tic influence upon the low-grade retino-choroidal irritations so commonly present in ametropic eyes—an influence, moreover, unattainable by a mere disuse of the eye without the local application of the drug.

THE PREVENTION OF MYOPIA.

Read at the Sixteenth Annual Meeting of the Mississippi Valley Medical Association at Louisville, Ky., Oct. 9, 1890.

BY FRANCIS DOWLING, M.D.,

OF CINCINNATI, O.

The simplest and at the same time the most concise definition of myopia is given by my friend and former teacher, Dr. Landolt, of Paris, when he says that "myopia is present whenever the retina is situated behind the focus of the dioptric system of the eye."

Before proceeding with the remarks on the means of preventing or limiting the development of myopia or near sight it will be well to give a brief outline of some of the principal causes of the affection, and for this purpose I have looked up the leading authorities on the subject. Schweigger, of the University of Berlin, is of the opinion that in the majority of cases myopia is congenital, or inherited, or, at least, there is a predisposition to it contracted through the parents. It occurs in early childhood and shows with the increase of years a progression both in frequency and degrees of development. Myopia may remain stationary through life, or at an advanced age it may show an apparent or actual decrease; the apparent decrease is due to the contraction of the pupil by which the circles of diffusion are made smaller and the images of distant objects more distinct. In other cases the affection is rapidly progressive during a period of life, generally up to about the twenty-fifth year, and after that remains stationary. Finally, in a small percentage of cases, the trouble is progressive through life.

Cases of myopia in children before the eighth year are extremely rare. On the other hand, previous to this age, hypermetropia generally exists. The trouble commences to manifest itself about the tenth year, and from that time on until the eighteenth year makes its greatest progress.

The accompanying table will serve to prove this fact. They are taken from the schools in the countries named:

GERMANY.		NEW YORK.		PARIS.	
Age.	Per cent.	Age.	Per cent.	Age.	Per cent.
6-8	11	6-8	3	7-9	6
9-10	15	9-10	5	9-13	6
10-11	20	11-12	10	11-13	6
13-14	25	15-16	15	10-19	8
15-16	40	17-18	20	10-15	13
16-17	45	18-19	25	13-15	4
17-18	50	20-21	26	13-16	23
18-19	55			15-18	25
19-20	60			15-19	50
20-21	62			17-19	75

It has been proven by statistics that myopia increases both in frequency and degree as one goes from the lower to the higher classes in schools. This might be explained by the fact that the age increases as one ascends in the classes, but statistics show that, irrespective of age, this increase in the frequency and degree of myopia bears a pretty regular ratio to the number of working hours. In this regard, Erismann, of St. Petersburg, gives the following statistics:

Among scholars occupied two hours per day, 17 per cent. myopia.

Among scholars occupied four hours per day, 29 per cent. Among scholars occupied six hours per day, 40 per cent. and so on.

Prof. Donders, of Utrecht, thinks that myopia is not equally prevalent in all countries, but is more particularly met with in cultivated nations, and further, that among the countries visited by him, he no where met with so many near-sighted people as in Germany. This tallies with my own experience; I witnessed proportionately more near-sighted people in the eye clinics of Germany than in any other country of Europe. Another thing I noticed was that the intellectual centres, or in other words, the university towns, had proportionately more near-sighted people than other places not university seats. Hence I infer that the very high educational standard in Germany, particularly in the college centres, by causing over-work of the eyes causes the greater percentage here than elsewhere.

Myopia is not usually directly transmitted from parents to children, but only a predisposition to the affection; in other words, all the conditions necessary to the production of the affection are inherited from the parents, needing only the addition of some exciting cause, such as over-exercise of the eyes in study, etc., to develop the affection in children, just as children of tuberculous parents inherit no consumption directly, but only the flat chest, the narrow shoulders, a weakly constitution, a tendency to contract colds, etc., in short, a predisposition to the disease.

It has been observed that in the transmission of this predisposition to myopia from the parents to the children, a father, as a general thing, transmits to sons only, and a mother to daughters. Cohn, in an analysis of some twenty-eight cases, found this rule to hold good. It is also found that in this hereditary transmission the affection usually confines itself to one sex; for instance, we often find that all the daughters in certain families are near-sighted, while the sons have normal vision.

