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COMPLIMENTS OF AUTHOR

SLEEPLESSNESS

FACTS RELATING TO ITS CAUSES
AND CURE

BY ✓

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SOME FACTS RELATING TO THE
CAUSES AND CURE OF SLEEPLESSNESS.

BY AMBROSE L. RANNEY, M. D.

A PERSISTENT loss of sleep is generally recognized, and properly so, as one of the most dreadful of human afflictions.

The recuperation of vital forces that takes place during peaceful slumber constitutes the basis of both mental and physical health. "Tired Nature's sweet restorer—balmy sleep," comes from natural causes as an unbidden but welcome guest to the many that would otherwise be unable to bear the burdens of each day.

To those who are robbed of sleep, however, from causes that may appear obscure, the struggle of life sooner or later ends in physical or mental disease. It entails upon them too often the distressing results of the opium or chloral habit, and, in many instances, a sudden termination of their misery by suicide.

There is probably no physical condition that the educated physician is so often unable to combat successfully as a persistent tendency toward insomnia.

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Many thousands of sufferers of this class are to-day exiled through medical advice from their business interests, traveling for needed rest or enduring a wretched existence in uncongenial surroundings far from their homes and friends, too often at sacrifices that they can ill afford to bear; simply because medicine in their special case has proved incapable of combating an inability to obtain the eight hours of peaceful slumber that health demands.

Again, it is chiefly among the intelligent and educated classes that this form of suffering is encountered.

Those by whom, in consequence of their mental endowments, the greatest successes might be and often have been achieved, by whom the greatest pleasure can be obtained out of life and alike bestowed upon others by their mental and social prominence, upon whom the greatest responsibilities are of necessity imposed, and in whom the greatest capabilities of suffering and patient enduring exist—these are too often the ones that turn in their despair to the physician for relief from this dread enemy that shatters hope, paralyzes industry, impairs the judgment, imperils large financial enterprises, embitters life, and casts a gloom over their present and their future.

The explanation of the fact that brain-workers (as opposed to muscle workers) are peculiarly disposed to insomnia, lies chiefly in the constant strain that is imposed upon the organ of the mind; but this does not necessarily justify the conclusion (too frequently arrived at by medical men) that the brain-cells, or the blood-vessels that feed the brain-cells, are the seat of actual disease.

Any expenditure of nervous energy in excess of that generated from day to day. (irrespective of where the excessive expenditure occurs) may in time so deplete the reserve capital of nerve force in any individual as to embarrass the workings of some part or parts of the nervous sys-

tem without any actual disease being present. The result of this temporary "nervous bankruptcy" is peculiarly apt to disclose itself in some derangement of the normal function of the weakest part—as an echo is heard far from the source of the echo.

Let us cite, as an apt illustration of what I mean, one of our every-day experiences :

An upright business man, with a stated income, has, from certain extravagances, etc., spent not only in excess of his income for many years, but has gradually encroached upon his capital. He grows moody, reticent, and irascible, and becomes almost imperceptibly an altered man. His friends, ignorant of the cause of the change, gradually become distant and fewer in number, Social estrangements, domestic unhappiness, a general loss of esteem, and many other complications then begin to arise day by day and month by month, until the individual falls from the high position that he once occupied with warrantable pride. Now, what has caused this fall, and what is the remedy? Unquestionably, to every thinking mind, the initial and underlying factor in all the ultimate results would be the excessive expenditure of money. The cure, moreover, lies in stopping the initial cause, with the hope that time and prudent living will restore not only the impaired business capital, but likewise the cheery nature and honest manhood that originally gained the individual his high position, and that can alone restore it to him.

The reader may possibly fail at first to see the application of this illustration to the subject at issue. He will see it in a clearer light when I submit the following proposition, which I shall endeavor to sustain by a report of cases that have come under my observation. This proposition I would present as follows :

Clinical evidence goes to show that a large proportion of

subjects affected with persistent insomnia of long standing suffer from some congenital defect of the eyes themselves or from an improper adjustment of the muscles that move the eyes.

In many incurable cases of insomnia this constitutes the underlying factor that entails an excess of nervous expenditure from the date of birth until death (if not properly rectified). In time it materially tends to exhaust the normal reserve capital of nervous force of the individual.

When we stop to reflect, we can understand how every letter on a printed page, as well as every object on the street, or in our homes, that we become cognizant of by the sense of sight requires a more or less perfect adjustment of the complicated muscular apparatus that so regulate the eyes in relation to each other as to enable them to see with both and yet perceive but a single image.

