QUESTION BOX LECTURE,

January 26,1914.

Diabetes,increase of,I.

Metabolism,I,2.

Digestion,the process of I,2.

" need of,4.

Starch building stones,2.

Saccharids,(Illus.) 2.

Protein building stones,3 Illus.3,4.

Fats,digestion of,3,4. (Illus.5.)

Starch,protein,fats,5.

Illus,"Mutton dog","mutton man"5,6.

Fats of vegetables like human fats 6,7.

Human fat made of starch 7.

Sheep fat 7.

Piggified-oxified man 7.

Dr. Bronson Alcott

Wendell Phillips

Early flesh abstainers 7,8.

Animal or foreign protein a poison when taken into the body 8.
Exper. by Dr. Vaughan.

The body becomes sensitized 9.

Antitoxin,use of 9,Io.

Foreign protein not always fatal-Explanation Io,II.

Metabolism,constructive,destructive II,I2.

Metal repairs I2,I3.

Fuel food-tissue food I3.

Protein,how much needed ⁷3,⁷4.

High protein diet-Exper of whole human race I4.

Protein ration of baby I4,I5.

Diabetes I5,I6,I7,I8,

" diet in-vegetable fats,vegetable proteins,starch I8,I9,2o.

" caused by autointoxication,Statistics 2o.

" pancreas diseased in 2o,2I.

" diet,antitoxic,results from 2I,22.

" causes of increase,Statistics 23.

Diabetic patients,care of 22,23.

Rheumatism,diet 23.

Non-flesh diet for inebriety(Exper. by Gen'l Booth) 24.

Butcher shop a recruiting station for the saloon 25.

Flesh-eating,effects of 26.

Keeley cure for indigestion 26.

" " harm of 27.

Osteopathy 27,28.

Vacuum breathing 29.

Exercise after supper 29,3o.

Salt 3o,3I.

Diabetes.

Question Box Lecture at the Sanitarium Parlor, Battle Creek, Michigan,

Monday, January 26, 1914

at 8:00 P. M.

by

J. H. Kellogg, M. D.

Q. Can diabetes be cured? If so, what is the treatment?

A. Now, in the first place, what is the matter when a person has diabetes? This question is getting to be one of tremendous importance, because diabetes has increased at such a rate that in fifty years from the present time if it continues to increase at the same rate, seventeen people will die of diabetes where one dies now. In other words, in fifty years, at the present rate of increase, diabetes will have increased 1700 per cent. That is terrible. At that rate,you can readily see that it would not take so many hundred years for this to become a universal complaint. Now diabetes is a disease which grows out of a certain disability, an acquired disability of the body. In order to understand about it we must have a little knowledge about metabolism. That is a technical word, isn't it? It is a new word, but in fifty years from now metabolism will be as familiar a word as digestion is now, and it is just as important a word. The process of digestion extends beyond the stomach and the digestive organs, the alimentary canal. The process of digestion is a process that extends into the entire body, every individual cell of the body. Every individual cell makes digestive ferments similar to those which are made in the stomach and in the digestive organs. Every little cell which the body has made is a cosmos. It is a complete animal and it can digest just the same as the stomach and intestines can digest. Each little individual cell has in it substances which digest protein and which digest sugar, which perform digestive acts, in fact, far beyond those which can be performed in the alimentary canal. Now this process of digestion which goes on in every cell of the body, that is metabolism. Metabolism is the name applied to the

digestion which is carried on in the tissues. There are a great many interesting things about metabolism. I will have to give you an evening's talk about that some time. The study of metabolism is one of the most interesting things in the whole body, of what happens to the food after it has passed through the intestines. I will give you just a little sketch of it now because it is so very interesting.

Food is complex. Starch, for example, is complex. A molecule of starch is made up of smaller molecules. The component parts of a molecule of starch, that is, the building stuff out of which the starch molecules are made, are known as saccharids; a starch building stone or brick is a saccharid. Now a single saccharid, we have an illustration of a single saccharid in what is known as glucose, dextrose or grape sugar. A molecule of grape sugar is one saccharid. When there are two saccharids together that makes a different kind of sugar known as cane sugar or malt sugar or milk sugar. These are di-saccharids. Now when there are a number of these saccharids together, nobody knows how many, there may be at least 30 or 40 and perhaps four or five times that number, a good many saccharids together, they form what is known as poly-saccharid and a poly-saccharid is starch. It is a very curious thing that there should be such a wonderful difference between sugar and starch,yet all the difference is that in starch we have a large number of these saccharids combined together. Cellulose or woody substances of wheat and what we call wood, the cellulose of oak or pine, and all the familiar woods that we are familiar with,this cellulose is also a poly-saccharid. It has just the same composition as starch and it can be converted into sugar. Now the conversion of starch into sugar consists simply in pulling the saccharids apart and reducing them down into individual saccharids, separating them into individuals. Then they become sugar, but while they are together in combination they are starch.

The very same thing is true of fat. Fat consists of a fatty acid, oleic acid, palmitic acid or stearic acid combined with glycerin. Now when we take an alkali and add it to a fat the alkali takes the place of the glycerin, so the fatty acid is combined with the alkali, then we have oleate or soda, for example, which makes soft soap or oleate of potash which makes hard soap. In the process of digestion these are separated.

Now the same thing is true of protein. In the protein we have building stones that are known as amino-acids. These amino-acids are the building stones out of which the protein is made. A protein molecule is immense. It is so large it has more than one thousand atoms in it. It has a molecular weight of three thousand to twenty thousand and there are probably not less than one thousand atoms in a molecule of protein and this molecule of protein is simply made up of amino-acids. They are the building stones that form the protein. Now the process of digestion of starch is simply separation of the saccharids and breaking them up so that the poly-saccharid becomes a mono-saccharid, and the process of digesting fat consists in separating the fatty acids from the glycerin, and the process of digesting protein consists in breaking the large mass of protein, what we might call the building structure, the temple of the protein, breaking it up into the original brick and stones out of which it is constructed. Well, that is what digestion is. Now digestion is really a wonderfully simple thing when you come to understand it. If we put some starch in warm water at the temperature of the body and put that aside, the starch will gradually break up into saccharids. The poly-saccharid will gradually break up very,very slowly but the process will go on very slowly and steadily. Now the ferments which digest starch simply accelerate that process. In the saliva there is a substance which when added to water in which the starch is mixed will accelerate the process of breaking up. That is what a ferment is. That is what digestion is. Now if we take some protein, grind

it up fine and put it into water and let it stand by itself it breaks up into amino-acids very, very slowly. If we add some pepsin to it or some pancreatin or erepsin, the ferments of the pancreatic juice, of the gastric juice and of the intestinal juice, these ferments accelerate the process, make it enormously more rapid so that the protein breaks up into its amino-acids very rapidly indeed. Now the process of digesting fat, we know about that. If we simply add an alkali to the fat it converts it into soap and the glycerin separates by itself. That is the way we get glycerin. The glycerin is a by-product of a soap factory. In the manufacture of soap we have glycerin left. I should say that the ferments do the same thing. Fats mixed with water will break up of themselves slowly. Alkalies will cause them to break up rapidly. When we add the digestive ferments, the stipsin or the lipase, as it is called, the fat digesting ferment of the pancreatic juice or the intestinal juice, this added to fat and water causes the fat to break up rapidly into its fatty acids and glycerin. Why do we need digestion? What is the reason for digestion? The reason for digestion is this: The body cannot absorb and cannot utilize starch. If we put starch into the blood it would be treated like a foreign body. The body could not make any use of it at all. The mucous membrane cannot absorb starch. Starch is a colloid and it cannot be absorbed. Protein is also a colloid which cannot be absorbed by healthy mucous membrane. The mucous membrane will not take it in. If the protein is injected into the blood it is a poison. The substances we use as food, gluten, fibrin and the albumin of an egg are poisons when they are put into the tissues because they are not human protein, and so it is necessary that these proteins should be reduced and separated into their amino-acids in order that they should be absorbed.

Now the very same thing is true of fat. Fat cannot be absorbed by the mucous membrane, but when the fat is broken up into its fatty acids and glycerin, these are readily absorbed. Soap can be readily absorbed. You know that

fat on the hands smears or soils the hands, but if you put a little alkali on the hands it has the effect to combine with the fat and then it becomes soap. Then it is soluble in water and we can easily wash it off our hands. Then it becomes soluble and becomes absorbable. When the starch is converted into saccharids or sugars, these sugars can be readily absorbed by the mucous membrane. When the protein is reduced to amino-acids these are readily absorbed by the mucous membrane. When the fat is reduced to acids and glycerin by digestion, they are readily absorbed. Now after these substances have been absorbed they are reconstructed. This is a very interesting thing. For example, after the fat and the glycerin have been absorbed they are put together again, and this is a very interesting thing that I can drop in incidentally because it is of such interest, that when we eat fats, for instance, if we eat tallow that contains stearic acid combined with glycerin. That is why tallow is hard because stearic acid melts at a very high temperature, so tallow is hard because of the stearate of glycerin or stearic acid there. Now when we take tallow and take it into our bodies, it is broken up into stearic acid and glycerin which are absorbed, and then they are recombined in the blood or the tissues into fat again and become stearin, just as it was before; so when one eats oil, like olive oil, he takes the oleate of glycerin and this is broken up into oleic acid and glycerin, and when this is absorbed into the blood it is reconverted and you have got olive oil in the blood and in the tissues. Now if you take a dog it has very soft fat, while an ox has very hard fat, and the sheep has quite hard fat. If you feed mutton tallow, for example, to a dog, then the dog in place of his natural soft fat will very soon have an accumulation of mutton fat and he will become very solid, and such a dog is known as a mutton dog. This

experiment is often made in physiologic laboratories and such a dog is always called a mutton dog. If the dog eats tallow he is a tallow dog. Now, of course, what is true of the dog is just as true of man. If a man eats mutton chops he becomes a mutton man, don't you see? And if he eats suet or ox fat, he becomes an ox man. Now this is the interesting thing that I am going to tell you, and it is a very practical thing. Now these things I am telling you, I did not discover at all, but I am simply rehearsing to you the information that you can get from any work on physiologic chemistry, and if you are interested you can read the work by Dr. Taylor or Philadelphia, who has written a very interesting work on the chemistry of digestion and metabolism, just out a short time ago, so it is entirely up to date and I have just finished reading it, and that is the reason why I am brim full of it. I have not only finished reading it, but I have read it over twice, and I have dictated an abstract of the entire book and I am having a copy made of that abstract, so that every nurse in the institution can have it, because it is up-to-date information on this question of metabolism, and because it has so many beautiful things that fit right into our Battle Creek philosophy that I am particularly interested in it, and this is one of the interesting things. The fats that are found in vegetables are like human fats, while the fats that are found in animals are unlike human fats. That is a very interesting thing, isn't it? The fats that are found in fishes are so unlike human fats that they are not found in our bodies at all. They are fats that are entirely foreign to us, so that they do not fit the human body at all. Now, fortunately, it is not necessary for us to eat fat at all, at least, very little of it. We need a very little

fat, but we can get along without very much fat, for the body makes fat out of starch. The body takes these saccharids, I was telling you about, and makes them out of starch, but I will tell you more about that in a minute. This is the interesting thing, the thing of great interest. When a human body makes fat out of starch, it makes fat peculiar to itself. It makes its own kind of fat, and no matter what the kind of starch is. When this starch has been converted into fat in the body, it is human fat, exactly the right sort, just exactly what the body needs. Now, of course, when a sheep eats grass, it does not eat much starch. The sheep eats pentoses. The carbohydrate, found in the grass upon which the sheep lives, is not starch, but a pentose--a different chemical compound. So the sheep out of that pentose makes a different kind of fat; makes sheep fat, mutton fat; but the human body out of the starch which it eats, makes human fat. But when we eat the fat of an animal, we simply transport that fat into our own bodies without changing it at all, so that if you eat a pig, you actually incorporate a part of that pig into yourself. When a man has been eating pork freely, he is part pork, and a man who has been eating sheep freely, is part sheep. The actual sheep is there in his body, and it is in just exactly the same condition it was when in the sheep's body. That is a thing to be thought about. So you see, really, there may be some foundation for the philosophy of old Dr. Bronson Alcott, the great philosopher, who was connected with the Brook Farm experiment, who said: "When a man eats pig, he becomes pigified, and when a man eats ox, he becomes oxified", and that was one of his arguments against the use of flesh, for, Dr. Bronson Alcott, as you perhaps know, was a flesh abstainer. He told me in my office, that for fifty years he had not eaten flesh, and it may be news to most of you, at least, that Wendell Phillips was also a flesh abstainer. He was a

sympathizer with the Concord philosophers and the Brook Farm experiment, and he told me he had not eaten meat for fifty-five years. In a very delightful visit I had with him one afternoon in my office, in one of his last trips through the West here, he told me that for fifty-five years he had not eaten meat except on a very few occasions,-when he had tasted fish when there was almost nothing else to eat, when he was on a lecture tour out West, when the bill-of-fare was very meager. I might mention several other persons who did not eat meat for a good many years. Some of the early fathers of the christian church were flesh abstainers. Catholic histories of the early fathers, represent a number of them as being flesh abstainers. Clement of Alexandria, for instance, one of the greatest fathers, and these early histories say that John the Baptist was a flesh abstainer, and that James, the brother of Christ, was a flesh abstainer, and they give some very interesting proofs of this. Some authors away back at the time of the second or third century when these writers were living, when there must have been a good deal of current knowledge that we do not possess at the present time.

