plasticity and with activity of neutralizing or compensating powers. If there are symptoms of eyestrain, and especially if accompanied with any doubts in my mind as to accuracy, I do not hesitate to use a mydriatic up to the ages of fifty-five or sixty. I think almost all patients up to fifty should have it. I mean homatropin and cocain, and instilled in the office.

Discrimination as to those with latent or manifest glaucous tendencies is, of course, demanded. The individual expertness of the oculist must also be considered. The art of refraction requires a skill, a judgment and a delicacy of perception, as great and rare as in any other calling, greater, I believe, than in surgical or inflammatory conditions. A highly exceptional mastery of the art may succeed in estimating the error of refraction without a mydriatic when others would fail. None may safely lay claim to such ability. None, at least, may safely trust himself in its habitual employment. Easy going assumption of it is another phasing

8. Osmotic partial pressure is the osmotic pressure of an individual dissolved substance in a solution of mixed substances. The osmotic pressure of a dissolved substance mixture is equal to the sum of the partial pressures of the individual substances.

9. Stern: A Contribution to the Pathogenesis of the Uremic State; the Probability of Its Physico-Electric Substratum, Med. Rec., Jan. 24, 1903.

10. Some Points Pertaining to the Therapeutic Management of the Uremic State, Amer. Med., May 2, 1903; Trans. of the Med. Soc. of the State of New York, 1903.

* Read in the Section on Ophthalmology of the American Medical Association, at the Fifty-fifth Annual Session, June, 1904.

of the characteristics which have duped us since proverbs and folk-tales and the ophthalmometter were invented.

2. The age at which presbyopic correction should first be given depends on the pre-existing refractive error.

The old rules as to forty-five, etc., are nonsense. If the patient has two diopters of hyperopia, the presbyopic correction will be needed much earlier than if he is emmetropic. If he has myopia, the necessity will arise later, as is well understood. But astigmatism creates a greater indefiniteness, and especially if it is unequal, or if unsymmetric. Anisometropia further complicates all rules and makes them still more indefinite. The onset of troublesome presbyopia also depends on whether the ametropia has been corrected or not for years previous.

3. The correction of the presbyopic error of one or both eyes is often dependent on the existence in one eye of amblyopia from disuse.

This exclusion of one eye from function always brings most difficult problems. If of high degree and of long standing it may not be possible to get reaction or to stimulate the lost power into function. As a rule I believe in saving partially ruined eyes, and it is possible to do so more often than has been supposed. Such eyes exist far more frequently than text books and teachers tell us about. In some rare cases at the presbyopic age the attempt to save the eye and bring it into function is not only possible, but will produce most decided rebellion on the part of eye and brain. These "hurt eyes," with stippled maculas which let you stare at them, and which so plainly show neglect and sin, both lay and medical, are daily visitors to the oculist's office, and they make his hair gray sooner than should be.

4. Less accommodation in one eye than in the other may condition the amount of the presbyopic correction.

This inequality of function may be the result of anisometropia, of right-eyedness or left-eyedness, of a peculiarity of occupation, of monocular disease or injury, of heterophoria, etc. It is of more frequency than is suspected, and causes much ill-success in the correction of presbyopia.

5. The onset of presbyopia demanding correction may be delayed beyond the usual age by hypertrophied accommodation.

This abnormalism of excessive accommodation is the result of lack of presbyopic lenses, with the resultant over-function of the ciliary muscle and abnormally retained elasticity of the lens. Excessive use of any organ, or abnormally prolonged use, produces disease. That of the accommodation in presbyopia causes eyestrain and all of its reflexes. The eye itself or the organs which bear the brunt of the derouted reflexes must suffer. I have heard of one oculist who attempted for many years to postpone presbyopia requiring correction into old age. That is a human vivisection experiment that would be somewhat interesting to science, but which I should be far from wishing to try in my own case. We see daily the injury and the suffering it causes in old people who indulge in the puerile vanity of ability to "read without glasses." The result is that they do not read much, their little intellect goes to seed, and the little reading they do produces disease.