The total *aggregate of such visual perceptions* during the sixteen hours of each day that we use the eyes is enormous; and it means a proportionate number of accurately performed adjustments of two cameras (the eyes) upon a single object, performed often with marvelous rapidity, and involving in many of the adjustments a complete change of combinations in the eye muscles that are successively brought into play. It is not much of a task to lift a penny once, but no living being could lift a penny a million times each day.

Now, Nature has so accurately balanced the relative power of each of the various eye muscles in a perfectly constructed being, and has so beautifully constructed the eyes as regards their focus, that the expenditure of nerve power (in the case of such an individual) required to perform the necessary eye movements throughout each day is reduced to a minimum, although necessarily very large as compared to the amount expended upon any other organ in the body.

But, when the adjustment of the eye muscles or the construction of the eyes themselves is so imperfect that the maintenance of single vision (when both eyes are simultaneously used) is the *result of an excessive expenditure of nerve-force* (far greater than Nature intended in many cases), any individual so afflicted begins from birth either to draw from the "reserve capital of nerve-force" that Nature has stored up for emergencies, or the eyes must be run at the expense of a proper nerve-supply to some other part (Peter being robbed to pay Paul).

Three factors then enter into the proposition as to how long a time can elapse before the serious influences of such a leak of nervous energy will be felt in any given case where the eyes or the eye-muscles are abnormal. 1. How much excess of energy over the normal amount is required to compensate for the defects connected with the sense of sight. 2. How much "reserve capital" of nerve-force the individual starts out in life with. 3. How much nerve-force the individual can generate day by day to meet the daily expenditure.

A child inheriting one hundred thousand dollars at birth could have expended upon him one thousand dollars per year in excess of his income without feeling the lack of money for one hundred years; but if the excess of expenditure be increased to five thousand dollars over his income, bankruptcy would stare him in the face when he attained his majority.

A serious defect of construction in one or both eyes, or a decided tendency of one or both eyes to deviate from parallelism with its fellow, may entail upon an individual a leakage of nervous force that is apt to produce in time very sad results upon the general health.

It is not my intention in this article to ignore the fact that many cases of sleeplessness can apparently be attrib-

uted to overwork, business cares, anxiety, or similar forms of nervous strain as a factor in its causation. Neither would I overlook the fact that organic disease of the kidneys and diabetes often manifest their onset by a persistent tendency toward wakefulness.

I desire simply to emphasize the fact that "eye-strain" constitutes in a large proportion of such cases a factor that is often unrecognized or ignored by medical men.

Some twelve months ago I published a contribution relating to the causes of epileptic seizures, from which I make the following extract:*

The necessity of knowing more about the refraction of the eye and the condition of the eye muscles is impressing itself daily upon many of our progressive practitioners as well as the specialists.

The field of the oculist is of necessity a large one. It will not be restricted by a wider dissemination of knowledge of the apparatus of sight among the body of general practitioners.

Within the next twenty years we will see every specialist of note in nervous diseases more or less expert in testing refraction for himself, and determining, without outside aid, the existence of defective equilibrium of eye muscles. He need not be an oculist, in the true acceptance of that term. Diseases of the eye properly belong to a specialty, and are best treated by those who see the most patients of that class. But the nervous specialist should know, and sooner or later will be forced to know, whether his patient has near-sightedness, far-sightedness, or astigmatism to complicate matters, and if the eyes tend to deviate from their normal and physiological conditions. The more he studies these conditions, the more will he find to interest him, and much to relieve that is now too often unrecognized in the sufferers who apply to him for aid. He will cease to give pills to patients with from three to twenty poisonous alkaloids

* Can Eye-strain cause Epilepsy? A Report of an Illustrative Case bearing upon this Inquiry. *Boston Med. and Surg. Journal*, Jan. 2, 1890.

combined, on the principle that the sportsman adopts when he uses a handful of shot, hoping that one may perchance kill his bird. He will study his cases more intelligently, and delve less into works of therapeutical speculation. This view is neither Utopian nor visionary. Neither is it the result of rash enthusiasm, but an earnest conviction that has come after years of patient inquiry and careful observation in a large number of patients suffering from nervous derangements.

A famous French philosopher seems to have fully realized the absurdities of purely therapeutical medicine when he said :

“ Nature fights with disease a battle to the death. A blind man armed with a club—that is, a physician—comes in to make peace between them. Failing in that, he lays about him with his club. If he happens to hit disease, he kills disease. If he hits nature, he kills nature.”

The time has passed, I think, when the blindness of prejudice against the views advocated in this paper holds sway as strongly as in the past among the leading minds of the medical profession. From many sources, both here and abroad, abundant confirmatory evidence of the truth of this doctrine is being published from time to time, showing conclusively that defects of the eyes and eye muscles do constitute an important factor in the causation of many forms of obscure nervous diseases. Those who still oppose this view most vehemently have, in many instances, shown by their writings gross ignorance of the methods employed to decide the points at issue.