Now here are these substances which have been prepared for digestion, the starch converted into sacharids, and the protein converted into amino-acids, and the fat converted into fatty acids and glycerin. These substances are absorbed and then they are, as I have just said, reconstructed. The fat is reconstructed into fat; the protein is reconstructed into protein, into human protein in this case, because it would not do for us to take in animal protein, but animal protein taken into the body, any foreign protein taken into the body is a poison. It is a deadly poison.

A good many of you know that from experience, and what a distressing poison it is. For instance, Dr. Vaughan of the University of Michigan has made many times this very interesting experiment although, of course, it is a cruel experiment, and I am glad I do not have to do it. Dr. Vaughan injects into a guinea pig's body, an ounce or two of white of egg. The guinea pig does not suffer a particle, runs about as healthy and happy as any guinea pig ever was. After three weeks have passed, then Dr. Vaughan injects into that guinea pig just a few drops, half a teaspoonful perhaps, of a solution of white of egg, and the guinea pig shortly goes into convulsions and in a few hours is dead, with terrible suffering. Now, I am sure if some of you saw a guinea pig going through the tortures it suffers after the injection of this white of egg, you would say, "I know just how that guinea pig feels; that is just the way I felt when I had a headache the last time", and that headache was produced in just the same way. It was foreign protein that was taken into the body. When protein is taken into the body, the body becomes sensitized. We won't go into the modus operandi of the sensitizing process, but the body becomes sensitized in such a way that although the first time this protein was not a poison, the next time it will be a poison. That is the reason why doctors have to be so careful when they use antitoxin, to inquire, "Has this baby ever had antitoxin before?" If the baby has had antitoxin once, when the baby gets diphtheria again, and the same dose of antitoxin given to that baby that was given before with perfect safety, the baby would almost certainly die. Many deaths have occurred from antitoxin because of lack of knowledge of that fact. At the present time every intelligent doctor is supposed to know it. There may

be some doctors who are isolated and have not found out, so I think it is a good thing for the public to know about it, that a person who has once had antitoxin, can never take it again without having special precaution. It is necessary to give a very small dose of the antitoxin. Instead of giving 3000 units, for example, which might be given ordinarily, to give one-tenth or one-twentieth or one one-hundredth part of it, a very small dose and watch the effects. That very small dose may produce effects that the large dose did not produce in the first place. This foreign protein, if it gets into the tissues, then it does harm. How can it get in? I have just been telling a little while ago that it cannot be absorbed and how can it get in? If there is a raw surface anywhere it can slip in through that raw surface because the gate is down, so to speak, and the pigs can get into the garden. The skin and the mucous membrane are a fence, a wall built up to keep these materials out from intimate connection with the life tissues of the body. When a thing lies upon the skin, it may be the venom of a snake or the most powerful poison, it doesn't do any harm simply lying upon the skin, but if it gets under the skin, if there is the smallest bit of abrasion upon the skin, it will produce the most deadly effects. The same thing is true of protein. The reason why the snake venom is so poisonous is because it contains a tox-albumin. A little molecule of a very poisonous protein is there in the snake venom. In every molecule of protein, there is a little molecule of poison. In every one of these protein molecules, there is a little molecule of poison. "Well," you say, "why doesn't the big dose kill the man, then?" Because when the big dose is introduced into the body, it is treated like a foreign body. No attention is paid to it, but by degrees the body develops a substance which decomposes the protein and lets out this poison molecule, but it does it so slowly

that it does not do the body any harm. But after the body has once been trained, has once had that experience, it has acquired the power of digesting that particular protein quickly, and so the next time you give a dose of protein, it is digested immediately and all the poison is set free at once and then powerful poisonous effects are produced. That is the explanation. It is a very reasonable explanation which was worked out by our Prof. Vaughan of the University of Michigan, a man of whom the whole state feels very proud because he has achieved an international reputation by his industrious and painstaking investigations of abstruse questions of this sort. Now after this protein then the many molecules, the building stones, after these have been absorbed into the blood, they are constructed by the body into human proteins. They are made into blood albumin and blood globulin--two proteins found in the blood. Then the blood circulates to the tissues and each cell takes out of the blood these two albumins, blood albumin and blood globulin. It takes these two proteins into itself and redigests them, tears them all down again to the original amino-acids into building stones, then recombines these building stones into the particular kind of protein which is found in that individual cell. Now that is metabolism or a part of it, but there is something more. That is, the constructive metabolism or anabolism. It is called the building up metabolism, but there is another kind of metabolism, the destructive metabolism. That is a process which is akin to the breaking up process of digestion. It is carried on under the influence of ferment, just exactly as the process of digestion is carried on under the influence of ferment, and this consists of burning, oxidizing, or combining the protein, the fat or the sugar which is taken into the body, of combining it with oxygen and gradually reducing it down to simple substances which can be

easily eliminated from the body. Now the principal work of the body consists in the burning up of sugar and of fat. Fat is not usually burned very much. The body does not usually burn fat because fat is a storage substance. When we take a meal of starch and the starch is all converted into sugar, the sugar must be stored for a little while in order that we may be able to use it in the intervals between meals. So some of it is stored up in the liver and the muscles in the form of glycogen, a kind of animal starch. The mono-saccharid becomes a poly-saccharid again in the liver and is stored up in that way, but if there is any excess of it, any more than is needed for this kind of storage, that is deposited in the form of fat under the skin inthe muscle, the greater part of it in connection with the connective tissue of the body, and to these connective tissue cells have the power to take the sugar of the blood and convert it into fat, which is a very interesting process. Now the sugar, then, is the fuel of the body; protein is the building material. It is taken for the purpose of building up the tissues in infancy and childhood, for building up the body machine which is made of protein chiefly. That is the living tissue of the body, but the fat and the sugar are used for burning, for producing heat and energy. Now you know how it is with a locomotive. It stops at a station and takes on coal, at almost every station it takes on a little coal, but every once in two or three hundred miles it goes into a machine shop where it is overhauled, looked over to see if there has a nut dropped out here or a bolt dropped off there, and these metal repairs, nuts, bolts, brasses and things which the engine has lost, which have become worn out or broken, these are replaced so the engine itself is put in repair. Now that is metal repairs, you see. The metal supplied to the engine in this way might be in a serious sense called fuel for the engine, and the coal burned in the furnace is fuel for producing the energy with which the train is

pulled. That is exactly what we have in food. We have two kinds of food; fuel food and tissue food, food which is for the purpose of repairing or building the tissues, and food which is for the purpose of burning to furnish heat and energy with which to do the work of the body and keep it warm. Now sugar is the natural food for the body. Fat is made from sugar, but it is sugar stored up for future use, stored sugar, if you please. The protein has no use in the body. Nobody can show that protein has any use whatever in the body except as building material and repair material. Now you can readily see that we do not need such a very great amount of protein then. How much do we need? Well, we certainly need some. I used to talk a great deal about a low-protein diet, but I don't talk about it any more, because I believe in a high-protein diet. We need all the protein we need. I don't believe in people taking anything less than what they need. I think we should have a little surplus rather than a deficiency. I believe in a high-protein diet, and I want everybody to know it from now on. I have changed my views on that subject. The only question now is, what is a high-protein diet? What is high and what is low? That is where the physiologists are all at sea, but we cannot find out, we cannot find out. If you ask a professor, he will tell you, "I do not know". These experiments have not been conducted long enough yet. Prof. Chittenden only carried on his experiments for about nine months, and that isn't long enough to tell whether a ten per cent protein ration is safe or not, but Prof. Chittenden has been living on that ration for ten years now, or twelve years, I think, or eleven years, at least, since his experiments were conducted upon the soldiers loaned him for this purpose by the Unites States Army, volunteers, of course, and he himself has been thriving under it, and I myself have

been living on a ten per cent protein diet for many years and I am thriving under it. Nevertheless, the physiologists say, "A whole lifetime is not enough." They endeavor to put us out of court entirely by saying it takes an age-long experiment to tell what diet is best for a race. A man might say, "This diet agrees with me perfectly well." Yet if that diet were followed for fifty or sixty years, it might produce some bad effect, we do not know. It might produce some bad effects on posterity, we cannot tell. It takes several generations to find out whether a diet is the right sort of diet or not. I have discovered an experiment that is as old as the human race, by which I can determine what a high-protein diet is, and I have discovered a high-protein diet is necessary and is essential, and I have found out what a high-protein diet is. You ask me, "Who made that experiment?" The whole human race has been making it. Every baby is a subject of this experiment. A baby is nourished by mother's milk. Now, there is an experiment which has been repeated every time a baby was born and was nursed. It has been fed on mother's milk. Now if we can find out how much protein there is in mother's milk, we will know exactly how much protein is necessary for the baby. Now, I never took very much interest in that question until recently, because I sort of took it for granted that mother's milk was such a very high-protein diet, it was entirely out of the question for adults to think about. I confess, I have been so stupid and occupied with other things that I had not looked into that question, but in reading Prof. Taylor's work on the Chemistry of Digestion, I ranacross this interesting fact, which I confess I had been so stupid as to overlook, that the protein ration of the baby, which is necessarily a high-protein ration, is not nearly so high as I had supposed it was. A baby is being built. It is a human machine that is being constructed. Hence it needs the largest amount of protein an individual can ever need in its lifetime. It must need it when it is being built. It takes more metal to build a locomotive

than it ever takes to keep it in repair, doesn't it? When a locomotive is being repaired or built in a shop, in the course of six months or six weeks, the metal has to be put in very rapidly. Here is a baby growing so fast that it doubles its weight every few months. Some animals double their weight in just a few weeks, and the more rapidly the animal grows, the larger the amount of protein in the milk supplied to the animal. Cow's milk contains twice as much protein as mother's milk because a calf grows more than twice as fast as a baby does. A baby doubles its weight in nine or ten months, so it must have a high-protein diet, and if we can find what the proportion of protein in the baby's diet is, we shall know what a high-protein diet is. Dr.Taylor has worked that out and he finds that the baby requires only one caloric per pound of its weight. One and one-tenth calories are required to a pound of body weight. If a baby weighs ten pounds, it requires eleven calories a day of protein, so if a man weighs 150 pounds, he requires not more than 165 calories of protein a day if he takes a high-protein diet such as the baby has. But now I don't suppose he needs anything like as much as that, but as I said a while ago, I believe in a high-protein diet. I recommend people to take one calorie per pound of body weight of protein, so you do not need to worry about that any more, for a baby can grow on that proportion of protein. It can build up its body, and if it can, certainly an adult can keep his body in repair, because the amount required to keep the body in repair is very, very much smaller than the amount required to build the body. Now what has all this got to do with diabetes? We are just getting around to that question. I was telling you a little while ago that sugar is the fuel of the body. I have been giving you a little talk on metabolism so you would appreciate this thing. Sugar is a body fuel. Protein is not fuel. Protein is tissue food, not fuel food, but sugar is the fuel of the body and if the body has more than it needs to burn for the present moment it deposits the sugar in the form of starch. If the

body gets entirely out of ~~xxxxxx~~ sugar, then it burns its fat, and that is why we lose flesh when we stop eating. We are simply burning up our fat, which is the stored up sugar. Now a diabetic is a person who cannot burn his sugar. He is crippled. He has lost the power to burn sugar. Now if he is a mild diabetic he has only lost that power in part. He can burn some sugar, but cannot burn enough. He cannot burn a proper amount of sugar. As the diabetic goes on he burns less and less sugar as the disease advances until after a while he gets to a point where he cannot burn any sugar at all. Then he has to live on his fat entirely and he can still burn fat. He can eat fat and burn it. He can burn his own body fat, but as the disease advances, by and by he gets to a point where he cannot burn the fat, and then he is a bad diabetic. He has a grave case of diabetes and he goes on down pretty fast then, and after a while he gets so he cannot burn any fat at all, so he cannot burn any sugar at all, and then he dies. Now the beginning symptom of diabetes is a little sugar in the urine, just a little, when a person eats a large amount of sugar. If a person eats no sugar at all or very little sugar, and gets the smallest amount of sugar in his urine under those circumstances, he is a diabetic; but anybody can eat enough sugar so that some of it will pass through into the urine, and if a person ate half a pound of sugar and some of this sugar appeared in the urine, he would not be necessarily a diabetic. He has simply overwhelmed his body with more sugar than it can utilize and some of it slipped through the kidneys, but if a person eats a meal simply of starch and no sugar, and any part of it slips through into the urine, that person is a diabetic for, under such circumstances, there should never be enough starch slip through so there will be sugar appearing in the urine. As the disease advances, there is more sugar, and more and more sugar, constantly a larger amount of sugar. There may be a

