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Therapeutic and Preventive Medicine.

ARTERIOSCLEROSIS, WITH SPECIAL REFERENCE TO DIET.*

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Mr. President and Gentlemen of the Lynn Medical Fraternity:—

I AM highly appreciative of the opportunity of addressing you on a subject that I have found of the profoundest interest.

Everyone hears very often the term, "arteriosclerosis," but I doubt if many have a clear conception of what is meant when this word is used. The word itself of course means hardening of the blood vessels, but the blood vessels constitute a very important and extensive part of the human body. If you have ever seen one of those anatomical preparations in a museum that have been made by injecting the blood vessels with plaster of paris or some other insoluble material and then putting the part in solution of acid so that all the flesh was eaten away, and the only thing left was the plaster outlining in the blood vessels, you noticed that the blood vessels constituted a very large part of the anatomical structures. Indeed, when you come to consider the capillaries as part of the circulatory apparatus, they constitute, not only

a large part, but a large proportion of the structures of the body.

Though the term "arteriosclerosis," if confined to the blood vessels, would still constitute a very extensive disorder, nevertheless, in clinical medicine it is used to name a disease that is much more extensive than merely the circulatory organs. It is used as a general term to define the degenerative disease in which the blood vessels take a conspicuous part.

The usual cause of this disease is a disturbance of the functions of nutrition, defined also as a disturbance of metabolism, so working back from the name, which is given to the disease because of the conspicuous participation of the large arteries, to the early cause of this condition, we find that arteriosclerosis may be defined as a disease dependent upon a disturbance of metabolism, resulting in thickening of the blood vessels.

It is easy enough for the man who is writing a dictionary to define arteriosclerosis as a thickening of the blood vessels. It is a very different matter to define the actual disease to which we give this name.

The fact is that no one has so far given a satisfactory definition of the disease arteriosclerosis.

It certainly is not merely thickening of the blood vessels, and anyone who stops, after having defined it in his own mind as a structural change in the blood vessels, will not get very far in treating people who suffer from this disease.

The disease is primarily a disturbance of function, and the true pathology of arteriosclerosis

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sis is a moving pathology, that is, a pathology which is all the time changing.

The man with fully developed arteriosclerosis is easy enough to recognize. He is usually a ruddy individual with often prominent temporal arteries, a particularly shiny eye, and all the appearance to the untrained observer, of excellent health. But if you talk to him, you find that he has been rejected by a life insurance company, or that he has noticed some discomfort in his chest when he moves about after a full meal. You will find that he has been a great eater of many varieties of food, or that he has been subjected a few years before to some very severe illness, some great nervous strain or some definite attack of food poisoning.

On examination you find his heart hypertrophied, his blood pressure elevated, and the kidney secretion showing a trace of albumen and a few casts.

Thus you have a picture that is duplicated in many individuals over forty years of age who are destined, if not taken care of, to die in the fifties or the early sixties. When they die it will be said that they died of heart disease or kidney disease, or lately—since the term has become popular—of “arteriosclerosis.”

As a matter of fact they did not die of any of these things. They died of the end result of the habitual change in the physiology of the cells of the body. In other words, they died because the process of nutrition of the individual cells has failed through a disturbance of the relationship of these cells to the food materials by which they ought to be nourished and which ought to supply the fuel for their activities.

The medicine of a hundred years ago gradually became founded upon a special consideration of structural changes that were found in the bodies of people who had suffered from particular diseases. Pathologic anatomy was the banner around which nearly all serious workers in medicine rallied. When the physician had been able to define to his pupils, to his fellow practitioners or in his own mind, the exact structural condition of the organs of the sick person before him, he believed that he had accomplished a task that was more or less complete.

During the past thirty years there has grown up a school of medicine that has paid great attention to function, and has based its opinion upon modifications of function, changes in the chemical processes of the body, and in the habitual attitude of the cells toward outside materials which come in contact with the cells as food or in the form of some invading micro-organisms.

As far as treatment is concerned, this is much more fruitful and helpful than a mere determination of pathologic anatomy.

When we think only of a sclerosing organ it does not hold out very much hope to us that we may be able to do anything for the person who is the possessor of that organ, but when we regard the sclerosing organ as simply the

end result of a process that is still going on and which we can detect and arrest, and when we consider the great and wonderful process of compensation, by which additional strength is given to one organ to compensate for another, or one part of an organ to compensate for loss of strength in another part, we have a new outlook that is extremely promising. The main function of medicine is the making of the sick person well. Curing the sick does not necessarily imply making them sound. That is often not possible, and it is not at all necessary. What is necessary is to balance up the damaged organs with compensating forces and side-track the underlying cause of the original injury.