6. The correction of presbyopia at an early or late age, and the high or low degree of the error depends on the amount of near work demanded of the eyes.

In nonreading farmers, workmen, seamen, etc., the correction is not required to be made at so early an age, nor perhaps in so high a degree as in sewingwomen, literary people, engravers, etc. A hurried test may also

result in a too low correction, because the accommodation by a moment's intense effort may prefer a lower lens than would be required in more prolonged use of the eyes at near range.

7. Presbyopes who deceive the oculist as to their age may suffer if he has not been alert minded to detect the error.

One must be on his guard in treating "women of doubtful age."

8. The peculiarity of the habitual occupation may necessitate a higher and earlier correction than is usual.

Embroidering, "sewing on black," engraving, watch-making, measuring in sixty-fourths of an inch, etc., are kinds of employment that make inordinate demands on the accommodation.

9. The light, its quality, power, etc., must also be inquired into.

If a patient works all day by artificial light, or by poor daylight, in darkened rooms, if the angle at which even a good light strikes the work is not right, eyestrain is sure to result. If after a long day of strain, under these hurtful conditions, reading, sewing, etc., are continued at home, and again perhaps, with bad lights, the results must be deplorable.

10. The position of the body and head in sewing, reading, or other near work, may be harmful to the eyes and the general health.

If the book, sewing material, writing, etc., is placed in the lap, or in such a position that the head is bent over, the spine curved, and the chest flattened, the injury to the patient's eyes is almost certain because of nonillumination of the page, paper, etc., and also because of the improper position of the eyes and head. The health generally must be harmed by the compressed condition of the pelvic organs and the lungs, poor respiration, etc.

Bookkeepers, etc., should stand at their work as much as they may, and chairs at desks should be low, the desk high, the writing leaf inclined, the axis of vision as nearly as may be perpendicular to the plane of work and of the spectacle lenses. The single disadvantage of the bifocal lenses is that they compel the axis of vision to be inclined downward. For this reason they should be set high before the eyes, and the habit advised of "chin-up." Book rests, book holders, etc., should be encouraged. In my boyhood "sewing-birds" screwed to tables were common. They were most excellent devices.

11. The state of the general health, the preserved vitality, the vigor of will and of body, will also condition the early or high correction.

A flaccid muscular tone, anemia, denutrition, care and worry, a melancholic or pessimistic disposition or philosophy of life, may not be entirely overlooked. Patients so handicapped require a fuller or earlier presbyopic correction than those who are more vigorous. Their innervational power is lessened and sometimes nothing the oculist can do will enable them to carry on severe near work when presbyopia doubles their strain.

12. Failure to cure the reflexes of eyestrain may be due to the want of bifocals.

Two separate pairs of lenses can not correct eyestrain as do the double lenses. With a distant pair only, there is an hour or more of strain every day in eating meals. There is also forgetfulness to change or indifference to the need of it, lenses are not repaired, are misplaced or lost, etc. The one disadvantage of bifocal lenses is counterbalanced a hundred times by the manifest benefits over the distant and near glasses made separate.

13. Eyeglasses being more prone to maladjustment than spectacles may be the cause of failure to bring relief of the symptoms or sequels of presbyopic eyestrain.

There are few noses capable of retaining bifocal eyeglasses in a correct position. The more expert the optician the more the attempt may be tried. This is especially true if the patient can consult the fitter at least once a month. Patients who by reason of living at a distance can not do so should not be allowed bifocal eyeglasses under any circumstances. To those with high degrees of astigmatism they must also be forbidden, except for one nose in ten thousand. Vanity causes a deal of suffering both to patient and oculist. It may prevent the patient wearing any glasses, and thus double the local and systemic reflexes. When, as usual, vanity demands eyeglasses, and the result is certain to prove bad, my custom is to tell the patient to consult another oculist. No greater ill fortune could happen to your rival than to have the patient go to him! And there is no better punishment for vanity than eyeglasses, unless it be the rest cure.