It took Lister and his followers some ten years to teach the profession that, if the antiseptic method was to be tested as a basis for adverse criticism or for the benefit of suffering humanity, the operator must clean his finger-nails; that he must also wash his hands with great care, make his knives aseptic, and follow out the published plan of procedure with due regard to detail before the results obtained

could be worthy of publication or in any way reliable as a basis of scientific deduction.

To what extent the leaders of the medical fraternity willingly lend their ears and give their earnest support to any new method of treatment [provided it consists of a drug, or of a subcutaneous injection of an agent whose component ingredients are unknown and which is adopted purely on faith] has been demonstrated during the past few months in a way that now bids fair to subject such child-like credulity to ridicule, if the ill results to humanity do not in time justify merited condemnation and rebuke.

On the other hand, any system of treatment that is based upon facts which can be determined with the same scientific precision as the computation of an astronomical problem, that is supported by well-recognized physiological laws, that has yielded and is yielding daily relief to many individual cases culled from suffering humanity which medicines have failed to afford, that has lived and steadily made progress year by year in the face of bitter and organized opposition—such a system of treatment can not now be annihilated by ridicule as a substitute for scientific argument, or impeded in its progress by the condemnation of those who have had no experience in it.

I quote again from my article relating to epileptic seizures as follows:

Not long ago a famous orator told the following fable:

“A well-fed horse who, in his greed, scattered grain upon the floor of his stall became in consequence the constant companion of a rooster who picked up the scattered oats. One day the rooster suggested that friendly relations were desirable and would be put on a much firmer basis by the existence of a solemn agreement between them. The horse assented, and on asking the basis of the compact, was told that it should read: ‘*Neither of us shall step on the other’s feet.*’”

I do not desire to carry out in full what, to my mind, might be the true application of this fable. None of us desire to stir up discord if important facts can be insured a fair hearing without recourse to asperity—but the establishment of a great truth can not be crushed by being “stepped upon.”

I do not propose, in this article, to discuss at any length the optical problems (often very difficult to solve) which are liable to be encountered in subjects who suffer from serious nervous disturbances of the functional type. Neither is it my intention to review here the work that has already been done in this field by the employment of methods now in vogue, old or new.

It may be well, however, for me to mention in this connection a few of the reasons why, in my judgment, the treatment of the eyes has totally failed, in the hands of some observers, to relieve or modify some nervous conditions that had withstood judicious medication for years; and why it is that subsequently, in more experienced hands, treatment of the same patients directed to their eye muscles has led not infrequently to the happiest results.

(1) I would call attention to the fact that *preconceived notions about old methods must be abandoned without prejudice* when a new method is to be tried.

(2) Each observer must, of necessity, make himself *thoroughly familiar with all the details of the method* which he proposes to employ before he is competent to decide *pro* or *con* respecting its merits. This can not be done exclusively by reading. No one can describe with a pen the many intricacies that are apt to arise in solving complex optical problems. It is certainly not beneath the dignity of even an eminent man to learn (by personal observation of the work of another whom he perhaps thinks is misled, and by timely suggestions thus obtained) how facts that bear upon successful treatment may be determined that were, perhaps, at first obscure and difficult to ascertain.

(3) With a full knowledge of the method, its intricacies, and its difficulties, *conclusions should never be too hastily arrived at* in any given case. It is always “better to be sure than sorry.”

Those who have had the largest experience may occasionally make mistakes in judgment when a peculiarly complex problem is presented for solution. How much easier is it, therefore, for one with a limited experience to fall into error! The story is told that a selection of a pilot for a vessel laden with precious merchandise which was to enter a harbor full of sunken ledges and sand-bars was once being made. One by one the applicants told a tale of uninterrupted successes. Finally, one pilot was accepted simply because he said: "I ought to know the channel, as I've wrecked a ship on every rock in this harbor."

So it is with many cases of epilepsy, chorea, insanity, insomnia, neuralgia, headaches, and kindred nervous affections. These patients have, as a rule, acquired and constantly practiced from birth *certain faulty combinations of the various eye muscles* in order to enable them to use the eyes together.