half a pound of sugar or a pound of sugar, or even more than that. We have had cases here in which persons were losing through their kidneys a pound of sugar a day. After a while something else appears in the urine, and if we have a case of diabetes and this something else is not there, we always have great hopes that we are going to help that patient, but here is something else that appears and it is a matter of a great deal of importance to know about it, and that is, acetone or diacetic acid and betaoxybutyric acid. The appearance of these substances in the urine means that the body has lost its power to burn fats. Fat contains about nine calories of energy to the ounce. The diabetic is able to burn that fat in part. He can partly burn it. He cannot burn it up completely into carbon dioxide and water, as he did, but he can only burn about half of it, so that there is about five calories left in the molecule, and this half burned fat is betaoxybutyric acid or diacetic acid or acetone. These are the substances which are left from this half burned fat, and these half oxidized fats are highly poisonous substances and there may be associated with them other still more poisonous substances that we do not know about, those very highly substances, and when they are circulating inthe blood they poison the brain, they poison the nerves, they poison the entire body so that a person who has acidosis, as it is termed, that has these acids in the urine, is said to have acidosis, and when a ~~patient~~ diabetic gets to the point where he has got acidosis, then he has gotten to the second stage of the disease, he has gotten to that stage of this disease where he cannot burn fats, and this condition is a bad one. If he goes on still, and the acidosis rises higher and higher, by and by the patient begins to suffer from nausea, gets headaches, feels weak, has distress in breathing, then he begins to feel drowsy, after a while perhaps goes to sleep and don't wake up. That is the way the disease often ends. Now there is a great deal more to be said about this, but to try to tell you what needs to be done for diabetes is rather a complicated question. It depends upon what stage of the disease has been

reached. There are three stages of the disease. The first stage is a stage that is easily corrected. There is only a little sugar in the urine, and if the patient's diet is regulated the sugar disappears entirely; and the second stage is when the regulation of the diet does not cause the entire disappearance of the sugar of the urine; and the third stage is that form in which the patient has lost his power to use or to oxidize the fats, and he has acidosis and this acidosis is constantly present. Now it is wonderful how much canbe done in the treatment of diabetes by a careful study of the case. The first thing is to find out just exactly where the man stands, to find out what stage of the disease he is in, whether the beginning stage, the middle stage or the terminal or third stage of the disease. Now the next thing is to adapt his diet exactly to his condition. If the patient has lost the power to digest sugar, then we have got to feed him on fats, and we have got to manage his diet in such a way as to keep him alive and to give him the right kind of fat, the fats that are the most easily digestible. We could not feed him on butter fats, because they are not easily utilized by the body, but give him fats which are nearly like those of the body, because we can deal with those the most readily, and these fats are the fats found in vegetables. Vegetable fats are by all means the best for the diabetic. Now it is also possible for the diabetic to utilize protein. There is sugar in the protein and the body can get sugar out of protein if it is supplied the patient in proper proportion. If we give a great excess of it, we will do him harm, because we will get putrefaction in the colon and autointoxication. If we give him just the right amount of protein, just the amount he can utilize, he can get some sugar out of the protein. About half of protein, just about half its weight is sugar, and it is found that the vegetable proteins are far more serviceable to the diabetic who can utilize them, very, very much better than the animal proteins, which is

a very interesting fact. Now another interesting thing is that the patient can utilize different kinds of starch with different facility. Here is a man who can digest oatmeal starch, a diabetic that can digest oatmeal starch and digest quite a large amount of it, whereas wheat starches he cannot digest at all, or very poorly. A principle which is universal with diabetics is that the diabetic can deal with one starch better than with a variety of starches, and the larger the number of starches the more trouble he has, so it is better for him to have one starch at a time, instead of having several, and of these several starches oatmeal is most commonly the most easily assimilable, and if a patient takes a diet consisting of green vegetables which contain no starch, practically no starch, and oatmeal with butter, olive oil or fats of some sorts, vegetable fats are best. I have been for 20 years trying to find a vegetable substitute for butter, particularly for the benefit of these diabetic patients who cannot utilize so much ordinary butter. I am glad to tell you I have succeeded at last. I will have some of it on the table in a day or two, so you will have a chance to test it. We are eating it at our house and like it first rate, and I think you will find it pretty hard work to tell that it is not called butter. The principal difference is that it is better. It is a little sweeter than ordinary cow's butter. It is found that potato starch will agree with some patients better than other starches, so we must test out each individual case and find out which particular kind of starch is suited to his particular case. Then we must find out just how much starch, how much protein and how much fat he can utilize.

If we have too much fat he will get acidosis in consequence of it. If we have too much protein he will get autointoxication. Now there is one question you want to ask me, and that is, what is the cause of diabetes. If you ask me that, that question has been asked me, I suppose, five hundred times, at least, and I have already said I didn't know, that nobody knew, but now I think I can tell you that we practically know what is the cause of diabetes. The more recent studies within the last year or two have brought out some wonderfully interesting facts, and I have ventured the opinion for a good many years that autointoxication was the cause of diabetes, but people smiled. They said that Dr. Kellogg was mad on the question of autointoxication, that it was a hobby of his that he liked to ride on all occasions, and that he attributed everything to autointoxication. Well, I have never thought that I was so addicted to riding a hobby that I would form a conclusion of that kind without a reason for it, and the reason I have believed that autointoxication, intestinal intoxication, had something to do with diabetes, was the fact that intestinal intoxication always accompanied diabetes, that whenever we find a patient suffering from diabetes he always gives a history of chronic inactivity of the bowels, always has very foul stools, very bad intestinal flora and has intestinal autointoxication. His skin shows it. He has a dark complexion generally, unless he is in the beginning of the disease, and has indican in the urine, a large amount of indican, another proof of autointoxication. Now the recent studies on this subject have shown a very intimate connection between these intestinal infections and diabetes. 97 per cent of cases of diabetes, according to a recent authority, show a diseased condition of the pancreas. Post mortem examination shows that the pancreas is diseased. What has that to do with diabetes? It has this to do with it. You know I told you this process of burning sugar was a digestion process and it takes place under the influence

of a ferment. Now it is found this ferment is produced in the pancreas. The pancreas produces pancreatic juice which is poured into the intestine to digest the food, and it also produces a ferment which is absorbed into the blood and carried perhaps by the white blood cells or otherwise to the muscles, and there in the muscles it combines with another ferment and these two ferments together burn the sugar which gives muscular energy and which keeps our bodies warm. Now when the pancreas becomes diseased, as is found to be the case in 97 per cent of all cases of diabetes, if it loses the power to make this ferment, even while it may still have the power to make pancreatic juice, it may lose the power to make the ferment which burns the sugar, and that is the beginning of diabetes. As the disease goes on the pancreas becomes more and more diseased. The sugar increases in quantity and the disease advances, and that is why it is so hard to cure this disease by the methods which have been employed heretofore. It is because the cause still continued to operate. Now it is found that this diseased condition of the pancreas is a pancreatitis. It is a disease that comes from infection. It is found it is due to bacteria which work their way up through the ducts of the pancreas into the pancreas and infect the pancreas and set up inflammation there, which is entirely akin to the colitis which is found in the colon and to the colicystitis of the gall bladder and the inflammation of the gall ducts. These conditions extend up into the pancreas. It is due to intestinal autointoxication. It is very necessary that every diabetic should be treated, first of all, for intestinal intoxication. The diet should be an antitoxic diet, and you can readily see why it is that a meat diet has never cured diabetes. The more meat a patient ate, the worse the autointoxication, the worse the pancreatitis, and the more the disease would advance, and that has been the case. We have been treating these cases here without meat at all, giving vegetable proteins instead, and the re-

sults we have secured have been sometimes very striking. I remember very well an eminent clergyman who came here a year ago now, just about a year ago, and we found him suffering from diabetes. He had been suffering from it for five years. He was discharging from his body three and a half ounces of sugar every day, and for five years he had suffered in this way, had lived almost entirely upon meat. He thought he must live upon meat. He had eaten a great deal of it and was very fond of meat, had eaten it largely all his life. If meat will cure diabetes, it certainly ought to prevent it, but it had not prevented it in his case. We put him at once upon a non-flesh diet, a diet of vegetable proteins, and it is very, very wonderful what improvement he made. In four or five weeks the sugar had entirely disappeared, and although he returned to his work and has not been under treatment now for eight or nine months, I got a report from him a short time ago that repeated examinations had shown that there was not a particle of sugar present, so it is possible to cure this disease. This was a case in which there was no acidosis, and cases in which acidosis has not appeared are, I believe, the great majority of them practically curable. This gentleman could easily get diabetes again by eating an enormous amount of sugar or any excessive amount of carbohydrates, but we have found he could eat every day 700 calories of carbohydrates, and we found that he ought to take about 350 calories of protein. Then the balance of his ration was fat. He had still the power to oxidize fat completely, so he could live on a fat protein diet with a small amount of carbohydrates, just enough to furnish the sugar to him that his body needed. The body can burn fat and can get sugar out of the fat, and can also get some sugar from the protein in this emergency. Every patient who has diabetes should be put under careful observation in an institution. Very little can be done for these cases in the ordinary routine of home practice, because the patient's diet must be absolutely regulated in the scientific way. The urinary

examination must be made every day for a week perhaps, in order to know the effect of every meal of every day's ration, until finally the exact capacity of the patient has been worked out for burning starch and for utilizing starch and for utilizing sugar and for utilizing protein, and when we have got a formula for a patient once made, then the patient can follow that for a considerable length of time, but he must return for examinations, must have the examinations repeatedly made. We have gotten up what we call a metabolism chart, which shows graphically just exactly the effect of the different dietaries, and these are prepared by our dietitians and shown to the doctor every morning, and the chart shows at once what was the effect of the diet the day before, so the doctor knows what to do next. The reason why diabetes is increasing so rapidly is not because we are eating so much sugar. That is one cause, but the worst thing is, we are eating so much meat. It is the meat-eating, producing auto-intoxication and infection of the intestine and infection of the pancreas and a damage to the pancreas. That is the thing that makes diabetes. The country uses an enormous amount of sugar. It is somewhere about 85 pounds of sugar per capita every year. Every man, woman and child living in the United States, even including the babies a day old, on an average uses between 80 and 90 pounds of sugar a year. That is over a quarter of a pound of sugar a day, you see. That is a lot of sugar, so we have got an immense sugar consumption, but the meat appetite is worse yet. We consume nearly 200 pounds of meat per capita every year, including fish, nearly 200 pounds per capita. That is more than half a pound of meat a day for every man, woman and child in the country; but I must hasten and answer a few of these questions.

Q. What is the best diet for rheumatism? For a person who also has appendicitis and intestinal pain?

A. The best thing is a laxative diet. The best thing for that man is a diet which will produce free bowel movements, three or four bowel movements a day, and an antitoxic diet, that is, a diet from which protein is largely excluded. Rheumatism is one of the diseases that comes from a high-protein diet.

Q. What is the best treatment for inebriety in a man fifty years old, who has been a habitual drunkard for twenty years, on sprees, etc.?

A. The best treatment is to send him on a long voyage, on a ship to be gone three years or so. That is the very best treatment I know of for that man. If you put that man on a strict antitoxic diet, it is very likely the appetite will leave him. On a non-flesh diet the appetite for tobacco and alcohol is very likely to disappear. It does not in every case, but is very likely to. There is a large experiment being carried on by the Salvation Army in England. It has been conducted for nearly fifteen years now. They have for about fifteen years carried on this home for inebriate women on the plan. It is a home for inebriate women. The court sends to this Salvation Army Home women that are considered absolutely incorrigible. They are committed to the Home. They are the very lowest grade of drunken women found upon the streets, and are considered absolutely incorrigible. They are turned over to the Salvation Army, and they have this Home. Now about twelve or fifteen years ago General Booth, who was a flesh abstainer for more than 20 years before his death, asked the person in charge of this Home, the superintendent, to try the experiment of feeding these women on a non-flesh dietary. Now the superintendent gave her annual report. I remember very well reading her first annual report when it came out. She said the transformation in those women was simply wonderful. She said, "Why, those women when they first came in here were so perfectly crazy for drink that for three or four weeks we couldn't do anything with them but hold them. They were perfectly wild, crazy. We had a terrible time,-could not get them to do a thing. They would not work or occupy themselves at anything, but since we have fed them the non-flesh diet, within three or four days after these women come here, they become docile and tractable, take hold and help about the work, and seem to lose their appetite for liquor in a very short time. This is simply an experience

that has been known to us for more than forty years. In this institution here, for more than forty years we have followed this practice of withholding flesh meats entirely, and the high-protein diet, putting the patient on a low-protein diet, and the appetite for tobacco and the appetite for liquor seemed to drop off when a patient adopted a natural dietary. There is a very strong suggestion in that, my friends. That is, that the butcher shop is a recruiting station for the saloon. The craving for alcohol is one of the effects of saturating the body with uric acid, which produces a state of nervous irritation that demands something to quiet it. Tobacco and alcohol are the narcotics that are needed to keep down the nerves that have been over-excited. By the toxines, the poisons that are formed in a heavy meat diet. I have not a particle of doubt that is absolutely correct. In thousands of cases, experience here bears out that statement very perfectly. In thousands of cases this thing has been observed. If I were to get the testimony of the people in this room at the present time, I dare say there are twenty people in this room that could testify to the truth of what I have said, not as regards alcohol, but as regards the use of tobacco. I presume there are twenty people in this room that have had friends, perhaps, who have had this experience, that after they have adopted the Sanitarium bill of fare, the appetite for tobacco rapidly disappeared, some quite intimate friends, perhaps, in some instances.