14. Premature presbyopia, or paresis of the accommodation, may occur years before the usual age, and explain failure to relieve symptoms when none of the preceding causes will do so.

The patient may have contracted a chronic habit of reading at too great a distance, and the presbyopic lenses ordered may force him to hold the page or sit at writing at a shorter distance than is comfortable or perhaps best.

This is especially true if there is exophoria or insufficient adduction power. If this is so, the adduction should be increased until comfort is secured, habitual reading or writing at, say, 20 inches may itself be a source of eyestrain.

16. The patient may have supernormal adduction power and the presbyopic lenses ordered may force him to read or write at too short a distance.

In this case, at least until the adduction lessens, the too weak lenses may cause discomfort.

17. The symptoms may not be due to presbyopia, nor to any eyestrain, but to systemic disease.

Every oculist has had many patients whose symptoms had been treated by glasses alone, or whose ocular muscles had been "clipped," when all the time there was concealed or unknown systemic disease, e. g., nephritis, diabetes, anemia, etc., or some morbid result of bad dietetic or other habits, which were the only or chief causes of trouble. This does not in the least excuse those wonderful oculists who find that all eyestrain symptoms and reflexes are due to systemic conditions. That is a good way to please the referer of cases, and to conceal inaccurate refraction. But it is not the best way to practice ophthalmology.

The preceding rules are, in fact, non-rules; they are in truth, cautions to have no rules in correcting presbyopia. Every case is exceptional and individual and requires a freedom of the mind from bias or prejudice of any kind. Precision in estimating the conditions, infinite patience, delicacy, and conscientiousness, in hunting out the individual variation there before one, and inexhaustible ingenuity in meeting all the varied and varying phases and factors, are the prerequisites.

There is but one invariable rule: Have no rule. Rules are the makeshifts of the lazy and unintelligent. The cunning rely on them, forgetful that cunning is really stupidity. Optical machines are often rules made into iron rods, scales and wheels. They may be of service if used not as dictators but as slight helpers, in the hands

of the intelligent and guiding machinist, but they may serve as the excuse and ruin of those who rely on them to the exclusion of intelligence and diagnostic skill.

Any number of cases could be epitomized, illustrating the foregoing suggestions. I shall content myself with but few, because in every oculist's memory there doubtless arises plenty of examples.

CASE 1.—A lawyer who carried on a tremendous amount of eye work had an enormously high and complicated compound hyperopic astigmatism. Despite a perfect correction of his ametropia by capable and good oculists, and despite the best treatment by general physicians, his dyspepsia persisted. In obedience to his demand his oculists had allowed him to wear bifocal eyeglasses. A difference of five degrees or ten degrees in his astigmatic axes, inevitably caused by maladjusted eyeglasses, rendered his ametropic correction worse than useless. They failed to cure their patient because they did not demand spectacles.

CASE 2.—A woman of thirty-nine had sick headache which reappeared every few weeks despite my best correction of her low compound hyperopic astigmatism. I had three times gone over my work and found no change in her glasses was to be made. I feared I had what I had always been looking for—a typical migraine which I could not cure with glasses. Inquiry elicited the fact that the woman habitually did an enormous amount of literary work. I ordered presbyopic correction and bifocal spectacles to be worn constantly and the "migraine" has never shown a sign of itself since.

CASE 3.—A healthy, clear-headed intellectual man was given two pairs of spectacles for his myopic astigmatism, a stronger or higher correction for use at the theater, driving, etc., a weaker correction for reading and daily or constant use. For a year his wife and daughter observed, without telling him, that whenever he wore the strong, or accommodation-exciting glasses he "caught cold" with coryza, hoarseness, etc., which at once disappeared when the weaker lenses were used. He used the stronger ones but few times a year. When certain of the strange coincidence his wife told her husband. In the past ten years the cold has been produced in this way, a hundred or more times. Now if his weaker glasses get "crooked," or maladjusted, miscorrecting his axis of astigmatism by a few degrees, his cold promptly appears, to vanish in an hour after a visit to the optician.