In cases where both parents are myopic, the disease in being transmitted, manifests itself in a lighter degree in the children than in that of either parent, and very often it corresponds in degree to the sum of that found in both parents.

The time allotted for my paper is not sufficient

to enable me to enter into anything like an elaborate consideration of the causes of myopia, for this reason it will be sufficient to state here that the weight of testimony seems to show that the causation of myopia depends on two essential factors, the first of which is an inherent predisposition on the part of the person, inherited, or otherwise; the second a determining cause, which may be looked upon as a species of seed which when planted in the prepared soil of predisposition, causes the development of the disease.

Among the predisposing causes may be mentioned arrests of development of the sclerotic coat of the eye, a peculiar conformation of the globe, and chief of all, the disease called choroiditis in its various forms. In this connection it will be well to mention that in cases of hereditary predisposition there is a congenital weakness of the sclerotic coat, and more especially in its posterior half. The contents of the globe of the eye, under any undue exertion of the organ, causes pressure on this naturally weak spot; this pressure causes the membrane to stretch and give way in a measure, and thus are started many of the cases of so-called progressive myopia. Among determining causes may be mentioned the acts of convergence and accommodation in using the eyes for near work, as for example, in reading, writing, sewing, etc., as both these acts tend to increase the intraocular pressure of the eye, and the pressure, spending its force principally on the membranes of the eye causes them to stretch and give way, particularly in their posterior sections, and in this way the majority of cases of myopia are started, and if the cause is kept up, of course the trouble will continue to increase in degree.

The first endeavors to find out the causes of myopia, were, it seems, made in Germany, where the trouble prevails to a greater extent than in most other countries. In this country Dr. Cohn examined the eyes of some ten thousand children, and found that one thousand of them were more or less near-sighted. He also found that the trouble steadily increased, both in regard to the number of cases, and in the degree of refraction, as he went in his examination from the elementary to the higher schools. Another discovery which he made was that there were, relatively, more cases of myopia in badly lighted schools than in those that were more favorably arranged in this respect. The publication of these facts by Dr. Cohn caused quite a stir in the school boards of Europe. Lord Montague brought the matter before the British Parliament, and, although nothing definite was done by that august body, still the official notice of the facts in this way attracted to the matter the attention of educators at large, and whatever could be done to bring about a better state of affairs was done, and a better condition of school rooms, in

the way of illumination, fresh air, better printed books, a judicious abbreviation of the school hours, etc., were the results of the agitation. As a consequence there was a marked reduction of the percentage of myopia among the scholars in the schools where the reforms were carried out. In speaking of this subject, Florschütz says that the number of myopic pupils fell from 21 to 15 per cent. three years after the building of the Coburg schools, according to hygienic principles, and Von Hippel, in an address at the anniversary of the foundation of the University of Giesen, made the statement that he found only 34 per cent. of myopia in the new schools of Giesen compared with 40 per cent., which was the usual average in the old buildings.

Considering all the information that is at our disposal in regard to the factors that enter into the causation of myopia, both in its starting point and developing stage, no one ought to doubt that the prime factor in this causation is work with the eyes at near range; therefore, it stands to reason that the only way to prevent or restrict the affection is to limit or prevent altogether this near work with the eyes during the years that are known as progressive ones for the disease, viz.: from the tenth to the sixteenth year, and for this purpose I would make the following suggestions:

1. A child who shows any marked predisposition to myopia, and whose parents, one or both, were affected with the disease, should never be sent to the public schools, as they are now constituted, but should be sent rather to some private class where the number of hours of study and the tasks could be arranged to suit the condition of the scholar's eyes. Of course, the lighter the tasks and the fewer the hours, the better it will be for the eyes; this, in any given case, could be regulated by the family physician.

While on the subject it occurs to me that it would be a move in the line of progress, if a competent medical man could be appointed by our school authorities, particularly in our large cities, who should have general charge of the sanitary regulation of our public schools, and who should pay particular attention to regulating the tasks and the number of study hours for such of the pupils as showed any predisposition to myopia. To me it seems very unjust to have a uniform system of tasks and working hours for all pupils alike in the same grade, irrespective of the physical peculiarities of the individual scholars, for one who inherits a weakly constitution, weak eyes, etc., will necessarily deteriorate physically in trying to keep abreast of a colleague, who may be naturally endowed with stronger eyes, and stronger physical powers. Examples of this may be seen every day. If we look at the myopic scholars, for example, in our public schools, particularly in our own country where the rapid, high pressure system of education is in full vogue, and

where the standard is entirely too high, we find that a large percentage of these scholars are subjects with weary eyes, with pale, thin faces, in which the story is plainly written that the *mind* is being educated at the expense of the *body*.