They are often able by the aid of such unnatural combinations to *simulate* a condition of apparent equilibrium of adjustment of the eyes, although a very serious expenditure of nerve-force may be demanded of them in order to do so. They are naturally unconscious of the eye-strain, because they think everybody does as they do, in order to see. They often have no eye-symptoms. They practice these "tricks of adjustment" instinctively, not as an act of volition; and they have generally to be taught, by the aid of prismatic glasses and other recognized steps, to abandon them and thus to disclose the actual maladjustment of their eye muscles which has entailed upon them this long-continued leak of nerve-force, and later on an abnormal reflex excitability of the nerve-centers.

They are not unlike a tortuous and difficult channel in which the hidden difficulties to surmount do not always disclose themselves upon the surface. They demand and generally repay a careful and scientific scrutiny into the adjustment of the ocular muscles and latent errors in refraction. They require time and great patience on the part of the observer, as well as skill.

(4) The old methods of testing the eye muscles will have to

be abandoned at no distant date. A phorometer* is now essential to all accurate work. Moreover, the separate muscles should be individually tested and their power accurately measured.

Not long since a physician who had twice collapsed from nervous prostration and insomnia at the very threshold of his professional labors came to me for advice. He showed at intervals an apparent condition of equilibrium in the orbits, but welcomed prisms for a deviating tendency of one eye above its fellow and improved rapidly under their influence. Within a week he showed unconquerable double images without his prism; and a radical step for the correction of his vertical strabismus was advised. At the advice of friends he then consulted an oculist of international repute, who not only failed to recognize the fact that the patient saw double images, but even pronounced the eyes normal in their adjustment. The description by the patient of the rough and unscientific tests upon which that judgment was made showed clearly that the oculist was either wofully negligent of his obligations to the patient, or incompetent to decide the point at issue.

Another patient upon whom I have lately performed a graduated tenotomy of the external rectus muscle with the happiest results (as it brought about a rapid and complete restoration to health), came to me originally with an eye that diverged at times, when her vision was not attentively engaged, almost to the outer canthus; yet she bore a certificate from one of the leading oculists of America that she had no defect in the refraction or adjustment of the eyes, and that her terrible headaches and difficulty in using her eyes required only constitutional treatment.

Hardly a day now passes that I do not receive from some patient written testimonials or verbal statements of the deepest gratitude for relief that has come to them through the correction of some defect in the apparatus of

* An instrument devised by Dr. George T. Stevens, and manufactured by Meyrowitz Brothers, opticians, No. 100 East Twenty-third Street, New York city.

vision (often unsuspected by the patient); and the intensity of their expressions of gratitude is unquestionably based, in many of these patients, upon the fact that drugs had been administered to them for years, according to the latest therapeutical theories, without any perceptible benefits.

One of my warmest professional friends and an eminent medical teacher, Dr. J., whose wife has been relieved of insomnia and some other nervous symptoms of years' standing by the aid of glasses alone, writes me as follows: "Your name will occupy a prominent place in our shrine, and heaven will be continually besieged to bless both you and yours."

Another patient, at one time a hopeless victim to insomnia, writes me after an operation on an eye muscle, and the fitting of proper glasses: "I can not trust myself to think of what the final result might have been had you left me to my own will last August. I have had what I can not pay for in money, even if I could send you my check for a very large amount."

Dr. R., an eminent divine of this city, says: "I am better since your treatment than ever before in my life in my sleep, digestion, pulse, calmness, vigor, and eyes."

In the reported cases that follow, some terms are employed that may require explanation to the general practitioner, although they would be easily understood by the oculist. These are comprised in the following table:

Terms related to the focus of the eye (<i>refractive terms</i>).	}	HYPERMETROPIA (<i>far-sightedness</i>). A <i>shallow eye</i> (from the front to the back), causing an imperfect focus of objects.
		MYOPIA (<i>near-sightedness</i>). An <i>elongated eye</i> (from the front to the back), causing an imperfect focus of objects.
		ASTIGMATISM. An <i>irregularly curved cornea or lens</i> , causing distortion of images on retina.
		EMMETROPIA. A <i>perfectly constructed eye</i> .

Terms related to the muscles which move the eyes (muscular terms).	}	ESOPHORIA. A tendency of one or both eyes to deviate toward the nose.
		EXOPHORIA. A tendency of one or both eyes to deviate toward the temple.
		HYPERPHORIA. A tendency of one eye to rise above the level of its fellow.
		ADDUCTION. The power of the internal muscles of the eyeballs. <i>It varies in health between 25° and 60°.</i>
		ABDUCTION. The power of the external muscles of the eyeballs. <i>It should be 8° in health.</i>
		SURSUNDUCTION. The power of the vertical muscles of the eyeballs. <i>The right and left should be alike.</i>
Various forms of glasses employed by oculists.	}	SPHERICAL. Ground upon a <i>convex or concave sphere</i> . Used to correct hypermetropia and myopia.
		CYLINDRICAL. Ground upon a <i>convex or concave cylinder</i> . Used to correct astigmatism.
		PRISMATIC. <i>Two plain surfaces of glass meeting at an angle</i> . The thick side is termed the base of the prism. Used to relieve errors of adjustment of the eye muscles.

