

Functional nervous diseases of reflex origin / by Albert Rufus Baker.

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Baker, Albert Rufus, 1858-
American Medical Association, 1890 :), Nashville, Tenn.)
University College, London. Library Services

Publication/Creation

Chicago : printed at the office of the Association, 1890.

Persistent URL

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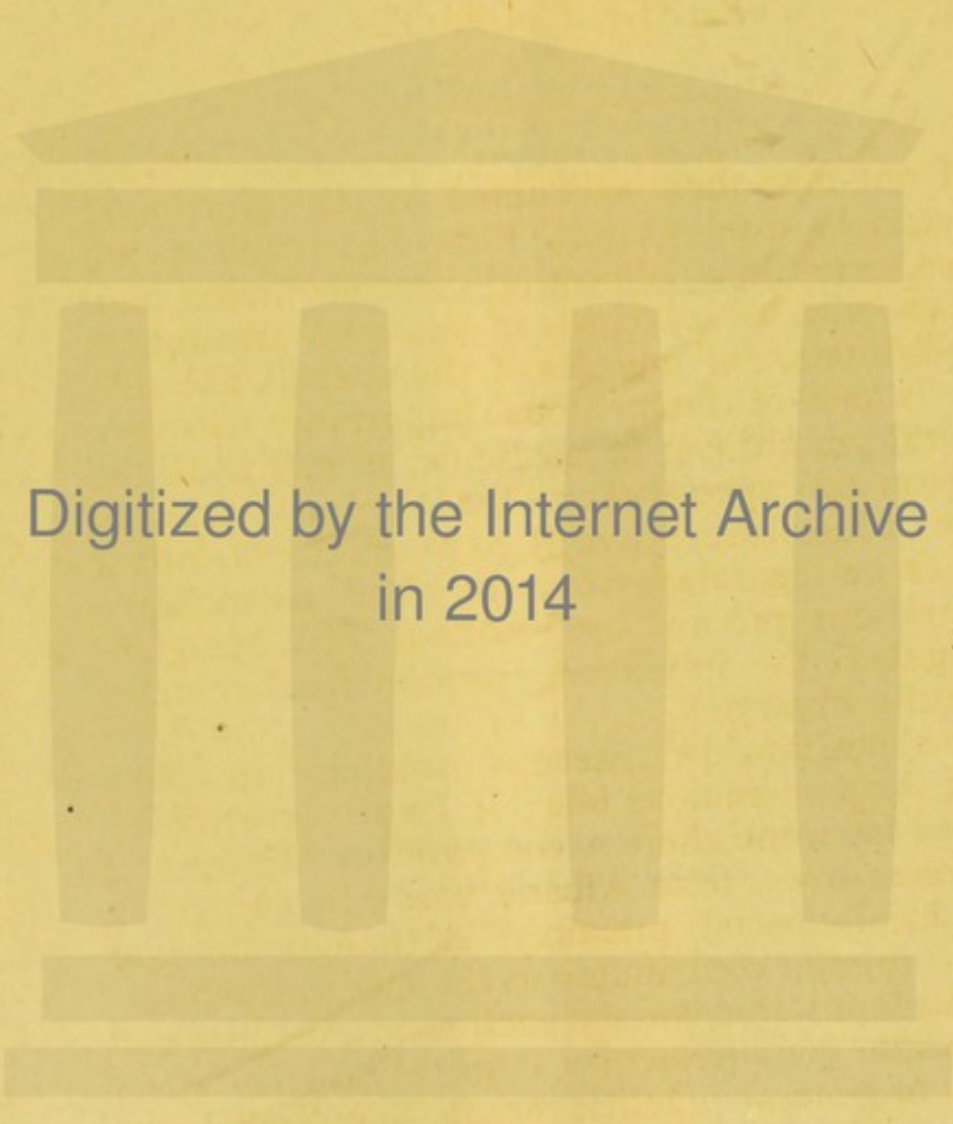
Functional Nervous Diseases of Reflex Origin.

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*Read in the Section of Ophthalmology at the Forty-first Annual
Meeting of the American Medical Association, held in
Nashville, Tenn., May 21, 1890.*

Reprinted from "The Journal of the American Medical
Association," July 12, 1890.

CHICAGO:
PRINTED AT THE OFFICE OF THE ASSOCIATION.
1890.



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FUNCTIONAL NERVOUS DISEASES OF REFLEX ORIGIN.