CASE 4.—A gentleman of fifty years of age had consulted many of the most famous oculists because of severe and frequently recurring subconjunctival hemorrhages. Some of these had refracted his eyes, some had not, but all had followed a not uncommon custom of charging such symptoms to gout. None had found any error of refraction, except, of course, a couple of diopters of presbyopia. By the most competent authority his eyes had been pronounced mathematically emmetropic and perfect. None, of course, had used a cycloplegic. With paralyzed accommodation I found 0.25D of simple myopic astigmatism axis 180 degrees in each eye. For several years he has had no hemorrhages and by his glasses he has had also such relief from other cerebral symptoms that he has had heavy iron spectacles made for use in his bath, so that he may not be without lenses for a minute.

DISCUSSION.

DR. ROBERT L. RANDOLPH, Baltimore, said that he is surprised to find how often it is necessary to use homatropin in order to discover the astigmatism which is frequently responsible for the discomfort in these cases. The presbyopic condition, no matter how advanced, has never deterred him from the use of homatropin where there was the slightest doubt in mind as to the true condition of the refraction and he called attention to the great convenience of the cocain-homatropin discs. He usually employs two of these in each eye at intervals of twenty minutes, and an hour from the time when the first disc is introduced into the conjunctival sac the patient is ready for the examination. Results in his experience in both old and young do not differ from the results obtained when either atropin or

homatropin has been used. The fact that the desired result is obtained quickly is a distinct advantage as lessening the chance of high tension, and the fact, too, that the effect is promptly nullified by eserine is an additional advantage for obvious reasons. It is no uncommon thing for a patient to be able to use the eyes for close work within two or three hours after the instillation of the eserine. It is his habit to wait till the patient has experienced decided twitchings of the lids before allowing him to leave the office. These discs can be best used when put up in gelatin capsules (No. 2 size). The smaller half of the capsule is taken off and the disc can be emptied right into the conjunctival sac, where it remains. Four capsules, each containing a disc, are used for each patient.

DR. G. C. SAVAGE, Nashville, Tenn., said that a strong ciliary muscle means a small nervous impulse and late presbyopia. The presence of a strong ciliary muscle may be determined as follows: In the first place, there is orthophoria for distance and exophoria for near; exophoria far, greater exophoria near; or esophoria far and less esophoria near. Another method of determining this is that these patients will overcome a minus lens stronger than 3 diopters—they will overcome 4, 5 or 6 diopters and sometimes 7. Whenever there is delayed presbyopia, beyond the age of 45, there has been an abnormally large ciliary muscle, requiring a corresponding small nerve impulse. A weak muscle means a strong brain impulse and early presbyopia. This condition can be determined as follows: In the first place there is orthophoria for distance and esophoria for near; exophoria far, less exophoria near; or esophoria far, greater esophoria near. A weak ciliary muscle demands a strong impulse from the tenth conjugate center in the brain. It is generally understood that the center for the ciliary muscle is intimately associated with the third conjugate center for convergence. Every excitation of the tenth center means over-excitation of the third center controlling the interni, and means esophoria for near. These patients can not overcome a minus lens of 3 diopters; they will overcome a 2.50 maybe, or a 2, or a 1, and Dr. Savage has had patients who could not overcome a minus lens of .50 diopter. Dr. Savage related the following case: A confrère sent him a patient for consultation. The lady was 28 years of age and had other troubles besides a refractive error. She had had albuminuric retinitis and now has optic atrophy. She was suffering and no one expects suffering from atrophy of the optic nerve. The physician wanted Dr. Savage to help him work out the case, and in testing the case Dr. Savage found that she had orthophoria for distance and 6 degrees of esophoria for near. A plus 1.50 D. sphere gave her orthophoria in the near. That woman had a weak ciliary muscle. It required a strong impulse from the tenth conjugate center in the brain. The impulse liberated from that center caused a corresponding excessive impulse from the third center controlling the interni, and hence the esophoria. With a plus 1.50 D. sphere before her eyes her esophoria was corrected. Now the absence of necessity for an excessive impulse from the tenth center put into a normal state of action the center in the brain acting on the interni. A plus 1.50 D. presbyopic correction for that woman, only 28 years old, will be most helpful. Dr. Savage said that the corrected hypermetrope will not have, as a rule, early presbyopia, for he has an abnormally strong ciliary muscle. Correct the hypermetropia, being always guided by the muscle condition as to ordering full or partial correction, and, if in early life the hypermetropia is corrected, the patient will go beyond 45 without the need of presbyopic correction. It means delayed presbyopia because hypermetropes have abnormally large ciliary muscles.