I do not deem it necessary to encumber this article with a long list of cases that entail considerable time and labor upon the author without adding materially to the demonstration of the point at issue.

It has been denied most emphatically in the past by some specialists of prominence, both in eye diseases and nervous affections, that the eyes or the eye muscles have any marked influence upon nervous diseases. Statements of this kind are still made by some, both verbally and in print, with the same vehemence (based, it is to be feared, upon bitter prejudice and partisan feeling) as they were five years ago. Despite evidence to the contrary, they refuse to see what many non-partisan minds are seeing more and more clearly

every day. They discard, without trial, new methods of research into complex ocular problems; they prohibit the use of instruments (that alone allow of an approach to scientific precision) from institutions that they control; and in every possible way they appear to try to mislead the line of professional thought from the main points at issue.

One thing is evident—viz., the view that “eye-strain” can and frequently does cause serious nervous conditions must be either true or false.

If it be false, then it has made steady progress in spite of its weakness and against organized and bitter opposition; if false, then the growing list of converted advocates among the younger oculists and neurologists is incapable of explanation; if false, then the thousands of suffering humanity are deceived who believe that they have cause for the deepest gratitude in the recognition and relief of an existing “eye-strain.” It is contrary to all precedent that a mere “fad” should steadily flourish and gain strength year by year over a period of many years; neither does the statement that some cases have failed to be benefited by this treatment have any weight in argument. Every method of treatment of disease sometimes fails to relieve individual cases; yet no one attempts to discard all therapeutical efforts in consequence of this fact, because such a deduction would be manifestly illogical.

CASE I.—Miss B., aged forty, single, lecturer.

Family History.—One sister was for over a year a victim to “complete nervous prostration.” Father is a very nervous man.

Eye Defects.—Vision $\frac{3}{80}$, without atropine. Under atropine, a latent hypermetropia of + 0.75 s. in each eye. Patient had never used a glass for reading, but accepted + 1.50 spherical glass. Esophoria, 3° (which ultimately, under influence of prismatic

glasses, exceeded 7° . Adduction, 23° . Abduction, 5° . R. sursumduction, $1^{\circ} +$. Left sursumduction, 2° . The adducting power later on exceeded 43° , and the abducting power fell below 3° . At no time did homonymous diplopia disclose itself (with or without a red glass).

History of Case.—This lady had for some years been doing an excessive amount of mental work. Her profession required an enormous amount of reading. This had been done largely at night. Although small in stature, she had always been vigorous and had taken an unusual amount of exercise. She *had always considered her eyes very strong*, and was loath to believe, when she first came under my care, that her eyes could constitute a factor in her serious nervous condition. Furthermore, she was strengthened in this belief by the fact that she had not long before consulted an oculist of prominence, who had stated that he found no defect requiring treatment or glasses, and who had sent her to one of his friends (a specialist in nervous diseases) for treatment.

The "break-down in her health" began about twelve months before she came under my care. It was attended with an extreme and persistent loss of sleep, a loss of emotional control, an utter inability to read or sew (which aggravated all her symptoms), a more or less constant headache, an inability to concentrate her intellectual faculties for any length of time, and an aggravated type of mental depression. She feared, and had every apparent reason to fear, that her professional labors were imperiled and that her mind might possibly give way. The neurologist, who endeavored to build her up by tonics, rigid diet, rest, etc., assured her (after some improvement had occurred) that he feared at first that "melancholia" might be the end of the case. At his advice, she spent the summer at the sea-shore; but, beyond a certain point, she failed to progress satisfactorily, and her headache and sleeplessness would at times be as bad as ever. Any attempt to prepare herself for her fall engagements would cause a return of her old symptoms to a very marked degree, accompanied by physical weakness, mental fatigue and depression, extreme despondency, and a lack of control over her emotions. After any attempts at

study, she would frequently lie awake most of the night. This was her condition when she first came under my care.