Thus a man with arteriosclerosis, feeling pain in his chest every time that he moves, suffering from a blood pressure that is so high as to be a danger to life, with kidneys that are unable to perform their functions, can by proper diet, exercise, and attention to the state of his intestinal canal, be so improved that he will present all the appearances of health, perform all labor that can be reasonably required of a man of his age, and can live out the period of his expectation of life as laid down by the insurance tables. That is all one could ask.

So long as disease is defined as the dictionary defines arteriosclerosis, as merely a structural change, there can be no hopeful attitude toward degenerative disease.

This is possible only when we define this degenerative condition, which carries off a large part of those who survive to middle life, as a disease consisting of a change in function, or a disturbance of metabolism.

This word “metabolism” is so good a word that it is worth while to have a clear understanding of what we mean by it. In popular language the field of metabolism is covered by the word, “digestion,” but in medical parlance digestion is rather limited to the processes of the stomach or the stomach and the intestines. Metabolism takes in the digestion in the mouth, stomach and intestines, but it takes in a good deal more. It takes in the chemical processes involved in the absorption of food from the intestinal tract by the body, the changes which take place in this food supply by the activities of ductless glands and of the organs that have ducts, and those processes by which the individual cell takes up from its surrounding blood plasma the food materials that it needs for its nourishment and converts them to its own use.

So you see there are in fact two digestions: There is the digestion of food in the intestinal tract, and then there is the digestion of food by the individual cells.

The logical conclusion of all this discussion is, that in the disease—known to the world as “arteriosclerosis”—*diet is of very great importance.*

The diet of arteriosclerosis has been, and is still, a matter of much discussion by writers on

dietetics. In reading from year to year what has come along on this matter of dietetics, it seems to me that there is a great lack of certainty in dietetic teaching. There are many books on dietetics that do not teach anything practical. They are loaded down with tables of food values—with classification of foods. Some of them enter into the naming of a great variety of different proteins, and there is an attempt to lay down a different dietary for every known disease.

It seems to me that most writers on dietetics have started at the wrong end. They have started at the food end and worked toward the person, while they should have started with the individual and worked back toward the food.

In other words, the question is not whether food is good food, or has a certain food value or what its qualities are, so much as whether it is the right food for the one who has to live on it. It would therefore seem that the proper study of dietetics in disease depends upon a study not so much of the food as upon the reaction of the patient to the food.

We know very well that diabetics are idiosyncratic against sugar. We know that gouty people are idiosyncratic against a meat diet. We know that there are certain people who are habitually unable to deal with certain particular foods. Almost anyone can recall some friend or relative who is made definitely ill by some article of food. The person is idiosyncratic to it.

This disturbance of metabolism that is responsible for the degeneration of the human body, leads to death from a disease that may be defined one way or another, but consists practically of an acquired food idiosyncrasy. Much of this danger can be avoided by observations to discover as early as possible when people have acquired such idiosyncrasies. When these are found, until it is proved that the idiosyncrasies have disappeared, the harmful food must be avoided.

This theory, placing arteriosclerosis as an end result of a disturbance of metabolism, consisting in the large proportion of instances of acquired food idiosyncrasies, is one that I have taught for a long while and is accepted by a certain number of people. A good many persons have never heard of it because the part that any one man plays in the large field of medical literature is very small. Some have definitely rejected it, but many have accepted it, so it is necessary to keep on talking about it, until better light appears.

The main point is that it is a helpful theory. It is so easily demonstrated that people with the severer types of arteriosclerosis do well on a strict diet. The diet must not be founded upon the old principle of the low protein diet, but must be founded upon the new principle of the "few protein" diet. The few protein diet implies the absolute exclusion from the dietary

of those proteins which are believed to be harmful to the person concerned.

My experience has taught me that no diet in arteriosclerosis is of much use in helping the patient that is not a very strict diet. It is easy to appreciate this fact if you will remember the definition of the disease, and think of the cells as having this acquired food idiosyncrasy against particular proteins so that the cell is made violently ill every time it gets in contact with the smallest particle of the protein which is harmful to it. A small amount of the protein to which a person is idiosyncratic will keep up the irritation of the cells that will cause trouble with the kidneys and irritation of the heart. The progress of the changes in the blood vessels and of the disease as a whole depend upon the irritation of the cells.

The only dietitians that have ever been successful in the world have been found among those who, by many, have been considered "cranks." The crank has a definite belief in some particular thing which he is anxious to promulgate and to apply in the control of mankind. It is only firm believers in dietetics who have held people to a sufficient adherence to special diets to prove or disprove the value of them.

Nothing has done more harm to dietetics that I know of than the over-emphasis of the quantitative values of food products. Of its economic importance there is no doubt, but it always left out of consideration the individual. You cannot determine how little a particular individual can live on except by experiments on that individual. You cannot discover by general experiment how much an excess of food a person can stand until you try it on the person himself. The war in Europe has taught us that the minimum amount of food required for the population is but a fraction of what they were accustomed to consume, and a visit to any fashionable restaurant in New York City will convince you of what an enormous excess of food mankind can absorb and yet pay no immediate penalty.