Q. How does the cold coil to the heart differ in effect from the ice bag?

A. It is better, because the ice bag is colder. The cold coil is 60°, and that has a more moderate and permanent effect upon the heart than does an ice bag which, being at a lower temperature, is more exciting.

Q. If beef steak contains so much uric acid, how is it that one does not feel some of the bad effects immediately after eating it?

A. There was a New York doctor here attending our Race Betterment Conference a little while ago. He had been accustomed to living entirely on coffee and beefsteak, and he was very much disappointed when he found no beefsteak and no coffee and no smoking room here. He had to smoke all the time between meals to counteract the effects of the beefsteak and the coffee at meals, you know. However, he got along for two or three days, but at last he thought he must have beefsteak, so just before he left for home I met him at the depot, and he said: "Doctor, I have been over there to the Post Tavern, and I got a big beefsteak and it lies heavy on my stomach." He says, "It always does, but I like them." I said, "You remind me of a little boy who asked his mother for another piece of turkey. She told him it would make him sick if he ate some more turkey. He said, 'Please, mamma, give me another piece, and send for the doctor.'" That is the way people are willing to do, do the things they know are going to do damage, expecting to call upon the doctor to help them out. I met a mansome years ago, and was remonstrating with him about his diet, and he said, "Now doctor, I am paying no attention to my diet at all, because I know a doctor down in Pennsylvania that has got a medicine that will knock out the worst case of dyspepsia I ever saw. I had a friend who had terrible dyspepsia, nobody could be worse than he was, and he went down and got this doctor's medicine and in a few days he was all right, so whenever I get into trouble with my stomach, I am going to that doctor and he will knock it out all right, and his medicine will do the business." He thought he had a sort of Keeley Cure for indigestion, you see. The Keeley cure has done a great deal of harm in that way, by making people think it was an easy remedy to cure the appetite for alcohol, for liquor, and counteract its bad effects. But when a man has gone on using these things until he sees that tobacco is hurting him,

till he finds he has got to stop, he is ruined, he is spoiled. It is a good thing to stop, but not very much use, as he is a wreck already. When a man has used cigars until he sees they hurt him, he has got an irreparable damage. Of course, it is better for him to stop than it is for him to keep on smoking, but still, the great benefit he might have got from stopping when he began, he has lost, because he has used up his capital, you see. As long as he had a margin of safety left, he didn't know it was hurting him. He has been using up that margin of safety, that capital, that vital dynamo of energy which was intended to keep him alive away on to old age. He has been burning that up at the end of a cigar, puffing it out in smoke, until he has finally got down where he has just a little bit of margin left, and when he smokes a cigar it uses up that margin right away, and he feels the bad effects of it right off, so he has not got much to go on; he is not much worth while.

Q. Where do pine nuts come from?

A. From a special pine tree known as the "nut pine", which grows in mountains three to five thousand feet high. These nut pines grow very extensively in Spain, and the pine nuts we get come from Spain. They also grow in the coast range of California, of the Pacific Coast, and the Indians gather them and have for ages subsisted very largely upon these pine nuts. They use them all the year.

Q. What is osteopathy?

A. The Lord only knows, I don't. When osteopathy first appeared, it claimed to be dealing with sick joints and bones, but it has spread out, enlarged, enlarged and enlarged, until it includes gynecology and everything else now-a-days, and that is a good thing to keep away from. Whatever good there is in osteopathy was known before osteopathy exported it; whatever is good is old; whatever there is new in osteopathy, I think amounts to very little. There is really almost nothing at all in it that is new except

the extraordinary claims that are made. For instance, rubbing the back of the neck is said to cure diphtheria. I talked with an osteopath, one I thought was an unusually intelligent one, and he was surprised when I expressed lack of belief in this idea, that rubbing the back of the neck would cure diphtheria, and he said he knew it would, for he cured a neighbor's daughter of diphtheria by rubbing the back of the neck; so you can see that there are some things in osteopathy that are absolutely unscientific, and it is a strange mixture of things that are good and things that are dangerous, and for that reason it is not to be relied upon as a scientific method. There are exercises that are used in osteopathy that are old as the hills. I understand that Dr. Still, of Missouri, sent to Stockholm, Sweden, and got expert men who understood the Swedish movements, to come to his place and teach his students the Swedish movement system. I visited Stockholm myself, personally, more than thirty years ago, and became familiar with this system and imported a number of people from Stockholm to instruct our nurses, and we have at the present time in the institution several people who have been trained in Sweden in the Manual Swedish Movements, so this system is known here as the Swedish System. It is the basis and foundation of osteopathy, but the osteopath has added to it various sorts of hocus pocus which they claim will accomplish things they do not accomplish.

Q. What is the cause of neuritis?

A. It is in many cases due to poisons in the blood, which are in many cases absorbed from the colon.

Q. I have almost recovered from chronic indigestion. While sick I lost about one-fourth of my usual weight. I have no trouble in digesting my food. How many squares of butter would you advise me to eat each day, if it agrees with me?

A. I should have to say that the data given is not quite sufficient for a scientific answer. I should want to know how tall this person is. I should say, in a general way, that it would be perfectly safe to take a couple of squares of butter or to add an extra ounce of butter and three or four ounces of starch. Add, say, 500 calories of carbohydrates, and a couple hundred calories of fat.

Q. Can a person breathe in as much air through the mouth as through the nose?

A. Yes, he can breathe it in just as well, but the nose filters the air, which is the advantage.

Q. What effect will a bad state of saliva have upon digestion?

A. It would be inactive, and food would not digest properly.

Q. What is vacuum breathing?

A. Vacuum breathing consists in breathing into rarified air, and the effect is to aid expiration. We find it very useful indeed for a person suffering from asthma. A person who has asthma finds it hard to get the breath out. It is easy to get it in, but he cannot get it out, because the small air tubes of the lungs are contracted,so such a person breathing into rarified air will be assisted, for the rarified air will tend to draw the air out of the lungs.

Q. What should chronic asthmatics avoid of the Battle Creek Sanitarium bill of fare?

A. I don't know of a thing on our bill of fare that is injurious for an asthmatic or anybody else.

Q. Why does the march come so soon after supper?

A. Because it is partly for entertainment, and partly to make you forget that you have eaten. That is one reason we have these exercises.

Another thing, we find the simple exercise, not violent exercise, but this general exercise, is really favorable to a person's digestion. It stimulates the muscles of the diaphragm, and that aids digestion. It makes the heart beat faster, that pumps more blood around the stomach, and that aids digestion. If you suffer from pain after eating, from a good deal of heaviness and distress, you better lie down for half an hour, and do not take the march. If you don't have pain in the stomach after eating, don't feel a wretched heaviness there, then the exercise won't do you any harm.

Q. Is the continuous use of mixed bran food, such as bran gems and bran biscuit, etc., harmful to a child of two years?

A. I don't believe a child of two years, or any age old enough to eat bread, would be in any way harmed by the use of graham or whole wheat bread. That is the natural way to eat the grains, anyway.

Q. Do you think music will ever be used in the treatment of nervous disorders?

A. No doubt it will be. It has been tried repeatedly. Dr. George M. Beard of New York, one of my old teachers, was one of the first to make this attempt, about thirty years ago, and it was quite successful.

Q. Is a large amount of salt injurious?

A. There is no doubt about it. Salt is an article which the kidneys must eliminate. The body needs a small amount of salt, but all that is necessary is found in the ordinary food, and there is evidence for believing that the salt in the food is in organic combination, and consequently is a little different from the salt we get out of the salt barrel and the salt-cellar. It is better prepared for the use of the body, and all the salt that is necessary is found in the natural foodstuffs. We don't have to add salt, unless we feel a

little necessity for it in order to make the food palatable, and if that is the case one can become accustomed to less salt and less salt by a little careful training of the palate, so that by and by you would be able to take food with no salt at all, and relish it quite as well, or at least with very, very little salt. All I can say about this is, that a little salt is not a very harmful thing for the body, but for the ordinary individual, in large quantities it is very harmful, and should be eaten only in small quantities, and can be dispensed with without any danger. "But", you say, "all animals eat salt." That is not true at all. Carniverous animals do not eat any salt at all. Insects do not eat salt. You often see flies hovering around a sugar barrel, but never around the salt barrel. The insects outnumber all the other animals one hundred to one, so the majority is on the side of no salt, you see. But even herbivorous animals, some of which do eat salt, do not necessarily eat it. Out West, where the cattle occasionally visit salt lakes, they don't visit them all the time. In winter time they are frozen up or dried up, the salt springs which the cattle visit. The cattle up in the mountains, grazing up there, come down in the summer time and visit the salt lakes at certain seasons. The steer on the West end plain does not travel five hundred miles every day before breakfast to get to a salt lake. It only visits these salt lakes once in a great while. Now, as a matter of fact, antelope of all sorts get on just as well without salt. In Central Africa, where there are millions of square miles where there is no salt at all, the antelope grow abundantly and are the most active and most numerous perhaps of antelope to be found anywhere on the face of the earth at the present time in Central America where they have no salt at all. If you take a walk on a pleasant day out to my house at the end of Manchester Street, you will

QUESTION BOX LECTURE.

February 2,1914.

High blood pressure-joy, nursing baby anger, envy, depression (Dr. John Hunter, Spartan mother I,2.

Optimism.

Sunshine manufacturing, smiling, down in the mouth, pulling corners of mouth up, getting the laughing muscles going 3.

Turning up the nose (the levator labii superioris alaeque nasi muscle) 3

A solemncholy face, a "long-favored countenance", attracting sympathy 4.
Keep your face straight and the rest of the body will take care of itself 4.

A smile makes sunshine that strikes in, and will keep the blood pressure going down 4.

Napé another kind of tea 4.

" chewers of South America show signs of chronic intoxication 5.

Coffee taster expert effected by caffeine 5.

Caffeine in Coco-Cola, tea, coffee 5,6.

" drunkards 5.

" is the "chemical devil" in coffee, tea, Napé, Coco-Cola 5.

Coco-Cola, paralysis from 4o glasses a day 5.

Drug fiends, drinkers of 25 or 3o cups coffee per day 6.

365 grains of poison dose for average American 6.

Meat in summer 7,8.

" no for fever patients 7,8.

Protein stimulates the body more than it feeds it. (Prof. Mendal's observations) 7,8.

Obeying instinct in summer 8.

Perverted " No demand for meat 8.

No ham sandwiches in J.H.K's kitchen-Tramp's satisfaction with the "real thing" 8.

Satisfaction wanted not meat 8.

Prof. Zuntz of Berlin enjoyed protose steak 9.

Nature's bill of fare-great variety in 9.

Meats,few kinds of 9.

Did not want to eat a singing bird Io.

Cannibal's idea-"The more noble the animal,the more noble the diet" Io.

Bite of animal,no natural instinct for taking a Io.

Boys cannot be kept out of cherry trees any more than birds Io.

Boys' stomach,effect of cherries in II.

Menagerie of dead things II.

Bad breath,bad complexion,autointoxication,high blood pressure II.

High blood pressure diseases not caused by Nature's food II.

Beefsteak,uric acid,sweetbreads (Dr. Hall's Exper. II,I2.)

Gout,apoplexy,hardening of arteries,Bright's disease I2.

Urine of child used as medicine less than Ioo years ago I2.

Uric acid-beef tea,bouillon,extract of beef I2.

Extract of beef cannot rot again I3.

All but the squeal utilized I3 .

Pleasant flavors of meats derived from delightful flowers and vegetables I3.

Nature,marvellous alchemy of-Tar from wood,colors from tar I3.

Vegetable food from the original mine I3.

Animal food second hand I3.

Trachina,history of (Germany) I3.