Treatment and Results.—In this case a full correction of the hypermetropia was made for distance, and + 2.00 spherical glasses were given for reading, as she showed some failure of accommodation. Prisms of various strengths were employed over her distance and reading-glasses for about two weeks, and 7° of latent esophoria were found to exist. This was rectified by a graduated tenotomy of one internus and the prisms were then discontinued. During this interval the patient had improved very rapidly, had become very dependent upon her spherical glasses, and become cheerful and hopeful of recovery. She had, moreover, entirely regained the normal power of sleep. During this interval she had frequently slept twelve hours without awakening and without recourse to any drug. As atropine had been used during the early part of the treatment, she had been allowed during the two weeks of treatment to use her eyes very little in reading or study. During the following two weeks two degrees more of latent esophoria disclosed itself. For the relief of this defect a prism was combined with the spherical glass worn over the eye which had not been subjected to a tenotomy.

For the past five months this patient has been able to fill all her engagements without any return of her bad symptoms. She has read and studied at night, attended church and places of amusement that previously she dared not attend, has accepted more work than for some years past, and has continued to sleep well and enjoy perfect health. During this interval she has taken no medicine, nor has she been restricted by me in her diet or in any other way. Her reading-glasses have been increased to + 2.50 s.

The records of her case show that a graduated tenotomy of the internus of both eyes will eventually have to be performed, in order to properly adjust the balance between the two eyes.

During one of her last visits this patient said: "I think I am stronger to-day and have better health than I have had for many years. I certainly do my work with less fatigue, and

enjoy things that my ill-health has previously debarred me from."

CASE II.—W. C., aged forty-two, minister of the Gospel, married.

Family History.—Mother living (aged eighty-four). Father was a delicate man, and had headaches. One brother and one sister have severe headaches. One brother has several times broken down in his studies from eye-pain and asthenopia.

Eye Defects.—Myopic astigmatism, O. D. — 1.25 c.; O. S. — 0.50 c. Exophoria, 10°. Crossed diplopia of 4° (with red glass before either eye). No hyperphoria. Adduction, 18°. Abduction, 12°. Right sursumduction, 3°. Left sursumduction, 3°. Presbyopia (uses + 1.00 s. for reading).

History of Case.—This patient was never a very strong man and had always been a hard student. About six years ago he began to suffer from sleeplessness, confusion of thought, and an utter inability to apply himself to his work for more than a few minutes at a time. He put himself in the care of a prominent physician of this city, and at that time was examined by an oculist of note, who prescribed glasses to correct his astigmatism. These gave some temporary relief, but he soon broke down completely, resigned his position, and for many months was unable to do any work. After a long rest, he again took charge of a church, but his insomnia soon became so severe that an extended vacation was necessary. Since that time, by the most regular habits, careful diet, and daily exercise in the open air, he had been able to keep his position, although he feared a collapse at any moment. Finally, his loss of sleep, distress in his head (although he had no actual headache), and confusion of thought became so constant that he was again on the verge of resigning his position when he came to me for treatment.

Treatment and Results.—The treatment of this case consisted simply of two graduated tenotomies for the relief of the exophoria, and subsequently a reading-glass to correct his presbyopia. The result of this treatment was most gratifying. A report received from the patient within three weeks after the first tenotomy states that he "now sleeps well, and has great

relief from the distress which he has so long experienced in his head."

For eighteen months past he has been doing his work with more comfort than for many years. He sleeps well, with the exception of an occasional poor night after an unusually trying day's work. He has taken no medicinal treatment.

CASE III.—A. C. H., aged forty-six, manufacturer, married.

Family History.—Both parents lived to seventy-six years. Two paternal uncles died of phthisis. No hereditary tendency to nervous diseases.

Eye Defects.—Vision $\frac{2}{30}$ without atropine. Under atropine a latent hypermetropia of +1.00 s. in each eye. Patient had never used a glass for reading. Esophoria, 5° (after using prismatic glasses for a short time, the patient showed esophoria of 13°). Adduction, 24°. Abduction, 4°+. Later on the adduction exceeded 50°, and the abduction fell to 0. Homonymous diplopia with the red glass over one eye was usually present, and at times without the red glass.

History of Case.—This patient had been a perfectly well man and had carried on a very large business up to fifteen years ago. At this time, while attending a sale in New York, he was suddenly seized with a dizziness, faintness, and a sore feeling in his head. These symptoms lasted for three years in spite of all treatment, during which time he suffered severely from sleeplessness, extreme nervousness, and soreness in his head. He was unable to look out of a car window while traveling without great distress.

He had suffered all his life from obstinate constipation, and had taken cathartics so regularly that now any cathartic water causes intestinal hæmorrhage.

When this patient first came to me he was able, by the most careful diet, regular habits, and by retiring at eight or nine o'clock, to carry on his enormous business only with the greatest difficulty because of the following symptoms: Inability to sleep at night, which at times was very distressing and persistent; extreme nervousness after the slightest fatigue; mental depression without any cause; hot flashes up and down his

spine; pain in his shoulders and across his back. His insomnia was often prolonged and very exhausting after any slight excitement or fatigue.