2. The sanitary condition of the schools should be first-class, ventilation, light, etc., should be as near perfect as possible, and our school boards should spare no expense in keeping up this condition of things, for it has an immense influence both on the condition of the eyes as well as the general physical condition of the scholars.

3. Whenever the system of one affected with or predisposed to myopia, becomes at all relaxed, all work with the eyes should be suspended, until the health is again entirely restored to its normal condition; for it must be borne in mind, that it is during lowered conditions of the system that certain forms of myopia make their greatest progress.

In this connection it will be well to state, that from my own observations, especially in the clinics of Germany and France, a large percentage of those affected with myopia are burdened with some constitutional taint, such as the tuberculous, scrofulous, etc., owing to which, the powers of life are usually below a healthy standard, and this, in itself, is a potent factor in furthering the development of the myopia, and singularly enough, it is especially during the years that myopia makes its greatest progress, viz.: from the tenth to the twentieth year, that tuberculosis and its near relation, scrofula, make their greatest advances, therefore the condition of the general health of a young person predisposed to myopia should receive the most careful attention on the part of the medical adviser.

4. Young persons, who may be predisposed to myopia, should never study at night time, all near work with the eyes should be done by good clear sunlight. If, however, artificial light is used for this purpose, the electric light is the best of all its competitors, such as gas, oil, etc., being far less injurious to the eyes, for the reasons that in point of color it more nearly approaches that of the sun, than any other artificial light known: Then its volume is more uniformly distributed throughout the room, and by virtue of the great strength of its illuminating focus, it can be placed high above the head, and still be of uniform service; and lastly, the light does not vitiate the atmosphere of the room, like gas, oil, etc. If means could be invented to render the light steady, it would be the prince of all artificial lights for near work with the eyes.

5. The books from which one predisposed to myopia should study, ought to be printed with tolerably large type, and the Latin letters are the best of all others, as they are less fatiguing to the eyes than the German, etc. This fact is, probably, the reason why most scientific works and students' manuals throughout

the world are now printed in Latin letters, and one thing that surprises me is that Germany, with all her intellectual progress, still retains the old, crooked German letters in book printing, and particularly in the daily papers, which are the poorest printed of any in Europe, and the bulk of the population have to read this miserable print, by the equally miserable light of a candle, as gas light is only enjoyed by the few in Germany. This fact struck me as one of the causes of the great amount of myopia that is found, particularly among the middle and poorer classes of that country. But to return to our subject: in reading, writing, etc., the eyes should be kept at a distance of about 30 centimetres from the text, and the reading, etc., should be frequently interrupted, so as to rest the eyes, they should be closed for five minutes or so at a time, or directed at some far away point.

6. In cases where the myopia is at all marked, all work with the eyes, such as study, etc., should be postponed until the sixteenth year. The child should, if possible, be sent to live in the country, where the range of vision is longer than in the city, and then it should be kept outdoors, in the fresh air, as much as possible.

7. The wearing of glasses by a myope is optional, at least for distant vision, as they have very little, if any influence in checking the progress of the affection. They are only useful as a means of enabling the wearer to recognize more clearly his surroundings, and when worn should be of a weaker refractive power than that necessary to correct the actual degree of myopia present, and they should not, as a general thing, be put on before the fourteenth year.

If, however, the myopia is beyond a certain degree, say three dioptics, then the use of proper concave glasses for reading and all other near work, may limit in a measure the progress of the disease by relieving the strain on the muscles of convergence, and in this way lessening the tension on the globe of the eye, which is one of the great factors in furthering the march of the affection.

8. In tolerably pronounced degrees of myopia I have found paracentesis of the cornea by means of a fine needle to do a great deal of good. It relieves the intraocular pressure that is often very marked in such cases, and thus retards the progress of the myopia; then another thing, it lessens the chances of detachment of the retina, which often takes place in high degrees of the affection. In practicing the operation, after making the puncture in the cornea, I usually cause the fluid to escape from the anterior chamber slowly, by pressing on the cornea, alternately, with the lower and upper eyelid. Twice a week is as often as I practice this treatment in any given case. The great advantage in letting the fluid escape slowly, is that the shock to the eye is not as great as when it is emptied rapidly.