If one-half that is claimed by Dr. George T. Stevens be true,—viz.: That nearly all headaches, neuralgias, almost all cases of chorea, and 50 per cent. of all cases of epilepsy are due to incoördination of muscles of the eyeball, the subject is one of momentous importance to every general practitioner of medicine, as well as to the surgeon and specialist. That there is a grain of truth in his observations, I have no doubt, but it cannot be separated from the chaff by positive declarations pro and con, without first being investigated by impartial, unprejudiced careful scientific observers.

The position Dr. Stevens occupies in New York is an anomalous one; if I am correctly informed he went there a comparative stranger, a few years since, from Albany where he enjoyed a fair, local special practice. Although he had been a regular contributor to the medical periodicals his reputation was not such as to gain him the immediate confidence of a large number of specialists or general practitioners in New York City. His contributions were mostly on the subject of muscular asthenopia, and eye strain, but were not given much serious consideration until after the publication of his book on "Functional Nervous Diseases," which was awarded the first prize by the Belgian society. Instead of candid-

ly investigating the merits of the subject, many of the leading ophthalmologists and neurologists passed sentence upon his work, declaring his statistics to be manufactured and his conclusions preposterous; but notwithstanding this verdict, Stevens continued to read papers before the medical societies, and to contribute articles to the medical journals until a few physicians became at least partial converts to his views.

About two years ago, the New York Neurological Society appointed a committee to investigate the claims made by Stevens, as to the possibility of curing chorea and epilepsy by correcting ocular muscular defects. It was decided by the committee which consisted of five neurologists and general practitioners and two ophthalmologists, that the cases of epilepsy and chorea should be first examined by the committee, and the history and present condition recorded. The case should then be submitted to Dr. Stevens for treatment, and examined by the committee again before reporting the results to the society. Only fourteen suitable cases were submitted for treatment: five of chorea and nine of epilepsy. Of these cases six were reported as improved, seven unimproved, and one unknown. Notwithstanding the committee express the opinion that the "method of Dr. Stevens does not afford a sufficient degree of relief to warrant its adoption or recommendation to the members of the Neurological Society as a means of cure," the results are certainly as good if not better than those obtained by other methods of treatment.

The November number of the *Journal of Nervous and Mental Diseases*, is devoted entirely to the discussion of the subject. The position of Dr. Stevens is somewhat similar to that occupied by Dr. Horace Green in 1857, before the New

York Academy of Medicine, before which he demonstrated the possibility of intra-laryngeal treatment; which resulted in the split of that society, the resulting wounds of which have only recently been healed; and no doubt well remembered by many of the older members of this society.

The subject of peripheral nerve irritation is an old one. It is now conceded that many headaches are due to nervous disturbances as the result of errors of refraction. Facial neuralgia from diseased teeth is of common occurrence. We may also mention the bowel troubles so common in children as the result of dentition. Ear cough is another illustration of the frequent occurrence of functional nervous disturbance from peripheral nervous irritation, and was given much attention by the older writers one of whom, wrote a large book on this subject, in which he demonstrated to his own satisfaction at least, that vomiting, vertigo, cough, paralysis, insanity and nearly all kinds of laryngeal disease was due to the irritation caused by plugs of wax in the ear.

More recently it has been claimed that asthma and many other respiratory neuroses are due to peripheral irritation as the result of nasal obstruction. We may also mention the intestinal irritation of worms, and that due to fissure and fistula of the rectum.

"Genital irritation was urged at one time by a distinguished surgeon as a cause of paralysis of the extremities, and for a time circumcision was regarded as a necessary preliminary procedure indispensable in the treatment of many nervous diseases, among which infantile paralysis and spastic paraplegia may be named. Later the influence of congenital stricture of the urethra was brought forward as a cause of many neuroses and

of temporary states of nervous excitability; and not long after, the claims of the genital organs of women rose in the estimation of the profession as fertile sources of nervous disease."¹ Other familiar examples of nervous phenomena of reflex origin are the vomiting of pregnancy, pain in the knee, from morbus coxarius, pain in the penis, from irritation of stone, etc.

These are among the more common functional diseases of reflex origin, and every practitioner of medicine could make additions of unusual cases from his own experience. The essayist reported a case some years since, in the *Medical Record* of a young girl whose hair on the top of the head did not grow over an inch in length, but which grew naturally after correcting an error of refraction with spectacles. Recently he met a case of sudden deafness as the result of acute inflammation of the Eustachian tube in which there was complete aphonia, and the boy only began to speak slowly after the hearing was fully restored. A few years since he was consulted by a woman with a plug of wax in the ear, and a bald spot on the side of the head as large as the palm of the hand; after the removal of the wax the hair grew again. A case of epilepsy has been reported as the result of polypus in the ear and cured by its removal.

These illustrations of unique cases of functional nervous diseases of reflex origin might be continued indefinitely; but these observations will serve to call your attention to the broad field which the subject covers.