Treatment and Results.—The treatment of this patient consisted at first of the wearing of prisms to relieve the esophoria, and latter on of graduated tenotomies on both internal recti. Subsequently, + 0.50 s. glasses were given for constant wear, and + 1.00 s. glasses for near work. The improvement in his condition was marked and continuous from the first, and he writes that he is so busy and feeling so well that he can not find time to have the slight remaining esophoria corrected. An extract from a letter received from him two months after the operation on his eyes speaks for itself. He says: "Seemingly I am all right, feeling better every day; have not had a headache for a month; appetite good and I sleep well." Over a year has now elapsed without any return of his former ill health, during which time he has constantly been engaged in active business pursuits.

CASE IV.—Mrs. J., aged forty-five, married.

Family History.—Not taken.

Eye Defects.—Hypermetropia and astigmatism of + 1.50 s. \odot + 0.50 c. in each eye (under atropine). Right hyperphoria, $\frac{1}{4}^{\circ}$. Esophoria, 0 — 1°. Adduction, 21°. Abduction, 8°. Right sursumduction, 2° +. Left sursumduction, 2°.

History of Case.—For many years patient has been a delicate woman, becoming easily fatigued, and suffering more or less after fatigue from insomnia and extreme nervous debility. For the past ten or twelve years one pupil has been very much dilated. She had consulted an oculist of prominence in Montreal concerning this condition, but his treatment failed to give any permanent benefit. During the past twelve months the insomnia and nervous prostration had become very much intensified, and the patient had become so weak physically as to alarm her family. Any attempt at walking, attending places of amusement, or making ordinary social visits were followed by a marked increase in the symptoms. Her husband, a prominent physician, feared a complete physical collapse. One pupil was found to be more than double the size of the other.

Treatment and Results.—The treatment consisted of a full correction of the hypermetropia and astigmatism for distance by glasses, which the patient was instructed to wear constantly. Under these conditions her muscular tests seemed to be modified favorably. The patient was instructed to return home and to return for further observation after wearing the glasses for a couple of months. Even before her return there had been a marked improvement in her symptoms. Two weeks after her return the following report was made by her husband: "My wife appears much better and more cheerful than for many years, the pupils are of equal size, appetite good, and the insomnia much relieved; is able to walk two miles without fatigue and enjoys the exercise, goes out evenings and feels no unusual fatigue from lectures, concerts, and sermons." A report one month later says: "My wife appears to enjoy life as she has not done for many years. There has been a very slight return of her old enemy insomnia, but not to an alarming extent. She hopes to see you again in the near future."

In this case sufficient opportunity has not yet been afforded for a complete examination of the eye-muscles. It is possible that there may be some lurking defect of equilibrium in addition to the error of focus. One thing, however, appears to be clearly established—*i. e.*, that her ill health and insomnia were directly dependent upon a condition of the eyes that had exhausted her vital forces and was keeping her in a state of extreme physical depression.

CASE V.—Mrs. W., aged fifty-five. Married.

Family History.—Not taken.

Eye Defects.—Hypermetropia, + 1.75 s. Presbyopia (uses + 4.50 s. for reading). Esophoria, 7°. Adduction, 23°. Abduction, 3° +. Later on she disclosed: Right hyperphoria, 3°; right sursumduction, 6° +; left sursumduction, 2° —.

History of Case.—This patient is the wife of a prominent physician, and, as such, has had the benefit of the best medical talent of the State in which she resides. She had always been a delicate woman up to the time when my professional opinion of the case was asked. For a year or more before I first saw

her she had been a victim to nervous prostration and confined most of the time to her bed or room. Her life had been despaired of during this interval at times, and the case seemed to present problems in diagnosis which puzzled the best medical men whom she had consulted. When she had gained sufficient strength to allow of her being moved with safety, her husband was advised to take her to a Southern climate. On her way to Florida he was advised to consult me in reference to the case, when he passed through New York.

When I first saw this patient she was in a state of extreme physical and mental depression, was unable to walk for even short distances without great fatigue, was sleepless and despondent, and was brought to my office in a carriage from a hotel not far from my residence.