Poluted food I4.

Brown gravy,vegetable bouillon compared with beef extracts I4.

No need of going down to the shambles for sweet flavors I5.

Meat not essential for brain workers I5.

Brandy at end of meal I5.

Alcohol,tea,coffee,vinegar,effect on digestion (Sir Wm. Roberts Exper.) I5.

Nutrition,undue acceleration of I5,I6.

A scientific conscience I6.

Protein-Statements by Prof. Rubner and Prof. Taylor I6.

Battling Nelson "knocked out" by extra beefsteak I6.

Pugilist fights with nerves as well as muscles I6,I7.

Judge of Supreme Court benefitted at vegetarian restaurant I7.

Animals,non-flesh-cating (reindeer) I7.

Anaconda asleep for three months I7.

Toxines,paralyzed by I7.

Ready for business I7. vegetarians

Dr. Wm. Lambe's experience I7,I8.

Kidney stones I8.

Cornmeal,wheat,rice I9.

Corn,the key-stone is lacking in (Exper. with cattle I9.)

Diet for boy of Io or I9.

Oysters,sanitary I9,2o.

" starved in fresh water,oyster broth 2o

" and typhoid fever in England 2o,2I.

" inspection of 2I.

" scavengers 2I.

Baby of Io mos. diet for-Milk of nuts in Philippians 2I.

Protein of nuts 2I,22.

Mucous membrane,a new 22.

Fomentations for reconstruction 22.

Asthuma-colon poisons 23.

Bad breath of I5 years relieved in half an hour 23.

Water drinking at meals 24.

Cancer 24,25.

" operated upon 7o times 25,26.

" fighting off 26

" some people not capable of having 26,27.

" inoculation (Exper. on criminals)27.

" healthy persons 27.

Build up the body-discard meat (Exper. Dr. Ross and DR. Lambe)27.

Hyperacidity,diet in 27,28.

Indican 28.

Candy in giving up smoking 28.

Catarrh,absorption of toxins 28.

Heart trouble and high altitude 3o.

Sanitarium not a paying institution 3o.

Lion suffers from autointoxication-man poisoned by Welch's bacillus 3I.

Obesity 3I.

Stomach,worn-out 3I,32.

Sauer-kraut,dill pickles 32.

" like farmer's greenstuff in silo 32,33.

Olive oil 33.

Mutton tallow,mutton dog,oxified man(Bronson Alcott 33.)

Gastric ulcers 33,34.

Cured by Nature 33,34.

Live the simple life,and you need not be afraid of anything under the sun 34.

Question Box Lecture at the Sanitarium Parlor
Battle Creek, Michigan, Monday, February 2, 1914 at
8:00 P.M.
by
J. H. Kellogg, M. D.

Question: What will cause high blood pressure besides hardening of the arteries and how can it be reduced?

Answer: It is reported that one of the greatest doctors who ever lived, Dr. John Hunter, when walking through his museum, he was a great collector of curios and prepared a great number of specimens with a great deal of care and painstaking dissection. One day he was walking through his museum which was the foundation of the great museum of the College of the physicians and surgeons of London, he saw a man whose duty it was to take care of these specimens, carelessly handling a specimen and he finally dropped it and destroyed it, a very rare specimen. The doctor was seized with such a fit of anger thathe made a very ugly angry remark and fell upon the floor in a fit of apoplexy. Now that thing has happened many a time, many a time. One of the most dangerous things in the world is to get angry. The blood pressure goes away up, away up, just goes shooting up like a rocket, and a person who already has high blood pressure should make up his mind that he will not under any circumstances of provocation, no matter how aggrevating to permit himself to become angry, that he will not permit himself to become excited because the risk to him is so great that he cannot afford it. That is the reason. Now on the other hand it is just as important that a person should not allow himself to become too overwhelmed with joy. A story is told of a Spartan mother whose sonscame home from the Olympian games victorious and as they came home wearing the olive wreath about their heads, the mother was so overjoyed that she dropped dead upon the threshold of her home. So it is dangerous to become too happy, dont you see, because when one is very happy, the blood pressure goes up. It is injurious for one to become excited in any way, ph ysically or mentally when his blood pressure is high, because these conditions raise the blood pressure. It is also dangerous for one to strain in any way, violent straining as has ruptured a blood vessel so many times. A person whose blood pressure is high, say 200 when it ought to be 100 may by straining from lifting some very heavy weight or running to catch a train or in any other straining muscular movement, raise the blood pressure

fifty or seventy-five points more and it may be that is just the difference between safety and the bursting point, don't you see. So it is dangerous. The emotion has a marvelous effect upon the human body. It is wonderful how profoundly, the emotions, even temporary emotions do effect the body. You know what sometimes happens to the baby when the mother gets angry. You have heard of that. The mother gets angry and the baby has a spasm. The nursing infant has a spasm because the mother got angry. Why? Because the mother's milk was charged with a poison that was generated by that fit of anger. Now here is the thing that seems to have been over looked until comparatively recent times: that when the baby is poisoned, the mother was poisoned first, don't you see. The same thing that poisons the baby poisons the mother, but the mother was poisoned before the baby was. It was because there was poising coursing through the mother's veins, that the mother's milk contained poison and the baby was poisoned, and consequently the mother herself suffered, if not just in the same way, nevertheless perhaps even more intensely because it is impossible to suppose that all the poisons were excreted and eliminated in the milk. It must be that the whole body is more or less affected by it. So when the mother gets angry, the mother is poisoned as well as the baby; and it is a poison so intense and so noxious, sp pernicious that the baby may have a fatal fit. Now a fit of anger then you see means that the whole body is contaminated with poison, and of course, what happens to the mother during an anger fit must happen to the father too. Fathers must be poisoned as well as mothers, perhaps. So you see that anger is a dangerous thing. To become angry means that you are poisoning yourself. You cannot afford to be angry. Nobody can afford to be angry; nobody can afford to be envious; nobody can afford to be jealous or to give way to any of these horrible emotions. They are poisonous, every one of them; they are deadly poisonous and we cannot afford to indulge in them. Depression raises blood pressure. If you have high blood pressure and you get the blues about something, your blood pressure keeps going right on up, so if you find you have got high blood pressure, youx are bound to be happy, but not exorbxxitantly happy if you want to keep it down. If you allow yourself to get depressed and get blue, that of itself sends the pressure trotting away up and it is an important thing to avoid depression and to fight it off. You must use a bible phrase when you find depression and

the blue devils coming after you. Say, "Satan, get behind me." Turn your face resolutely toward hope, courage, joy and optimism and just march right off and leave that darkness behind. If anybody comes around to you talking the blues and saying, "Oh isn't it a bad day; Oh isn't is horrid weather; Oh my don't we have lots of troubles these days," you say to such a person, "Satan, be gone, get behind me." Now you can manufacture sunshine. There is no mistake about it. You know the physiologists have been studying ~~ever~~ the question ~~of smile, that~~ what makes one smile? Does one smile because he is happy, or is he happy because he smiles? Now which is it? That is quite a psychological problem ~~and~~ some quite wise men have asserted, but that we are happy because we smile, ~~and~~ that we do not smile because we are happy. ~~But it is~~ that the smile that strikes in and makes us happy. Now there is something in that; there is not a bit of doubt about it. You know the face is intimately associated with the brain. ~~The face~~ just underneath the skin of the face there is an intricate system of delicate little muscles. Here is a little muscle that ~~comes around~~ surrounds the mouth ~~that~~ and shuts the mouth, ~~up~~ and ~~it~~ doesn't work as ~~often~~ quickly as it ought to sometimes. ~~The muscles get loose sometimes and things~~ get to running away. ~~Here~~ There is ~~another~~ a set of muscles that pull ~~up~~ the corners of the mouth and another set that pull them down; and there is another set attached to the edge of the nose here and the upper lip and that contracts and pulls the nose up. When these little muscle at the corners of the mouth contract and pull the corners of the mouth down, we are melancholy. You feel melancholy. You can't help it you know. When these muscles get contracted in pulling down the corners of your mouth, you are down in the mouth and you feel that way and you can't help it. Now on the other hand when these muscles that run up toward the ears get to contracting and pulling the corners of the mouth up toward the ears, you are happy and you can't help it. You feel happy because the risorius muscle is contracting and when this laughing muscle gets to going, you are happy and you can't help it. The thing strikes in. Now you see people going around sometimes with the nose turned up in that sort of fashion. That is simply because they contract this little muscle up here, the levator labii superioris alaeque nasi muscle. Don't tell anybody the name of it please. That is when a person turns up his nose. He simply contracts his levator labii superioris alaeque nasi muscle. That is why he looks scornful and

if a person goes around all the time with his nose in the air in that sort of a way, he feels that way inside. He can't help himself. It strikes in you see. These muscles of the face really rule the mind to a certain degree. One cannot imagine a person going around perpetually with a solemn face, a solemncholy face as some call it. And I think that is a very good word. A person who goes around xxxx that way with his face all pulled down, he has what is called a "long favored" countenance. An old lady said when a person goes round in that sort of way he absolutely cannot be happy but some people get the habit of doing that to attract sympathy and after a while they get very unhappy themselves. When they started out they didn't do so very bad, but the first thing they know, they get to feeling awfully bad because of the attitude in which they have placed their minds by assuming a facial attitude corresponding to that statement. So it is very important to keep our faces straight, don't you see. In fact, that is the principal thing we have to do in this world is to just keep our faces straight. Keep your faces straight and the rest of the body will take care of itself. All this has something to do with high blood pressure, don't you see. If your blood pressure is high, you want to be very careful to keep your face straight. Keep a smile on your face but don't get too hilarious. Keep a pleasant smile and that will make sunshine for everybody. That will keep striking in all the time, and it will just keep the blood pressure coming down. You may be sure of it. I have seen it tried many a time.

Q---The chemists and physiologists report that Nape', the South American aid, is a valuable stimulant and the only one known that positively had no bad after effects like tea and coffee. Have you ever given it a test in this Sanitarium? If so, what is the report from one who does not drink or coffee, but who has tried Nape?

A---Now it is a case of teedle dum and teedle dee. Nape' and tea are one and the same thing. Nape'is simply another herb which contains caffeine in its leaves. It contains caffeine just as the coffee plant contains caffeine in its bean, its seed while the tea plant contains the caffeinein its leaves; so the Nape' plant of South America has the caffeine in its leaves. It is simply another kind of tea,that is all. Now it cannot be that the caffeine contained in Napé is perfectly harmless while the caffeine in tea and in coffee is a pernicious drug. It cannot be. A traveler in South Amxerica

some years ago, a very keen observer, wrote an account of the Nape' chewers of South America and he reported that these people showed all the symptoms of chronic intoxication. Now you know tea tasters get a certain peculiar class of diseases. Their hands get tom trembling. I remember some years ago a man xkm came here who a tea taster for a large Chicago firm engaged in the manufacture of tea. Afterwards he went into the sugar business to compete with a great sugar house, went to Arbuckle's. The tea taster came here for treatment. He was a young man and was very skilled. He was a coffee taster rather than a tea taster and was able to tell the very plantation on which a specimen of coffee grew. As soon as he had sampled the specimen of coffee he could tell the very plantation on which it was grown; so he was a remarkable expert, but he had to give up his profession after many years training as a taster in which he got very expert.and was commanding a high salary. He got so he could not continue his business. Why? Because within half an hour after beginning his work in Chicago his hands began to tremble and shake and he became so intensely nervous he could not go a step further with the work. He had to give it up. Now that is the chronic effect of caffeine. Now this traveler described the effects of Nape upon the people addicted to its use in South America as being very similar. Coco Cola is another drug that is doing the same thing. It is the caffeine in the Coco Cola that makes people want to take it. That is the active principle of the Coco Cola and that is why it is so bad, and that is why Dr. Wiley made such an earnest battle to put it off the market. Dr. Wiley fought that thing as hard as ever he could but he could not stop the sale of Coco Cola unless he could stop the sale of tea and coffee, don't you see, because Coco Cola is simply another form of coffee, but here you see, parents, what an awful evil this thing really is. Parents all over the country suppose that Coco Cola is simply a soda fountain drink and must be perfectly harmless because it is bought from a soda fountain instead of from a bar, so they let their children grow up to become Coco Cola drunkards. I remember a man who became so addicted to Coco Cola he had to have forty glasses a day and pretty soon his hands began to shake and his head began to shake, his feet and legs began to shake and he died of general paralysis. It finally began to affect his mind; he became fodish and he finally died a complete wreck--a man who had been a very active business man and an orator, a brilliant man. Yet he was simply exterminated by Coco Cola. It is a good thing to let

alone, and people who won't allow their children to take tea or coffee under any conditions, xxxx allow these children to take a quarter and go down and buy just as many glasses of Coco Cola at the soda fountain as they want to, and they are getting just the same mischief as in taking tea or coffee at the table; for a cup of Coco Cola has just the same amount of caffeine in it as a cup of strong coffee. Nape' is still another name for the same thing. The thing that does the harm is not the tea, it is not the coffee, it is not the Nape', it is not the Coco Cola, but it is the caffeine that is found in all of these things. The caffeine is the chemical devil in the coffee, and in the tea, and in the Nape', and in the Coco Cola; it is the chemical devil that does the business. When people drink this drug and get under the influence of it, they are not themselves, they are drug fiends just as much as a man who is under the influence of opium. A person who drinks twenty-five or thirty cups of coffee a day, and I have known people to do that, are drug fiends just as much as a person who takes ten or fifteen grains of opium a day. Do you know how much of these different kinds of poisons we are taking in this country every day, how you take, every one of you, on an average? All of us Americans, men, women and children, boys, girls and babies take three hundred and sixty-five grains of poison we swallow every day. The alcohol, the nicotine, the caffeine, the opium, the cocaine all added together make for the average American, for every one of us, three hundred and sixty-five grains of poison. That is the poison dose for the native American and it isn't any wonder that we are degenerating; it isn't any wonder that we are getting so many criminals and so many feeble minded people much more rapidly.