DR. HAROLD N. MOYER, of Chicago, in opening the discussion, said: While I do not claim to be competent to discuss this paper, yet I feel that something ought to be said because of its evident value. There is certainly no subject in the range of ophthalmology of greater practical importance than the one to which this paper has been addressed. It is an able contribution—one that should be widely read by the general profession. I trust that the writer will not have it printed in the *Archives of Ophthalmology* or in some equally specialized journal, but publish it in some widely circulated journal, so that it can be read by the whole profession; for it seems to me it will do a vast amount of good if it is put into the hands of the general practitioner. In this way the subject can be brought before the various school boards in small as well as large country towns, and indeed in every large city.

DR. C. H. HUGHES, of St. Louis, Mo.: Inasmuch as other gentlemen do not manifest a desire to discuss this interesting question, I can hardly permit such a paper to pass without expressing my appreciation, as a general observer in medicine and a practitioner of thirty-one years' active daily experience, of the value of the position taken by the author of the paper in regard to the best methods of preventing and ameliorating this condition among our school children.

Germany has become largely a nation of myopics, and I hope that will never be the fate of America. There is something in the organic aptitude of the individual that develops myopia. To illustrate: It is not necessary that either of the parents should be myopic, and this question comes as near home to me as any one in medicine, for, belonging to a family that never had to wear glasses prematurely; married to a lady none of whose family had to wear glasses prematurely, there has developed in my family (in one of my children) this trouble. All of the other members of the family are free from it. I never wore a glass of any kind, nor my father or mother, until from 43 to 45 years of age, and these are the circumstances under which myopia appeared in my child.

At the age of 6 years the child became the victim of an exhausting fever—scarlatina. He convalesced tardily so far as the restoration of general vigor was concerned. There were no aural sequelæ, but there was evidence of damage done to the central (neural ganglionic) influences which preside over the nutritional processes of the organism, and it was with the utmost difficulty that I succeeded in rescuing my boy from decline. It became necessary to resort to all the therapeutic resources which would occur to a solicitous father practically familiar with the resources of our art. He was carefully and thoroughly nourished, he was tranquilized at night,

so that he did not lose the sleep he required for recuperation, his digestion was taken care of, and I traveled with him into invigorating atmospheres, but, in spite of all care, myopia developed. It is the first case that has shown itself in my family. There is no ancestral history which would lead us to expect it to appear in the family.

There is a great deal more behind myopia than is dreamed of in our present philosophy. We are very apt to explain it by attributing it to congenital deficiency of development alone, though it undoubtedly is the direct and immediate causative factor. But what is it in the organism of the child that singles out one of a family and, in the process of evolution from infancy up through childhood, causes the appearance of this deficiency? Of course, it is a failure in the central nutritional processes. There is a *minus* condition there instead of that *plus* process. There is a neurasthenic predisposition which makes the sequent myopia a possibility in myopics, and this may be either congenital or acquired. Myopic eyes are like congenitally shortened limbs, or like those trophic lesions that follow certain nerve trunk or nerve injuries, only in lessened degree. The methods of treatment, to be successful, must extend beyond the eye, and the oculist who satisfies himself with the immediate rectification of the condition of the eye alone that presents itself, will have only final failure for his pains.

Now, since the doctor advises outdoor exercise and all the conditions necessary for the proper evolutionary and developmental processes going on in the child, I would like to have him observe in the practice of his cases in the future the result of that treatment, and to find out how many of them are arrested and what proportion are ever cured. It is a question that becomes interesting when it strikes one's own family, and there is no doubt in my mind that myopia is just as much a product of abnormal and inadequate nutritional processes in the organism as the defective conditions in neurotics are, and the ophthalmologist, like the neurologist, otologist, or any other man who does special work in medicine, is the most successful practitioner who extends his range of observation and treatment beyond his immediate environment or practical work.

DR. C. W. MCINTYRE, of New Albany, Ind.: I do not know whether or not the writer of the paper called attention to the fact, that one of the principal causes of myopia is absence of proper light in residences as well as in school houses, but I know that to be true from experience. Myopic patients come to my office and consult me, and, after inquiry, they inform me that their residences and workshops are not properly lighted as I think they should be, and it is really necessary for our school boards to look after the sanitary condition of the schools in so far as they are properly lighted, etc.