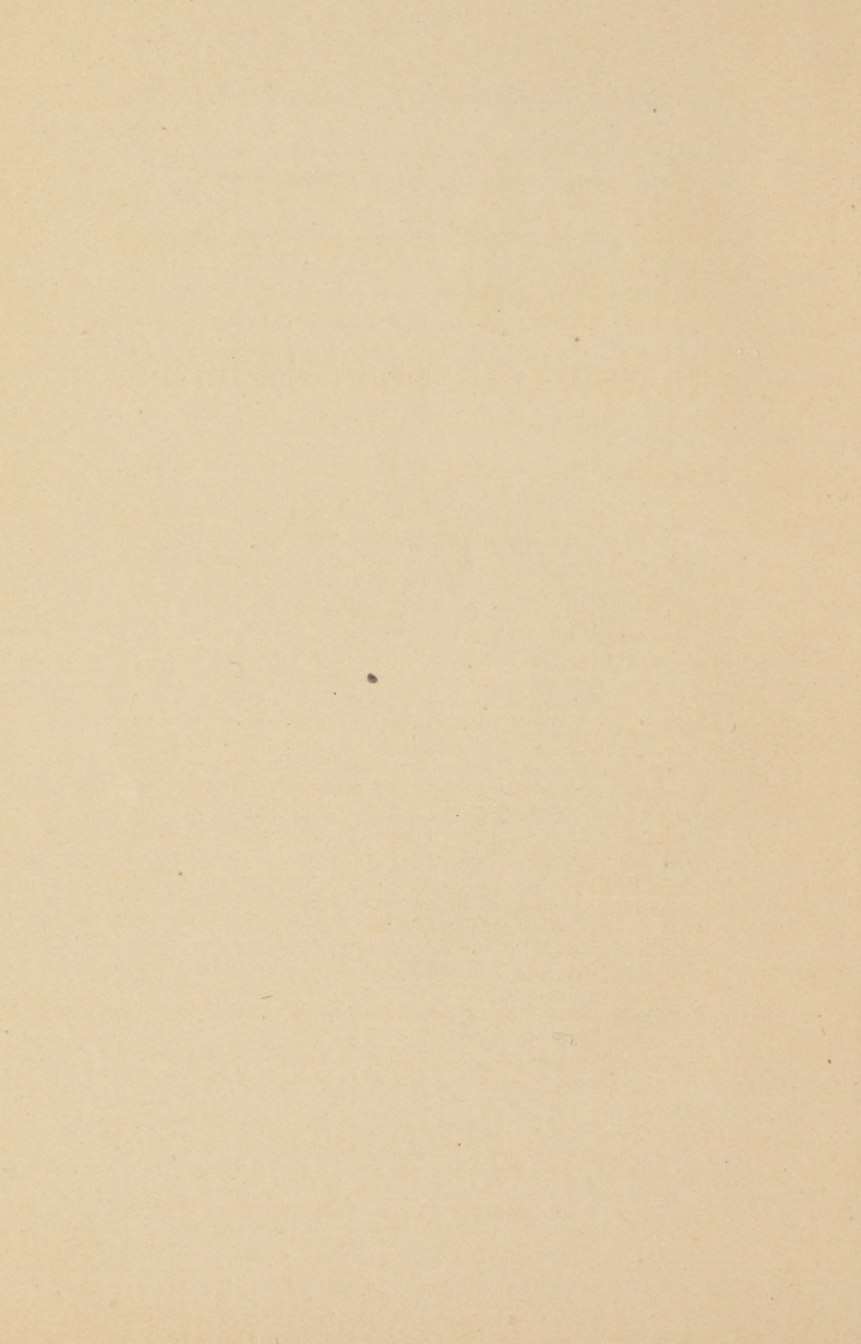
Treatment and Results.—At the first visit prisms were given to relieve the esophoria, and in five days a graduated tenotomy was done on one internal rectus. The patient began to feel the benefit of this step from the first. The second day after the tenotomy she reported that she had walked a mile and a half—a thing which she had not done for over a year. Five days after the first tenotomy, a second one was performed on the other internal rectus, prisms having been worn in the mean time. Two days following this the patient walked five miles, visited an art museum in the morning, and attended a theatre in the evening. In spite of the unusual fatigue and excitement, she was still sleeping well and feeling stronger than for many years. With the improvement of her general health came an entire cessation of an obstinate bladder trouble which had given her annoyance for many years, and was probably due to her weak muscular and nervous condition. The pain in the bladder, which was probably of the neuralgic type, ceased after the relief of the eye tension, and has never returned.

After an interval of four months, during which she had been comparatively well, she returned to New York to complete her treatment. A high degree of hyperphoria was found, and prisms were combined with her hypermetropic glasses to relieve it. With these glasses the patient passed eight months of almost

absolute freedom from distress of any kind, when a graduated tenotomy was performed and the hyperphoria prisms removed.

At the present time she is sleeping well, is able to attend to her household duties, can walk long distances, has taken no medicine for over a year, and is regarded by her husband and friends as restored to perfect health.

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