DR. HERMAN KNAPP, New York City, said that he wears bifocals and his eyes do not trouble him at all. He is hypermetropic and presbyopic, of course, and his sight with glasses is just as good as when young. He looks at a distance and reads without even bending his head, and operates with great comfort, even when doing fine work like a capsulotomy. He recommends these glasses as an immense comfort. The line where the segments meet gives a prismatic effect, however, no matter what any one may say to the contrary. This shows particularly in

walking down stairs, when a person must be cautious in order not to misstep. It is his habit to examine every patient who has any nervous trouble with the ophthalmoscope, with glasses and also with the phorometer. In all these anomalies of refraction a cure is obtained. Dr. Knapp thinks that the trouble is not in the muscle and he is astonished that Dr. Savage speaks of the weak ciliary muscle. It is a mere hypothesis which has been used to explain the different anomalies of refraction; for instance, a myopic squint. When a patient comes to him with asthenopic symptoms, after using the ophthalmoscope he tries the glasses if everything is all right with the ophthalmoscope, and, in the great majority of cases, he finds hypermetropia of .50 or 1 diopter; if he goes further and examines them with the phorometer he finds 2.50 or 3 degrees of esophoria; when he puts the convex glasses before these eyes the esophoria disappears. The person who is hyperopic 2 or 3 diopters must make a very strong effort at convergence. He must send into the ciliary muscle an impulse to do away with the 2 or 3 diopters of hypermetropia and in that way the latent hypermetropia can be detected.

DR. MARK D. STEVENSON, Akron, Ohio, said that he uses homatropin in from 1 to 2 per cent. solution while the patient waits in a darkened room. The ciliary muscle yields more readily to the cycloplegic action of the drug in a dark room since the patient is unable to read or see objects. In a light room the patient tries to use his eyes and the ciliary muscle is constantly straining against the effect of the drug; this, with the dazzling caused by the enlarged pupil, gives rise to discomfort, often congestion of the tunics of the eyeball, and headache. Dr. Stevenson uses atropia in the young, if the patient can spare the time, and homatropin in nearly all other cases. The degree of strain found in some old people's eyes is sometimes surprising. He uses cycloplegics in all ages unless he finds tension, and in people over 35 or 40 he puts one or several drops of eserine in the eyes as soon as he has completed the examination. Young myopes are sometimes unable to wear their full distant correction for near work. In some of these cases, after proper trial, it is well to give bifocals or two pairs of lenses. Occasionally young people have more close work to do than the ciliary muscle can accomplish; in some such cases bifocals or two pairs of lenses are useful. The relation between accommodation and convergence is too often neglected. It is well known that people past the age of puberty gradually lose their accommodative power until they require a presbyopic correction. It has been Dr. Stevenson's observation that these patients usually at the same time lose some of their convergence power. The patient's accommodation is generally relieved by a lens which draws the near point closer. This accomplishes two things: It necessitates greater convergence and at the same time partially or wholly removes accommodation, one of the chief stimulants to convergence. Many presbyopes have weak convergence and the additional burden added by advancing the near point gives rise to discomfort. In cases where the convergence is weak, give a farther reading distance, prism exercises with strong prisms bases out, or sometimes even combine prisms with the lenses bases in, or the equivalent by decentering. Sometimes it is well in a high degree of insufficiency, especially if combined with weak adduction and strong abduction, to perform a tenotomy of the strong or an advancement of the weak muscle. In cases with great excess of convergence it is often well to give a short reading distance and rarely use prisms. Eyeglasses with bifocal lenses properly adjusted are often worn by patients who would lay spectacles or two pairs aside. The reading angle should be correct in such cases. The patient's vocation must be kept in mind in determining proper working or reading distance. In a paper presented to this Section in 1900 Dr. Stevenson called attention to the unequal accommodation in the two eyes. If possible, give distant lenses for a few weeks before prescribing for near. Too frequently the correction for near is determined after the accommodation is tired by a long examination for distant correction; in such cases the reading or working distance will be too close.