The quantitative value of food in calories and grammes of protein is fallacious because of the varying abilities of people to take care of and appropriate the food that is given them. The man with nervous prostration needs a large quantity of food because for some reason his nervous system is badly nourished, and it is only by the stimulating support of an excessive diet that he keeps himself going. A person with a tendency to tuberculosis needs an excessive diet because experience has taught us that over-nutrition of the body tends to restoration of immunity and enables that person to combat the tuberculosis of infection. These are particular reasons for the over-ingestion of food.

On the other hand, there may be reasons for temporary starvation. There is no question of the fact that under starvation things are eliminated from certain structures of the body that

are never eliminated so long as there is a large food supply. You starve yourself for a day and you have a headache. You wonder why it is. It is because the current of nourishment has been turned from the tissues to the blood instead of from the blood to the tissues, and you are absorbing into the circulation part of your own tissue; this leads to a certain mild autointoxication and gives you a headache. If you starve long enough the headache will disappear for the balance would be restored again.

Starvation is of value in giving the kidneys rest, in diminishing the volume of circulating blood, and easing up the whole machinery of metabolism in general. Thus, in Bright's disease, with dropsy and a failing heart, one of the now fashionable treatments is to give the person the so-called Karell diet. The Karell diet is no diet at all! It consists simply of a pint of milk a day. On that diet the heart often picks up its strength, the kidneys functionate and a moderate attack of dropsy is cleared up in a few days. Of course, you cannot keep it up.

The quantitative requirements of diet are thus not without interest and value, but vastly more important is a qualitative consideration of diet in the determination of what food materials are harmful to the cells of the particular person who has shown a tendency to degeneration. Here the popular tradition of mankind will help us. We find that everybody, both lay people and the profession, are prejudiced against meat in so-called Bright's disease, which nowadays is called cardiovascular-renal disease and is synonymous with arteriosclerosis.

We find as we study dietetics that there is very little distinction to be made between the flesh of fish, animals and birds. We find that all these flesh proteins clinically react in much the same way. So we exclude from our dietaries the flesh of living things, the flesh of fish, animals and birds.

When we experiment with eggs we find that of all food products they present the most definite examples of food idiosyncrasies we meet.

Eggs have often been overlooked as important in the dietetics of arteriosclerosis. Yet I venture to say that there is not a single example of advanced arteriosclerosis of the usual type, that is, the kind which comes on insidiously without any apparent cause and slowly develops, that is not idiosyncratic to eggs, and I have seen a number of examples of very bad arteriosclerosis which were due to chronic egg poisoning. They present certain definite characteristics, and are quite easy to observe.

The person that is idiosyncratic to eggs always has a coated tongue. He tells you that since he can remember he has never had a clean tongue. Such a person benefits promptly on an egg-free diet.

I have a doctor under observation who came to me for treatment now three years ago at a time when it did not seem as though he would

live a month. He had a blood pressure of 230 mm. Hg., swollen feet, severe pain in his chest every time he moved around and numbness in one side of the body which harassed him with the fear of a stroke of apoplexy. He had a badly coated tongue, which he always remembered having. This man was put on a strict regimen because it was an unusually severe condition. He was ordered outdoor exercises, strict diet and several doses of castor oil. On several occasions a phlebotomy of a large amount of blood to relieve his circulation, was necessary. He has been faithful to his treatment and is in pretty good condition. Every time he has eaten eggs in the last three years he has had a very desperate setback, with the return of his symptoms, and he has finally convinced himself that eggs are his arch enemy and were a strong factor in the production of his arteriosclerosis.

Fish idiosyncrasy as a definite cause of arteriosclerosis is not so easy to pick out and prove, but I have seen at least two examples about which I have no doubt. Both of them were captains of coastwise steamships, which made trips back and forth, stopping at particular places where they took on oysters every night. These men formed the habit of gorging themselves with oysters every night and somehow they acquired an idiosyncrasy against them, probably by over-ingestion. They both developed arteriosclerosis and both finally died, because at the time I saw them they had great involvement of the kidneys and had carried their high blood pressure for a long time.

The number of examples of arteriosclerosis developing through meat are probably much greater than through any other single object, and that is in accordance with the accepted traditions that condemn meat more than anything else after the disease has developed.