Other phenomena of frequent occurrence are giddiness, vertigo, and vomiting; all of which have an intimate relation with eye strain, and are due to two causes: first, to the efforts necessary

¹ Starr, *Medical Record*.

to properly adjust the muscles of the eyeball in binocular vision; and second, to the muscular efforts made in accommodating the eye for objects at varying distances. Both these factors must be taken into consideration in every discussion of this subject. And here I believe is the weak point in nearly all the observations of Dr. Stevens and his followers. They have attributed all the functional nervous disturbances to the insufficiency or spasm of the muscles which move the eyeballs, and have almost entirely ignored the accommodation in the production of these functional neuroses. I believe that nearly all the troubles we have with the muscles of the eyeball are due to, and are the direct outgrowth of the errors of refraction. This is generally recognized in cases of hypermetropia as a cause of strabismus.

In most cases of muscular asthenopia we have the same excessive nervous stimuli sent to one pair of muscles that we do in strabismus, and those patients who have not sacrificed binocular vision, consequently suffer from pain and other nervous disturbances, due to the conflicting efforts at accommodation on the one hand; and those of convergence on the other. It has been my experience not infrequently in cases of errors of refraction that after correcting the ametropia, to find, that while I had relieved the pain due to the efforts at accommodation, I had disturbed the equilibrium that had become established between the efforts of accommodation and those necessary for perfect binocular vision, and thus set up a train of symptoms almost, if not quite as annoying as those from which the patient suffered before. If the limits of this paper permitted I would be pleased to report a number of cases illustrating this point.

It is in the knowledge of this subject gained

only by a large practice that the oculist who has had a wide experience, excels the beginner, and this is the reason why so often spectacles that are theoretically correct are rejected by the patient.

The dizziness which results from looking at a rapidly moving train of cars, while swinging, or from looking over a precipice, is due to the same excessive muscular efforts made necessary for the proper coördination of the eyeballs, and those of accommodation. The frequent instruction of stewards on board steamships to the passengers to keep their eyes shut while making their toilets and until they reach the deck, to prevent seasickness, is a practical illustration of this principle. The most essential factor in the cause of sea-sickness is due to the muscular efforts made necessary on shipboard in viewing objects at varying distances.

Persons suffering from astigmatism are peculiarly liable to giddiness and vertigo, undoubtedly due to these unusual muscular efforts. An astigmatic patient of mine, could not sew on striped goods; and was frequently caused to vomit while ironing such goods. Another said the mere mention of a barber's pole always caused a squamish sensation at the pit of his stomach. Another if walking behind a person with a striped dress on the street was always obliged to close his eyes or look in another direction to prevent falling. These cases were all cured by correcting the error of refraction. A statement made by an eminent oculist that if we, like the giant Cyclops, who assisted Vulcan in his workshop, had but one eye in the centre of his forehead, would not suffer from muscular asthenopia, is not strictly true, because we not infrequently meet persons who have but one eye, (or what is

more frequent who use but one) who suffer from reflex nervous disease due to eye strain.

It is necessary, in order to secure binocular vision, to have the eyes so adjusted, that rays of light coming from an object are focused upon corresponding parts of the retina. For perfect vision it is necessary that they are focused upon the fovea centralis of each eye. The delicate muscular arrangement, which is necessary for changing the focus of one eye for near and distant objects is a complex one; but to keep both eyes fixed on objects at varying distances is much more so, and it is not difficult to understand how muscular disturbances might follow as the result of errors of refraction; or even in cases of emetropia in which unusual or prolonged work is demanded of the eyes.

Dr. Noyes says, "the acquisition of binocular vision belongs to the first months of life. Young infants roll their eyes about in the most inconsequential fashion, and when their visual vagaries give place to binocular fixation an important step has been gained in ocular and cerebral development. In some subjects this function is never acquired, in others it may be lost after having presumably been acquired. All cases of permanent strabismus are instances of suppressed, or of lost, or of undeveloped binocular vision."

Muscular insufficiencies is one of the most difficult parts to master of the entire subject of ophthalmology. The diagnosis is always difficult, and usually requires repeated examinations. It is not sufficient to correct manifest defects as revealed by the von Graefe test, but we must seek after masked insufficiencies of the ocular muscles as we do for masked errors of refraction by the use of atropia. Unfortunately we have no such reliable means of solving the former prob-

lem as we have the latter, by paralyzing the accommodation.