DR. WALTER L. PYLE, Philadelphia, stated that early in his

career his attention was directed to the necessity of careful refraction, and to the value of cycloplegics. At the meeting of the American Ophthalmological Society in Washington, in 1903, Dr. Pyle reported the case of a patient aged 50, in which he used a single instillation of a 5-grain homatropin solution to get a better view of some peripheral lenticular opacities. On the morning of the third day she had violent acute glaucoma in both eyes. Dr. Pyle found her completely blind with both cornea steaming and with the eyeballs absolutely hard. He immediately performed posterior sclerotomy, which was followed by speedy relief. He also used hot applications and eserine. Within twenty-four hours the patient had normal visual acuity. The use of a drop of eserine solution before elderly or middle-aged patients leave the office avoids dangers of this kind.

DR. FRANCIS VALK, New York City, stated that in his work of fitting glasses for presbyopia, the more he leaves out the scientific ideas and gets down to natural methods the better seem to be his results. His objective point in fitting glasses for presbyopia is first to put the eye in a perfectly normal condition. The history of presbyopia in an emmetrope shows that they get along in life without any symptoms of asthenopia until they become 40 or 45, and then they require glasses. If they go to an optician and buy a pair of convex glasses, stronger as they need them, these glasses will carry them through life with no trouble. So, in a case of ametropia it must be put in the condition of the emmetropic eye by correcting the refraction, and then the addition of convex glasses will correct the presbyopia. In twenty-five years' work Dr. Valk has never found it necessary to use a cycloplegic in a case over 40 years of age. Some may find it necessary to dilate the pupil, but he has not met these cases. He corrects the refraction with the most careful objective examination, confirms this with glasses and then tests the range of accommodation. The text-books say bring the near-point up to eight or nine inches, but in many cases the position at which the patient works must be considered. His work may be at the desk and, if he has a very small region, this near-point must not be brought too close to the eyes. While Dr. Valk does not approve of the use of atropin in any case over 40, yet he would not hesitate to use it if he considered it necessary.

DR. JOHN S. KIRKENDALL, Ithaca, N. Y., agreed with Dr. Gould, but believes that the presbyopia spoken of by Dr. Stevenson in young myopes is apparent but not real. It is an acquired diseased condition, and if Dr. Stevenson continues to correct this apparent presbyopia in such cases he will add to the trouble by weakening the already atrophic ciliary muscles. Dr. Kirkendall's treatment of these cases is to thoroughly atropinize these patients, work out carefully their refraction and give them the full correction for both distant and near work, thereby developing the ciliary muscles, stopping the progress of the myopia and putting their eyes in the state of emmetropia; but at or about the age of 45 recognizes and corrects the presbyopia.