The important point to remember in this consideration of arteriosclerosis is, that it is ordinarily dependent upon acquired food idiosyncrasies. Therefore, meat is not bad for you, eggs are not bad for you,—if you have money enough to buy them in these days,—but if at any time in your life you have an attack of typhoid fever leading to disturbance of metabolism and permanent change in your relation to your food, then these protein foods may irritate the cells of your body and cause arteriosclerosis. Also if you are subjected at any time to great strain, worry, or anxiety, this is capable of disturbing the metabolism and causing particular proteins to irritate rather than nourish the body. Or, this food idiosyncrasy may be set up from an accidental attack of food poisoning, the so-called "ptomain poisoning," or it may be acquired from the over-ingestion of some particular type of protein.

One of the most interesting examples to me was a man who told me that when he was a boy he gambled for eggs one Easter and won a great many. He consumed all he wanted—and there

were several dozen. He was pretty sick, but he got over it. After that at regular intervals of a few days he was sick again, and no one could account for it. He would go along for a day or two and then have an attack of nausea and vomiting. Finally some one discovered that the attacks followed the eating of any food in which there was a little egg. An egg in any form or quantity would make him sick, and for twenty years he never could eat anything with the smallest bit of egg in it. Being a traveling man it was a source of great trouble. After years he partly recovered from the trouble and was able to eat eggs again without discomfort, but as he acquired arteriosclerosis, it is probable that the sensitiveness to eggs remained in a subsymptomatic stage.

In considering the dietetic examples of arteriosclerosis first, I have touched on what I believe the most important causes. However, there are a considerable number of cases that are due to germ infection.

At first sight, it will seem that this would constitute a very different class but it does not, because bacteria do not act as living organisms in their effect on the body, but on account of the particular relations of the proteins of their bodies to the cells of the animal that they have invaded. You get exactly the same immediate action whether you inject live or dead bacteria into the living body. Of course, the live bacteria can go on to multiply and in that way they are much more dangerous, but the immediate effect is much the same whether live or dead bacteria, because they act only through the chemical constitution of their bodies. Now when the body is invaded over a long period by a bacterium against which that body reacts or to which that body is idiosyncratic, then the cells are irritated very much the same way as they are irritated by food proteins and the resulting arteriosclerosis is very much the same. In this way arteriosclerosis develops in some conditions of chronic suppuration, but there are a great many cases of chronic suppurations which do not develop arteriosclerosis because the body is not sensitive.

The person may escape because the bacteria may not get into the circulation or because the cells are not idiosyncratic against them. Thus probably the colon bacillus frequently enters the circulation and does not do any harm. But if the person develops an idiosyncrasy against the colon bacillus, it becomes a source of irritation, may set up abscesses and do a variety of damage. In this way the same rule applies to germs that applies to foods.

We must also consider the form of arteriosclerosis due to specific disease. The syphilitic cases stand out clearly by themselves. In clinical medicine it is very difficult to pick them out, though of course, now we have the Wassermann reaction to help. However, they do not constitute a very large group. Considering the num-

ber of people infected by syphilis, the number that go on to chronic involvement of the blood vessels and to arteriosclerosis is not very great. The nervous system is more apt to suffer than the blood vessels in proportion to the number of people infected.

Then there is a group of cases of arteriosclerosis where we cannot be certain as to the origin. They occur in comparatively young people and the infection is not always clear. A good many of these sufferers have had scarlet fever, and some of them a severe infection from gonorrhea. Many of them seem to be primarily disease of the kidneys.

What has delayed our appreciation of the relation of diet to arteriosclerosis has been the existence of these types that depart from the rule, as it were—types that were due to syphilis or infection. In the vast majority of examples, there is no such history. Nearly always you can discover a history of an acute disease, a great period of severe worry, or food poisoning.

If I have succeeded in giving my readers an adequate impression of what this disease is—this arteriosclerosis of our time, the Bright's disease of former times, and the "heart trouble" mentioned on every side—I will not have written in vain.

Arteriosclerosis* is a disease that kills more than twice as many in our generation as formerly. Just why this is so I do not know, but the life insurance people whose business it is to record and study mortality give this out as a definite fact. There is no doubt that it is carrying off a great number of the most useful people, and to check this we need some conception of the nature of the disease. As long as we call it "kidney" or "heart disease," we will never get very far in finding a cause. However, as soon as we recognize it as a disturbance of the chemical functions of the body, we think of a possible change of our food. Cold storage has come in and there is a much larger consumption of food than formerly. People take less exercise. Everybody rides nowadays—if not in their automobiles, in the street cars or some other conveyance. Machinery has taken away the necessity for physical labor. In this way many people are deprived of the best preventive in the world for disturbance of metabolism, namely, exercise. Whether the cause of the increase in arteriosclerosis is a change in our food habits, in our habits of exercise or the so-called strenuous life of modern times, there can be no doubt of the importance of food as an intermediate cause and no doubt of the importance of diet in prevention and cure.

* For a further elaboration of this disease, see Bishop's "Arteriosclerosis," Oxford Med. Pubs., London, 1915.