The most satisfactory discussion of this subject with which I am familiar is a paper by Dr. Noyes, entitled, "On the Tests for Muscular Asthenopia, and on the Insufficiency of the External Recti Muscles," which was presented to the Eighth International Medical Congress at Copenhagen, six years ago. It is exhaustive, scientific, based upon a large number of cases, readily comprehended, and no list of outrageous new names to be remembered, such as heterophoria, orthophoria, esophoria, exophoria, hyperesophoria, etc., as are found in Dr. Stevens' work. On the whole, this contribution of Dr. Noyes is so much in advance of Dr. Stevens' book, both in time and every other commendable feature, that I have often wondered why Stevens is securing all the credit for work that was done so much better and earlier by Noyes.

It is necessary, in making these examinations, to find the amount of abduction and adduction both for distant and near points. In order to make these tests valuable it is necessary to have some physiological standard of adduction and abduction for comparison. A valuable contribution to this subject is given by Dr. H. S. Shell in the *American Journal of Medical Sciences*, October, 1878. He gives one table of twenty emetropes whose adductive power at the distance of 20 feet varied from 20° to 40° , and their abductive power varied from 4° to 16° ; the average was for adduction, 29° ; for abduction, $8\frac{1}{4}^{\circ}$; the average ratio between them was as 100 to 28. It is difficult to determine what is the ordinary condition of the muscular apparatus for the individual, as what is the normal condition for one is abnormal for another; and for this reason repeated examina-

tions are necessary, and they must be made with the most consummate care, or the most unfortunate mistakes will be made. Usually those whose adductive power is less than 8, and whose abductive power is over 28, may be assumed to have insufficiency of external recti muscles; and one whose adductive power is less than 28, and whose abductive power exceeds 9, may be assumed to have insufficiency of the internal recti.

This test of the muscular power I believe to be of more value than the equilibrium test of von Graefe. Some years since I instituted some tests as to the state of the muscles in persons who had normal vision. I found that only about one-half of those examined had perfect muscular equilibrium. Dr. Roosa, who has recently repeated these investigations, found that out of 103 subjects examined only seventeen were found to have muscular equilibrium. Rather a low percentage, I think. But of several hundred cases with *refractive error* in which I tested the muscular power, I found even a less number in which there was perfect muscular equilibrium.

It has been my practice for a number of years in all cases of muscular asthenopia in which the muscle at fault could not be readily determined, to resort to the use of atropia. This will reveal any latent error of refraction which may be the unsuspected cause of the asthenopia; but even though there be no error of refraction it puts the eye at rest, allays muscular irritability, and the investigation can be pursued with much greater ease and the results will be much more uniform.

The use of prisms for the correction of muscular insufficiencies on the whole, I have not found as valuable as I was led to suppose they would be from *a priori* reasoning. Nevertheless they are of very great benefit in many cases. They

seldom can be worn stronger than 2° or 3° for each eye, but even in cases where the muscular defect is greater than this amount the comfort to the patient is very considerable. During the first twenty-four hours more or less discomfort is suffered, the patient has some uncertainty in judging of distances, and experiences some difficulty in walking, especially in ascending and descending stairs ; but after the eyes become accustomed to the new adjustment the relief is very marked. If the prisms afford any permanent benefit the question of tenotomy ought to be considered.

The result of operative interference, if judiciously performed, is always more satisfactory than the wearing of prisms, which at best is only a poor crutch to lean upon for a time, and permanent cures can only be attained in many cases by making tenotomies.

As to the relief of headaches my experience would lead me to believe that a large number that can not be cured by correction of the error of refraction alone, can be relieved by the use of systematic muscular exercise, by prism, by tenotomies, or by a combination of all these methods. The same may be said to a limited extent of some cases of neuralgia, neurasthenia, chorea and epilepsy. But it is to be remembered in all these cases there is a neurotic temperament, that predisposes these patients to some form of neurotic disease. The peculiar form the disease may assume is often due to accidental causes, and this is the reason that when you cure these patients of one affection you are almost sure to have another follow, possibly in a distant organ. And thus it is that the oculist is reaping an abundant harvest from the fields already gleaned by the gynecologist, who has sewed up all the lacerated cervixes, and repaired all the damaged perinei until the

chastest maiden might envy the comely appearance of the genitalia of the most prolific matron. It may be true that these patients are relieved of side and back aches ; it may be that their constipated bowels or irritable bladders perform their function better ; yet these patients still suffer about the usual amount of pain and discomfort in the course of the year although it may be transferred to the head or eyes.