Q---If protein does not produce heat and energy, why do meat eaters crave meat less in summer than in winter and less on very hot days than on cold ones?

A---Now there is a very good reason for that. Doctors never give their fever patients protein. You all know that. Doctors never give fever patients beefsteak. If a man is found to have a fever, the doctor takes his temperature and finds it up to x 101 or 102 or 103, he says, "Don't give him any meat, but let him take light foods, gruels, cereals, fruit juices and perhaps milk." Every doctor knows that, and every doctor observes that simple dietetic rule. It is observed in every hospital in the world.

No doctor and no nurse, nobody who has any sense at all would give a fever patient a beefsteak or a mutton chop. They are not even allowed to take eggs very freely. Now why? Why because the doctor says and the old nurse who is taking care of a lot of sick people, though she never studied nursing, everybody knows that meat is heating. Why is it heating? If you take two sticks and rub them together, you can rub them hard enough to make a fire. That is the friction. You did not add the heat to it, but you made the heat by rubbing the sticks together. The sticks heated one another. That is exactly how it is with protein. Protein develops by its chemical affinitive and it develops an abnormal amount of heat in the body, not because it is such good food itself, but because it finds the flame. It is like a pair of bellows that blows upon the fire and makes it blaze up high and give off heat. That is what protein does, that is what meat does. It stimulates the cells of the body. I had a very interesting chat about this with Prof. Mendal of Yale University a few months ago when Prof. Mendal was here. He had been carrying on some experiments in our laboratory and brought one of his assistants to spend the summer in our laboratory to carry on some dietetic experiments which were of very great interest and will be of very great value to the world when they are published as they were very fruitful experiments. Prof. Mendal was telling me about them. He said, for example,"Here is a man that eats two thousand calories of food. If you give him two thousand calories of carbohydrates, fats and a normal amount of protein, the two thousand calories will be enough to keep up his body weight. That is what he needs to do. That is just the amount he burns up and that will be equivalent to just a pound and a quarter of wheat flour. But now if you should give this patient protein, beefsteak, two thousand calories of beefsteak instead of two thousand calories of wheat flour, the two thousand calories would not be enough to keep him from losing weight. You would have to give him twenty-five hundred calories to keep him from losing weight. Why? Because the protein of beefsteak burns up more than it supplies, you see. It burns up more than it supplies. It somehow compels the body to burn up a part of itself as well as the protein which is given to it. That is the reason, and that is why protein is heating. It stimulates the cells of the body and compels them to a greater degree of activity than is normal; so it is an unphysiologic food, and Prof. Mendal looked at me with a

twinkle in his eye when he told me this, and he said, "That is the best argument I know of for your vegetarian diet," and I told him I was very much obliged to him for giving me another argument, and he hadn't a thing to say against it, not a thing to say to off set it because there is a great physiologic fact that nobody can off set, that protein stimulates the body more than it feds the body. It causes the body to expend more than it supplies and so it is a wasteful food and for the same reason, it is a heating food. So in hot weather, there is an instinct in the body that says, "Do not eat it" and if you get that instinct to working, real often it will say, "Don't eat it in cold weather as well as in hot weather." That is what my instinct says. If an instinct has never been perverted, it won't want to eat beefsteak any more in cold weather than in hot weather. The fact of the matter is simply this, that is hot weather the body absolutely refuses to take the meat, it won't have it, it won't take it, will not appropriate it. It absolutely refuses it. In cold weather it tolerates it, It will use it in cold weather. It will receive it, but in hot weather it simply won't have a thing to do with it. If we become thoroughly educated upon the subject of dietetics, we will find that there is no demand for meat at any time. I am sure there is not. Sometime ago, a tramp called at our back door. I was not at home, but my wife told me the story. A tramp called there and wanted a ham sandwich. Now you can imagine that there was consternation in our kitchen, that anybody should think that could get a ham sandwich in our kitchen. This man was a traveler, was not acquainted with the neighborhood, did not know who lived in the house, so he was excusable perhaps, for making such a request. The lady in charge of the kitchen said, "We haven't any ham sandwich, but we have something better." And when he took it, he said, "That is better. What is it? I never tasted anything so good as that before." Now you see it wasn't a ham sandwich he wanted at all, it was a protose sandwich. He had simply made a mistake in the word. That was what he had been hankering for for years and he tried to get along with the ham sandwich, but he just found the real thing. So people who think they want meat, it is not meat that they want at all. What they want is satisfaction, that is what they want. They simply want satisfaction and we call the thing meat we want, because that is the thing we have been accustomed to take to get satisfaction. Now just as soon as we have learned that

and discovered that we can get satisfaction with something else besides meat, we don't want it. I met a gentleman not long ago, well he was an eminent professor of physiology from Berlin, Prof. Zuntz. Prof. Zuntz is one of the greatest physiologists that lives; he is one of the great german physiologists whose name is respected, revered the whole world over, because he is a man of profound scientific attainments and great scientific society. Prof. Zuntz was dining at our table and there was another professor, an American professor of physiology sitting at the same table. I am going to tell you who he was too. It was Dr. Lombard who is professor of physiology at the University of Michigan; and Prof. Lombard seemed to be not feeling quite happy because he didn't find any beefsteak on the bill of fare, and he says, "I don't see how you are going to get along without beefsteak, how you can get along without it." Prof. Zuntz was eating a protose steak and he said, "If I could get such food as this, I never should eat beefsteak or meats of any kind again as long as I live." Now that shows you that men of high authority are not at all afraid to trust themselves to the bill of fare that Nature provides for us, this splendid bill of fare that is spread out in the whole vegetable kingdom of the Universe, all the fruits and all the vegetables and all the delicious cereals. Just think of what a great variety there is! There isn't very much variety in meats. There is an ox, the hog and the cow and the calf and a sheep and a goat and a goose, a duck, a chicken and just a few other things. You can count them all on your fingers, all the different kinds of meat. They taste pretty much alike too. But now just think of the infinite number of different varieties of apples, and all the kinds of pears, and cherries, and plums and grapes, the oranges, the figs and the bananas, just think of it, the scores and scores of fruits and cereals and vegetables, the great variety of delicious things that are served up for us, a feast fit for a king. Nature supplies us and why should we want to go to delving down into the gutter, into the slime and ooze of the ocean bottom to rake out clams, oysters, and rooting around after things that scavengers feed upon. Why! why! when we have got these delicious things that are hung up for us to reach up for, hung up in the sunshine, given us by the breezes and the glorious sun ripened ready for our use, when these beautiful splendid things are prepared for us, why should we want to kill, to slay and smear our hands and mouths with blood and knaw the bones of creatures so much like ourselves that we can be easily deceived. Look into the eyes of a meek old

ox for example, and try to imagine yourself smacking your lips and wanting to take a bit off him, imagine such a thing. Why, a lady some little time ago stated to me ~~there~~ here in the surgical ward, "Oh doctor," she said, "I do wish I had a bird." "Oh well," I said, "I will bring a canary up to sing to you." "Oh no," she said, "I don't want a bird to sing to me, I want a bird to eat." "What," said I, "would you eat a bird?" "Oh yes," she said, "indeed I would." "All right," I said, "I have got a nice bird up at my house. I think a great deal of him, but in case of necessity I would sacrifice him. He is the finest parrot and he can talk just splendidly. Oh how he can talk!" But she said, "The idea of eating a bird that talks." I said, "Why should you hesitate to eat a bird that talks. I don't see any reason why you should not." There was a missionary once who asked a cannibal how it was he could endure the idea of eating a human being,"Such a splendid noble creature," said the missionary. There is an elephant, for instance, you might eat him or an ox or a bison or some other creature, but eating man, such a splendid creature as man, how can you bring yourself to eat men. And what do you think that cannibal said.? He said, "The more noble the animal, the more noble the diet." Now why not, why not? So I said to this lady, "Why not eat a talking bird." I said, "Very well, if you don't want a talking bird, how about a mocking bird. I think I can get you a mocking bird or perhaps a robin." "The idea," she said, "of eating a singing bird." I said, "Well, what you got against a quail, that you should eat a quail that can't sing or a hen that can't talk? So you would eat a good old mother hen and never think anything about the orphan chickens." "Well," she said, "you just go away, I don't want any bird." And I think if they had brought her up a quail on toast she would have thrown it out of the window. They don't stop to think that these things are unnatural and never intended to be food at all. There is no instinct that leads us to kill a bird and bite off its head and eat it, A cat, a lion, a panther or a bear has that kind of an instinct, but we have no such instinct as that. We have an instinct that leads us to sieze upon peaches, pears, plums and cherries and mothers know what a tribulation it is to keep the summer boy out of the apple tree till the apples get ripe and it is absolutely impossible to keep boys out of the cherry trees. You simply cannot do it any more than you can keep the birds out. Let a small boy climb a cherry tree and

fill his stomach with cherries and go home, have an awful stomach ache and he has a hot bag or a hot cloth on one side of him and a hot hand on the other side of him and the next morning he gets up, feels all right and you know he climbs another cherry tree and does the same thing over again. It doesn't do him any particular harm either, but suppose he had filled his stomach with dead birds, or dead beasts of any kind. Why he would have had a regular Golgotha down there and there might have been more than one funeral. Many a funeral have resulted from eating the flesh of animals. A friend of mine told me how it was out in Colorado one time, and a couple of men that went hunting killed a bear and they came home and set down and ate so much of that bear it made them sick and they layed down and swelled up and died before they could get medical help for they had the corpse of that bear decaying inside of them. I want to tell you, my friends, there are any number of people going around with a whole menagerie of dead things lying around inside, and then they are wondering why they have a bad breath, why they have a bad complexion, why they are suffering from autointoxication, and they wonder why by and by they get high blood pressure. It is the poisons that are generated in this way that make high blood pressure. Now the food that Nature supplies for us does not make high blood pressure. There is nothing in apples that make high blood pressure; there is nothing in potatoes that make high blood pressure; there is not a thing in the wholesome cereals, the fruits and the grains, the fresh fruits and fresh vegetables, such as lettuce and things of that kind. There is nothing there that makes high blood pressure; but every pound of beefsteak you eat has fourteen grains of uric acid in it, fourteen grains of uric acid, and that uric acid everybody knows makes high blood pressure. That is the thing that hardens the arteries; that is what makes gout and there are fourteen grains of it in every pound of beefsteak. Now the kidneys only remove from the body six grains a day. That is a day's work, a day's job for a pair of kidneys is to remove six grains of uric and a pound of mutton or beefsteak has fourteen grains in it, and that is not simply occasionally, but it is all the time and it means the best beefsteak you ever saw. Dr. Hall of Manchester, the great physiologist is the man who is responsible for that statement. He worked for two years studying uric acid in foods of various sorts, and he found that to be the fact, and in sweet breads

he found seventy grains of uric acid, five times as much; so don't allow any more sweet breads in your neighborhood. If you know of anybody eating sweet breads, tell them they might just aw well shoot themselves as to do that because the uric acid dose is so tremendous, why it is a whole week's job, dont you see, to get rid of the uric acid in one pound of sweet breads. What are the kidneys going to do with the uric acid generated in the body in the meantime? Why, you see there is no chance at all. It must be laid up, accumulated. That is the way people get gout, that is the way they get hardening of the xrkixx arteries, that is the way apoplexy comes and that is how people get Bright's disease, by the body getting so loaded up with these poisons that the concentration in the outgoing stream through the kidneys is so great that the fluid that passes down from the kidneys becomes poisonous to the kidneys. The urine is a poisonous fluid any way but it is not so terribly poisonous. It is less than two hundred years since the urine of a child was used as a tonic, just as people use beef tea now. That is a fact. It was used in medicine. It is less than one hundred years since it was regularly used in medicine in the preparation of cough syrup, less than fifty years since urine was regularly used as a cough syrup in a great many communities. I have got medical books in my library, classical, orthodox, medical books that describe the urine of a xxxixxxx child as a tonic and there was just as much reason as there is in using beef tea as a tonic because chemically they are nearly xixi alike, so nearly alike that a chemist confessed not long ago that the only way in which he could tell the difference between urine and beef tea was by the sense of smell. With all these chemical manipulations and tests, he could not tell any difference at all. He had to use his nose to find out which was which. Now you see how people are doing, filling themselves up with broths, with bouillon, for instance. If you sit down at a hotel table and call for soup of any kind, you can't get a thing that has not got a lot of this extract of meat in it, this Armour's extract of beef or so-called Liebig's extract of beef. I remember the advertisements used to say that every pound of this extract represents forty pounds of the best beef, that it contained all the nutritive elements of forty pounds of the best beef, whereas it did not contain a grain of nutriment; it did not contain a single grain of real food. If there had been any real food in that substance, it would decay, but this extract does not decay. It will keep any length of time because it is already spoiled, don't you see.