DR. J. L. THOMPSON, Indianapolis, said that he is not afraid of mydriatics at all. When von Graefe and others spoke of the danger they used atropin. Dr. Thompson should as soon expect to rush on the shield of Zeus and get off without punishment as to use atropin. Many people over 60 have some accommodative power. He uses homatropin because it can be corrected so nicely with eserine. The patient can be kept in the office until the pupil contracts. There may be a simulated astigmatism in the opposite meridian to the usual one and on using a cycloplegic it vanishes. Dr. Thompson sometimes examines women patients at 38 and then again ten years later and they are still not 40. Find out their reading point and judge for oneself about their age. If patients refuse the bifocals they may have two pairs of glasses. Dr. Thompson thinks that Dr. Gould stretches the matter a little. Sometimes on a bright day Dr. Thompson has migraine when passing a fence or on looking at a new, bright carpet. He has had it suddenly develop when getting ready to operate, caused by reflection from the white caps of the sisters.

DR. GEORGE M. GOULD stated that he uses homatropin and cocain—two-thirds homatropin and one-third cocain; and does not hesitate to use it up to the age of 60, or any time, because in suspicious cases he immediately brings back the pupil and the accommodation to normal with eserine. This he does with young and old if they wish to use the eyes the same day. He uses the eserine in solution of 2 gr. to the ounce, and the patients read as before in fifteen or twenty minutes after several instillations. In presbyopic cases one avoids in this way all possibility of glaucoma. The stronger eserine may cause a little spasmodic twitching for a few minutes, but otherwise no harm, so far as Dr. Gould has observed. Dr. Gould does not see how Dr. Valk can correct presbyopia without the use of a cycloplegic and he will be grateful to anyone who can show him how to do it. He believes in correcting the astigmatism and in the slightly misplaced axes he can not do this without a cycloplegic. He finds a large number of cases with axes 10, 15 and 20 degrees off from the vertical or horizontal, and in young people that, in what he calls "the dominant eye," will produce tilted head, which often brings about compensatory spinal curvature.

THE USEFULNESS OF THE OPHTHALMOMETER.*

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The ophthalmometer has gone through various stages of appreciation, depreciation and overpraise, back and forth over the same ground again and again; and still we have its enthusiastic advocates, claiming that it does away with the necessity of using mydriatics, while others consider it as merely an expensive scientific toy, utterly unreliable and of no practical value. Is it not worth while, then, to give the subject a few minutes of dispassionate consideration? Let us first take up the question: Is the ophthalmometer of any practical use in refraction work?

Those who argue against its usefulness base their argument on the ground that it only shows corneal astigmatism. The argument must turn largely, then, on the frequency and amount of lenticular astigmatism. Many authorities state that most of the astigmatism is corneal, and Suter and others explain the subtracting of half a diopter from the finding with the instrument in cases with the rule and adding the same amount in those against the rule by the fact that the lenticular astigmatism averages half a diopter against the rule. There is abundant testimony that this allowance should be made, and this certainly accords with my experience. A case will illustrate:

CASE 1.—Miss G., a sufferer from headache back of the eyes, had worn +0.25 sph. right eye, +0.50 sph. left eye, for two years without relief and they blurred her distant vision, which was improved from 15/15— to 15/10 with +0.50 cyl. ax. 90° right, +0.25 cyl. ax. 90° left. The ophthalmometer showed 1 D. right, 0.75 left, axis 90° or 180°, with the rule. Assuming it to be probably convex from information already obtained and subtracting 0.50 D., the usual allowance, we get the same glasses she saw best with. These were prescribed and gave satisfaction.

The ophthalmometer here only increases our confidence. This case is a type of such a common experience as to seem trite. Everyone doing refraction work recognizes the difficulty in regard to cases with oblique axes, and the following illustrations are of this class:

CASE 2.—A schoolboy, R. T., was referred to me because

* Read in the Section on Ophthalmology of the American Medical Association, at the Fifty-fifth Annual Session, June, 1904.