I am not prepared to state just what this neurotic habit is, but we are all familiar with its manifestations. With one it will be manifested by recurring attacks of sick headache ; in another by a paroxysm of asthma or hay fever ; in the female by painful menstruation or hysteria, and in others it may manifest itself as neuralgia, chorea or epilepsy. We specialists may lop off a branch here and there, and we may be of real value to our patient in relieving him of some troublesome or painful symptom, but there is something more necessary—the patient needs treatment more than this or that annoying symptom. Let us then not ignore the general practitioner in his more responsible duty of correcting the general condition, which after all is the real cause of these nervous diseases of reflex origin.

DR. SCHWINITZ did not wish to discuss graduated tenotomies and their effect on so-called reflex neuroses. He wished to point out that the mere correction of a local irritation was by no means sufficient to obviate the nervous explosion supposed to be caused by the defect, because the lack of the control of the higher centres over the lower reflex mechanism, which is really at the bottom of the trouble, is not thus restored. The inference was plain that this must be treated by general measures.

He drew a comparison between the refraction of the eyes and equipoise of eye-muscles of choreic children and those of children not choreic, and showed that they were closely similar. He stated his belief that correction of the ocular difficulties was often followed by disappearance of the chorea, which, however, was liable to return, especially in the "chorea months," if the child was exposed to the same environment which was present at the original onset.

DR. LEARTUS CONNOR, of Detroit, Mich., said : In a careful study clinically of numerous cases during several years I have reached certain results: (1) Most cases with heterophoria accompanied by disturbances of the nervous system are relieved by a correction of the optical defects, plus a lowered state of the general constitution. By such a course most persons were entirely relieved, the eyes remaining in so perfect equilibrium as to warrant no further interference. (2) A very few cases were not so relieved and a tenotomy performed. Partial tenotomies were unsuccessful, and a complete tenotomy was finally performed. (3) Occasional cases are relieved by the use of correcting prisms; but generally they are simply temporary expedients. (4) The recent discussions of this subject have placed in our hands a means for meeting the needs of certain cases more satisfactory than we previously possessed.

DR. EDWARD JACKSON : The point that these conditions known as reflex neuroses are due to lack of control in the higher centres, is of sufficient importance to be emphasized. There are certain facts that emphasize it. In some cases, when no heterophoria is revealed by covering one eye, it still appears on using the diplopia test, indicating that the position of the eyes is thus

shown to be not one of rest, but of a special action. The power of other muscles to adapt themselves to requirements made of them, if they receive proper innervation, would indicate, by analogy, such power on the part of the ocular muscles, and this is supported by experience in the performance of tenotomies for heterophoria.

DR. HOTZ wished to correct the statement that Stevens disregarded the effect of refractive errors on the nervous system, and only regarded muscular disturbances as a cause of functional nervous diseases. In his book and his journal articles Dr. Stevens has emphasized the importance of always first correcting errors of refraction. He gave tables showing the frequency of refractive errors alone producing headache, etc., which were relieved by correcting the ametropia. All oculists recognize the accommodation strain as a frequent cause of headache, and oculists have also always admitted that nervous symptoms can be produced by strain of the ocular muscles. The fact has never been denied, and the only question is to what extent and how frequently muscular strain is a cause of nervous disorders. It is a common occurrence that a man who is successful with a new mode of treatment is carried away by his enthusiasm, and so it may be that Dr. Stevens' claim may not be sustained by experience to its full extent. But whatever the verdict of the future may be, it will always give him credit for having widened an important field of investigation, for having directed our attention to the fact that difficulties in binocular fixation arise from other than the internal recti muscles more frequently than was ever thought of, and particularly that deviations of one visual line in the vertical plane occur and are a source of the most distressing asthenopic symptoms. The doc-

tor here gave the history of a case of asthenopia which had received no benefit at all from the correction of a low degree of hyperop. astigm., though glasses had been used for four years. The correction of a slight degree of hyperphoria removed all asthenopic and nervous troubles, and the relief has been permanent since over two years, even though the patient has dispensed with her glasses. That many persons with heterophoria are not troubled with headache or other nervous symptoms, is no argument against the doctrine, for with the same logic you might deny the relation of hyperametropia to accommodative asthenopia because not every hyperametrope is troubled with it.

DR. MINNEY: I believe Dr. Stevens' claims are founded upon physiological principles, but his enthusiasm has carried him to the extreme. A case of mine was operated on for insufficiency by the doctor, and the patient thought she was cured. She cannot, however, use her eyes continuously. The operation has acted as a placebo, and with the care she has learned to take of her eyes she can use them longer; but I do not think it is due to the operation.

DR. BAKER, in response to Dr. Hotz, said that he did not intend to convey the impression that Dr. Stevens did not correct errors of refraction, which he does most thoroughly; but he protested against his giving all the credit to the results of an imaginary operation, and ignoring the benefit derived from the use of spectacles.