I differ with the essayist in one particular, and that is, that the electric light is preferable to the other lights which he mentioned. I think an extreme light is just as damaging to the eye as insufficient light. We know that a number of myopic patients trace their condition to improper glasses used in reading or working. If our sanitary officers were to look after this, we would have less myopia in this country. If there is not more done in the future than there has been in the past, I fear we will get into a condition like Germany. It is necessary for every physician to take this matter into consideration.

As Dr. Moyer said, the paper should be placed in the hands of not only every specialist who devotes himself to ophthalmology, but it should reach the eye of every local practitioner, because we all have more or less of this class of patients which require our attention.

I wish to emphasize the fact that the absence of proper and sufficient light in residences and school houses is one of the principal causes of myopia as well as amblyopia.

DR. DOWLING, in closing the discussion, said: Something should be done to prevent this growing trouble. I am satisfied that were it not for intermarriages, especially in university centres, it would only be a question of time when we would all become myopics in this country. Were it not for the fact that people from the country intermarry with those of the city, myopia would be more prevalent than it is. This intermarriage is the only thing that saves us from becoming myopics. It occurs to me that it is becoming more and more frequent, especially in children, in our large cities. Take, for instance, Cincinnati, or any other large city, and we will meet with a large number of cases.

I believe that the appointment of a private medical officer would be a step in the right direction. I spoke to my friend, Dr. Culbertson, not long ago about this, and he said the health officer was supposed to attend to it. The average health officer has no time to attend to such matters. In a large city with perhaps twenty-five or more school districts, it would take up a good deal of time; nevertheless I maintain that a medical practitioner should be appointed to look after the sanitary condition of the students and regulate their hours of study, etc.

IN order that the changes produced in tuberculous tissues by Koch's fluid may be determined as accurately as possible, the directors of the Charité Hospital at Berlin have given orders that the bodies of any patients who may die after having been treated by the new method shall be examined as soon after death as the law permits. Koch found such early examinations a great help in his investigations on cholera.

THE CLINIC.

UTERINE MYOMA—RENAL CALCULUS AND SURGICAL OPERATIONS UPON THE KIDNEY.

*A Clinical Lecture Delivered at the Regular Surgical Clinic at
Rush Medical College, Chicago, Thursday, Oct. 2, 1890.*

BY CHARLES T. PARKES, M.D.,
PROFESSOR OF SURGERY.

Gentlemen :—The patient before you, Mrs. J. F., æt. 37, is suffering from an abdominal tumor which has been present a number of years, all the time gradually, and of late, rapidly increasing in size, until it has reached the large growth which you see fills the entire abdomen now that it is displayed to view. It is a source of serious trouble and annoyance to her and the burden of it is surely undermining her general health.

She has faithfully, during the last five years, tried various remedies and treatments, but they have proved of no avail; so under our advice, she has come to obtain relief by the removal of the mass.

Quite a variety of opinions have been expressed by different physicians whom she has consulted, as to the nature of the tumor; and this diversity of opinions increases the item of doubt which surrounds all extensive growths concealed by the abdominal walls.

Some have decided that it is an ovarian tumor, cystic in character; others have supposed it to be an outgrowth from the uterus itself, forming what is called a fibroid tumor or myoma. The difference between these two varieties of tumor is very wide indeed, and usually there is no difficulty attending the diagnosis between them.

It makes, also, a very great difference to the patient whether the tumor is connected with the ovary solely or with the uterus. If connected with the ovary it is usually easily and safely removable; if an outgrowth of the uterus, it is removed many times with great difficulty, and the removal is dangerous to the patient, for, in the majority of cases, the uterus and its appendages must be removed with the tumor.

Now we will go over the salient points in the diagnosis of this tumor.

1. It has been slow of growth, giving a history of several years' duration, commencing low down in the midline of the abdomen where it was first discovered as a small hard mass. Its growth has been unattended, until within the last year, with any serious interference in any way with the patient's general health. Its growth for the first year was accompanied with a very noticeable increase in the amount of blood lost at each menstrual period, but the amount of blood lost has never been extremely severe.

2. Palpation of the abdomen shows that the