It is already spoiled as far as it can be spoiled. It cannot go any further. When a thing has rotted once, it cannot rot again. It is completely decayed, gone down clear to the bottom of the scale, cannot go any further down, and so cannot decay, and that is what people take in the form of Liebig's extract of beef or Armour's extract of beef. You know Armour don't let a thing get away from him but the squeal and I suppose he will find some way to use the squeal yet. Every scrap of every sort he throws into a vat and boils it down and that makes Armour's extract of beef and the rest of it goes into fertilizer. Now you don't have to use such things to get good flavors. All of these flavors come from the vegetable kingdom. If there is any agreeable pleasant flavor in meat, it is because the old ox found it in the grass or the sheep found it in the grass, in the daisies and the buttercups or something else. It was eating.These delightful flowers and vegetation contain these flavors. Now we can go to the vegetable kingdom and we can find them all there. It is a marvelous thing, this alchemy of Nature. For instance, here is a tree; there is a chunk of wood. Turn that chunk of wood over to the chemist and he will get the tar out of it; then he will take that tar and make all the beautiful colors of all the florers in the world. These anilin dyes come out of the tar of wood so you see all the colors of the rainbow and all the tints of all the loveliest flowers and all the summer skies you ever saw are all there in the tar. They all come out of it. So you see when we eat vegetable food, we go to the original mine, that is the diamond mine from which all these choice and precious things come. They all come out of the vegetable world, out of the vegetable kingdom. We don't have to go to the animal kingdom to get them. What you get out of the animal kingdom has been used before, don't you see. When an old ox goes to the mine and gathers out some of these beautiful things and you eat the old ox, then you only get what the ox has gathered before for its own use and you are eating it at second hand, don't you see. It has not gone through a process of refinement, but it has gone through a process of pollution because it may be the old ox had a tape worm and if it did, when you eat the flesh, you will get tape worm. By the way, do you know the history of trachina? Some medical students about sixty years ago in Germany in dissecting human bodies, in the dissecting room found little white specks and on examination with the microscope found

them to be worm and it was a dissecting room xxxxx curiosity. Some years afterwards they had a big feast at which they had sandwiches and a lot of people were taken sick, over one hundred were taken sick and a good many died with symptoms which appeared to be typhoid fever; but on examination of some of their bodies, no typhoid fever was found, but after death, these little white specks were noticed and examinations showed that their bodies were swarming with trachina, and on examination every one of them was found to have trachina in their bodies. So it was suspected they must have eaten something which had the trachina, so an examination was made of the hams of which the sandwiches were made and they were found filled with trachinae. Then it was discovered that two animals had trachina. Human beings had xxxxxxxx it and hogs had it, and the question was, where did the hogs get it? Further investigation disclosed the fact that trachinae were xxx found in the dissecting room rats. These rats ran around the dissecting rooms and were nibbling about in the absence of the surgeons and doctors and these rats got trachinae Then it began to dawn upon the doctors how these trachinae came around and this was the road they traveled, don't you see. A man died. That is where they found trachinae first in a man. A man had had trachinae and died; a rat ate the man, got trachinae, then this rat got into a pig pen somewhere stealing some of the pigs' corn and the pig ate the rat along with the corn; so the rat died and the pig ate the rat and got trachina; and by and by the pig died and another man ate the dead pig and he got trachinae; then the man died and another xxx rat ate him and got trachinae. The rats were eaten by the pigs and the pigs got trachinae; then the pigs died and other men ate the pigs, so the thing was passed around, don't you see. One scavenger ate another and passed the worm around. Now you see xx our food is not improved by going through the animal kingdom, but it is degraded, polluted, it is infected and there is nothing added to it then that is of any value. When you call for brown gravy upon our table, when the cook sends in brown gravy, xxxx you will find it is the best brown gravy you ever tasted. When you call for vegetable bouillon, isn't it good. I gave some doctors some vegetable bouillon today and they declared it was the best they ever tasted in their lives, that Liebig's extract was nowhere, that Armour's extract was entirely out of sight, not to be considered for a minute. A man said, "Whenever I eat Armour's extract of beef, I try not to think of

the hoofs and horns and hide that go into it; try to put it out of my mind as much as I can." But here we have the regular Simon pure things, straight from the vegetable kingdom and all the flavors and all the sweetness. Everything is delightfully pleasing to the taste and we can get it all without going down to the shambles after it.

Q---Prof. Rubner and other eminent authorities of Germany claim that meat is essential to brain workers being stimulative as well as warming. They claim it is more necessary than to muscle workers. Why?

A---There is no why. It is not true. It simply is not true. It is a very strange thing that some of the most eminent scientists think it to be a part of their function to find some apology for popular foibles and they strain a point. They make vague suggestions without any scientific foundation under them whatever, just for the purpose of bolstering up scientific foibles. Now let me give you an illustration of it. Some years ago, Sir William Roberts set out to make an investigation as to the effect of alcohol on digestion. Now it was the custom at that time and still is in England among many people, including a good many physicians, to take a little dram of brandy, or port wine or champaigne or something else at the close of a meal to aid digestion. That was the idea. Sir William Roberts set out to get the scientific proof of this and he found to his consternation, that alcohol did not aid digestion at all. He found the same thing was true of tea, coffee, vinegar and other condiments that was supposed to aid digestion. He found that they actually hindered digestion at a terrible rate. Now it didn't take him five seconds to turn a summer-sault immediately and come right up smiling on the other side of the question. He said, we have been mistaken. We have supposed that we needed to aid digestion whereas the proof is that modern cookery has rendered our food stuffs so easily digestible, that at the present time, the great danger of our modern civilization is an undue acceleration of nutrition. Now that sounds ponderous doesn't it and we need something in other words to slow down the digestion and must take alcohol to hinder digestion instead of to help it. So you don't need the digestion to be helped but to be hindered because our digestive organs have got to going so fast, the wheels of digestion are whirling around so rapidly that they are likely to get off the track, you know, or something will go to smash, so

we must put on the brake and alcohol, tea and coffee and all these other things are very necessary. Now that is a fair sample of how scientific men cater to popular notions and to popular customs and to popular sanctions. We have got to get out of that and we will. Now then there comes along a scientific man who has a scientific conscience, developed in such a way that he won't do that and one of those men I conceive to be Prof. Taylor, the professor of physiologic chemistry of the University of Pennsylvania. He has written a book recently on the chemistry of digestion and he talks about this protein question. "Can protein do any good," he says,"when taken in excess beyond the actual needs of the body for repairing tissue." Prof. Rubner says, "yes we need some for stimulus" and it is not sufficient to eat just enough to repair the tissues which would be a very small amount indeed, perhaps seven per cent., not more than seven per cent. or one fourteenth part of the total food ration. Prof. Taylor says, "Do we need protein for stimulation or for complete nutrition or for any other purpose." He says some physiologists have made vague suggestions that protein is necessary for such purposes, but there is absolutely no scientific foundation for any such idea. Now that is the truth and very latest words of one of the most eminent men on this subject, and you see it does not give any prominence at all to the idea of a xxx high protein diet being necessary for xxx purposes of stimulation. Prof. Rubner does not seem to recognize some few great physiologic facts.

When a man eats a big beefsteak, doesn't he feel brighter? Have any of you ever had that experience? Do you feel wonderfully accelerated when you have swallowed a great big beefsteak. I remember reading in a newspaper sometime ago an interview with battling Nelson. I don't know him; I never saw him but some of you know him and perhaps xxx have seen him. You all know who he was. He had been just engaged in a fistic encounter with somebody and he had been beaten; and a reporter asked him to explain how it happened. He said, "It was the beefsteak that I ate." Now what do you mean by that. He said, "My trainer was out of sight, didn't happen to be there. It was the last meal I took before I went into that fight and I had such a keen appetite and the beefsteak looked so good I took an extra one and it knocked me out." It made him tired and it was the beefsteak that did it. Now I have know that a thing to be reported by other people besides pugilists. A pugilist fights not simply with xxxxxxxx his muscles but with his nerves as will. If there is

any man on earth that needs to have his brain and nerves alert, it should be a man who sees a fist coming toward his nose and he has got to do something to get his face out of the way or his nose out of the way before the fist gets there. I am certain that a man engaged in that sort of conflict could not afford to be dull at any rate. Battling Nelson found it was beefsteak that made him stupid. Sometime ago, I was out West, happened to be in the city of Des Moines and I found of a little bit of a vegetarian restaurant there and I dropped in and the keeper of this restaurant said that one of the judges of the Supreme Court came down there for his dinner every day. This man said "The judge told me the other day that he found our dinners were wonderfully helpful to him and he didn't know what in the world he would do if we should shut up and go away, because," he said, "before I began taking my dinners here, I couldn't do anything after dinner. My brain was so dull and I felt so stupid I couldn't do a thing after dinner, but now I come down here, eat your dinner, go back to the bench and I can work just as hard in the afternoon as in the forenoon, and my brain is just as clear, and I find your dinners are wonderfully helpful for me.'" Is a reindeer very stupid? Is an antelope very stupid? How is that? Do these creatures that are non-flesh eaters, are they so wonderfully stupid? The dog knaws away at a bone, then lies down behind the stove and goes to sleep. He is stupid. And a cat you know. An anaconda swallows a goat, then goes off and lies down and takes a nap for three months. These meat eating creatures whether men or animals are dull and stupid after they eat meat. They are intoxicated. They can't help it. There is a certain stimulating effect from the protein, but that stimulating effect is very quickly overcome by the great flood of toxines that are poured into the body which benumb the brain and paralyze it. Some of you know you came here feeling dull and stupid, and you know that already you are feeling brighter, looking brighter and the whole world looks better to you. You get up in the morning and feel as though you had some animation, some snap, some vim, some steam and feel ready for business. Some of you know that from personal experience, and when you go home, keep right on doing it and you will find your keep coming up and feeling better every month. More than sixty years ago Dr. William Lambe of London got interested in this question. He was not a member of any vegetarian society but he was a great surgeon, a professor of surgery in the Royal College

of Surgeons in London and a man who stood very high in his profession. He suffered from gout, had headaches, neuralgia and depression of spirit and was very miserable. He adopted the non-flesh dietary and it is a very interesting account he gives of the result of it. After trying it for many years and under a great deal of sarcasm and scorn from his colleagues, he persevered and when he was an old man, between eighty and ninety years of age, he gave something of his experience. He said, "Since I abandoned the use of flesh and confined my diet to the products of the vegatable kingdom with a little milk and eggs occasionally, I have found myself steadily improving." "And now," he said, "I could not see any improvement from week to week. I really could not see much of any improvement to speak of from month to month. But when after three or six months I looked back, I could see always a great improvement." He said, "It went on year after year and year after year for fifteen or twenty years, a steady steady gain in alacrity and vigor."

Q---Discuss the cause of kidney stones and the cure?

A---Suppose you have here some hot water and some sugar. You have got a quart of hot water and you have got, we will say, five pounds of sugar. Now you put sugar into the hot water and keep putting it in until the hot water dissolves the sugar. It will and by and by it won't dissolve any more and there is some sugar left in the bottom. Suppose you take that saturate solution of sugar, take it out of the kettle or the basin, the dish in which it is heated, put it in a small place by itself to let it cool and what happens. You can see what would happen. When that cooled some of the sugar would be precipitated and crystals would form in the bottom of the glass. That is one of the ways at any rate in which these stones form in the body. The uric acid is in solution; it comes down into the kidneys and the kidneys are right here at the outside of the body and the temperature falls a little, just enough so it lets a little crystal of uric acid form, and this uric acid crystal which forms then becomes a nucleus for others, and it keeps building up and building up until by and by there is a large stone forms. It begins up in the kidney, perhaps a minute little speck. It is probable that epithelium minute particles and other things of that sort sometimes form a nucleus for these stones.

Q---I notice preparations made from corn meal are very little used in your menus.

Tell us the relative value of corn and wheat?

A---The reason why we do not use more corn here is because corn is not the best cereal. Wheat and rice are the best cereals. It has been found that the protein of corn which is known as zein will not support animal life. The gluten of wheat will support animal life. Rats fed upon gluten will live as long as they can live, for months and years on a diet of gluten, but if they are fed zein, they live a few weeks and die. Why? Because zein is an incomplete protein. It is not a perfect protein. It lacks something which the body requires. You might represent the protein molecule as playing a sort of arch made by the stone s and up here at the top, there is a key stone that has to go in. The other stones are all made square but here at the top is a key stone and this arch cannot be made complete without that key stone. The body requires all the different things that compose the arch and xxxxxxx needs the key stone besides. Now in this arch in corn, the key stone is lacking and is the one thing necessary to complete the arch. It is gone. It is present in the rice and in the protein of potato and in the protein of wheat, and of all the green vegetables, but it is not present in corn. Experiments were made by the University of Illinois some years ago on cattle which were fed entirely on corn and they ran xxx on. Cattle fed on wheat do better. Cattle fed on a combination of wheat and corn do better than those red on either one alone. We do not recommend corn very highly because as I said before, it is not a complete food and it is not the best form. In the protein of corn, there is only about sixteen per cent. of it that is full value protein, whereas in the potato almost the whole of it has full value and the same is true of wheat.

Q---What is the best ration for a growing boy ten years old?

A---The best ration for that boy is to eat an ordinary simple diet, such as we furnish upon our tables, fruits, grains, vegetables. But he should take something fresh at every mean. By that we mean, fresh fruit or lettuce or a cucumber, raw cucumbers, not pickled cucumbers or cabbage. Now those are about the only things we have which are really wholesome and fresh, are lettuce, cucumbers and cabbage. Besides fruits, tomatoes are very good indeed. The tomato is a sort of fruit.

Q---I find here an advertisement of sanitary oysters, "The Smith's Island Virginia

Oysters are taken from Beds in the Atlantic Ocean four miles distance on the mainland and are therefore free from all possible contamination."

A---Well now, do you see what this signifies. What about all the rest of the oysters that are taken close to shore, that are lying down there with their backs stuck in the mud and their mouths wide open, swallowing all the filth that comes down through the sewers that empty into the rivers or empty into the ocean near where they are growing? It is sewage that feeds the oysters. That is why the oysters are so fat all along the Maryland shore, because there is so much sewage coming into the water there. The oyster men know all about it perfectly well. If the oysters were sent to you, they way they come out of the water, it would be pretty difficult for you to eat them. The oyster men take the oysters out of the water and put them into the fresh water, supposed to be clean fresh water and starve them there for several days. What for? Why in order to let their stomachs and intestines get empty. That is what it is for. But, of course, the kidneys are still there and these oysters are but into a tin box or a glass box or something, the kidneys continue to act and their secretions are going on and there they are with this juice running out of them. By and by there is oyster broth, don't you see, oyster juice and they think that oyster juice is awfully nice. Why, my friends, did you ever stop to think what filthy things you eat sometimes. I believe in sanitary oysters and if you are going to eat oysters, be sure that they are sanitary. Sometime ago it was discovered in England that the oysters were communicating typhoid fever. People were catching it from the oysters because the sewers were carrying down typhoid fever germs that came from typhoid fever patients that went into the toilet and from there down into the sewers into the water and down the river into the ocean and there were the oysters which were very fond of typhoid fever germs. Typhoid fever germs are delicacies for oysters. These oysters gathered up the typhoid fever germs and in one case of oysters that were taken five miles out at sea and a half a mile deep, typhoid fever germs were found in those oysters, so you have to go further out to sea to get a real sanitary oyster. Well when it was found and was announced in the papers that the oysters were full of typhoid fever germs, there was general consternation and the oyster men were almost put out of business and the man that had stocks in london telegraphed to the

oyster man, "Don't send any more oysters. Nobody is eating oysters,"and there was great consternation. Something had got to be done, so the oyster man appointed a representative to appeal to the parliament to ask parliament to appoint an oyster inspector or oyster inspectors and the matter was discussed in the English parliament and there was strong talk of appointing oyster inspectors, but when it came to final action on the question, it was readily discovered that it was a preposterous proposition for it was readily discerned that to appoint an inspector or inspectors in sufficient numbers so that they would be able to examine every oyster, to feel its pulse and look at its tongue and take its temperature to see if it had typhoid fever germs, it was out of the question. They could not do such a thing. They had to give it up. So there is no way to be sure that you have got sanitary oysters yet that I know of. The oyster is a scavenger. Let him alone. When you get where food is so scarce that we have got to eat turkey buzzards, then let us eat oysters too, for they both belong to the same family of scavengers, Nature's scavengers.

Q---Would you wean a healthy baby at ten months?

A---Yes, the baby probably may be weaned safely at that time if necessary.

Q---If so, what food would you give?

A---Give the baby gruels, potato porridge and purees of vegetables and fruit juices and the baby can have a little cream perhaps or cow's milk. The baby can be weaned without cow's milk or cream. Nuts are used. Milk is prepa red from almonds and various other nuts. There is a nut that grows in the Philippine Islands of which I received a sample a short time ago, a curious little nut which is used by the Philippine Islanders. I sent it down to Washington and asked the Agricultural Department to tell me about the nut. They said it is, in the Philippine Islands, eaten freely and the milk is prepared which all the native Philippine Islanders feed to their babies when they wean them. The babies, not able to nurse, are fed on a milk prepared from this nut. The milk of almonds, these nuts and several other nuts has practically the composition of mother's milk if it is properly diluted with water. The protein of nuts is not like the protein of flesh. It is casein, vegetable casein, so it has the same properties as the casein of milk.

The milk of the nut is practically the same thing as the animal milk, only has none of its impurities or disadvantages. It is possible to raise children on nut milk.

Q---When the mucus membrane of the stomach has been destroyed, will Nature renew it by careful diet and treatment?

A---Yes. Nature can make a new mucus membrane. Nature can make a new skin. If you have lost your skin xxxxxxxxxx when new skin forms it is membrane but it is not skin. No hairs grow on it, there are no sweat glands in it, there are no fat glands in it. It is just simply a little pellicle spread over for protection; but when a sore heals in the stomach, the stomach has such wonderful power that it reproduces its glands which make pepsin and hydrochloric acid. The actual mucus structure of the stomach is reproduced, so that it is something really very wonderful indeed and the same thing is true of the liver. Cut off a piece of liver and it will be reproduced. A German physiologist cut off half of a rabbit's liver and in three months it was grown on again; then he cut off the other half and in three months more it was grown on, so that rabbit had a brand new liver you see. Now that is what some of you want. That is the process that is going on here in the fomentations percussions and all the different things that are being done to you here. They are for reconstruction purposes, and these internal organs have the power to be reproduced, to be built over, and that is the beautiful thing about getting well in a physiologic way.

Q---Is asthma curable?

A---Most assuredly it is. Asthma is a disease of the colon. That is why it is so easily curable. Dr. Read was telling me just this evening as I was talking with x him--- we have a little apparatus at the end of the hall. When persons have an attack of asthma they breathe into that apparatus and they are relieved right away in two or three minutes. And the relief is generally so complete that the person can sleep well all night. Now that is temporary, that is simply palliative. When a person has asthma, he can breathe in but cannot breathe out well. He breathes in quickly and he breathes out very slowly. He gets the air in but can't get it out. That is the trouble with asthma. The reason for that is that the small air tubes are shut up so that the air gets on beyond into the air cells but cannot get out. The air getssinto smaller and smaller tubes and so goes into the lungs and at the end of each one of the little tubes, there is a group of little sacke.

These air cells become stretched and distended and these little ducts here adjoining the air cells become contracted so that the air gets in and can't get out and these cells become enormously distended, so a person who is suffering with asthma, suffers because he can get the air in but can't get it out. This apparatus consists of an arrangement for breathing into rarified air or what is called commonly, a partial vacuum. There is an air pump attached pumping all the time, so when one breathes into this, this pump pumps the air out of his lungs quickly, then when he tries to breathe back, it is this rarified. It is harder to breathe the air in, you see, and that slows the inspiratory xkx effort and quickens the expiratory effort, and so restores the normal rhythm of breathing in which the inspiratory effort and the expiratory are about alike. This restores the rhythm and the person is relieved right away, but that is not permanent relief. The real cause of asthma in the great majority of cases is poisons absorbed from the colon, which when brought into the circulation get up to the lungs and cause spasm. Now when people come in contact with ipecac uanha, for example, or the pollen of rag weed very often this will cause the same kind of spasm. But in chronic asthma, the difficulty is caused very often xfrom by trouble with the colon. Some people when they ride behind a horse are taken suddenly with spasmx of the bronchial tubes because there is certain poisonous effluvia that comes from the horse. Little particles thrown off from the horses' body in the air enter into the lungs and set up this spasm. This spasm as I said before in chronic asthmatics is usually due to poisons that come in from the colon, and these colon poisons must be removed by cutting out meats, making the bowels move three of four times a day and the symptoms rapidly disappear. It isn't once a year that a persons comes here suffering from asthma that is not speedily relived. Almost every one of these poor sufferers can be relieved. I do not hesitate to say it with a great deal of assurance because it is an every-day experience with xx us here. Persons come here who haven't had a good breath in fifteen years, and in half an hour are relieved and in the course of six weeks are permanently relieved if they will take care to live right and keep their colons free from these awful poisons. As I was in the office this afternoon, with a physician who was visiting us, Dr. Reed who has charge of that department, said, "Dr. Kellogg, you know Mr. so and so of New

Jersey who was here a year or two ago?" I said, "Yes I remember Mrs. Jacobs very well." He said, "I got a letter from her yesterday and she said she has not had a single attack since she went home and although she had suffered for three years before coming here." I think everybody ought to know that there is relief for these persons who sometimes suffer agonies worse than to die many times over. It is something dreadful. It is only necessary to get at the cause and that cause can be gotten out and relieved.

Q---How soon after eating can a person drink water?

A---There is no harm in taking a little water while you eat. If one does not take more than a glassful of water at a meal, he is not doing himself any harm unless he is suffering from ulcer of the stomach or extreme hyperhydrochloria. In such a case he may do himself harm because the stomach pours out too much water. There is an excess of secretion already, and to take water makes him ~~xx~~ pour out more hydrochloric acid. Drink half an hour before the meal or an hour after the meal, but ordinarily a person can take a glassful of liquid of any kind at a meal without any injury; but one should not drink tp wash the food down. Chew the food thoroughly. Take a sip between morsels but don't drink when you have food in the mouth, or you can get along without it. ~~xxxxxxxxxxxxx~~

Q.Can cancer really be cured?

A. Thousands of cases are being cured all the time. We did an operation today that I hope will effect a cure. A lady came into my office a few days ago and we found in the breast a little bit of lump about as big as a pin head and she said, "I have noticed this for several months. It is a little sore but it isn't very bad." Now we said, "We will examine that lump and see whether there is anything bad about it and if it is we will do some more"so we removed it and examined it at once under the ~~m~~microscope and found it was a very pernicious malignant kind of cancer. Then we proceeded to remove the entire breast and to make an incision up clear to the arm and to dissect ~~all~~ away all of the fat glands in arm and there were large masses of cancerous glands in the arm pit already although there was just that mere little bit of a lump in the breast and it appeared to be almost nothing at all so it was necessarly to remove a great mass of tissue~~m~~ and after the tissue was removed and the wound all open we brought that patient down to the X-ray department and applied powerful doses

of the X-ray by a new methods which has been developed within the last two or three years in Germany. We sent our rentgenologist over there on purpose to become acquainted with this method last summer and by the use of a new tube one of the discoveries which has been made within recent times, the general Electric Company have had experts at work for several years to find a method of improving the X-ray tube, of making the tube that would give rays like radium rays, much more powerful X-rays, rays with powerful penetration and at last they have succeeded and I am very proud to be able to tell you that the General Electric Company selected the Battle Creek Sanitarium as one of four places in the world where this tube should be tested and so brought on a s upply of tubes and very expensive tubes. They brought them here, placed them at our disposal and there are being used and this is one of the first cases treated in this way by this tube and we hope we have eradicated that cancer completely. We hope by this method of treatment that with the wound laid open applying the X-ray in such a way as to come in direct contact with the tissues, we hope this patient will be entirely cured. Certainly if there is any cure to be effected at all it may be done in this way. The sooner the disease is attacked, the better. It is very important that the public should be come informed about cancer. It is important to know that every twelfth man over 40 years of age dies of cancerx and every seventh woman over 40 years of age dies of cancer. That is an awful thing to know but the reports of the United States Census Bureau show that. 75,000 people in this country died last year of cancer. 300,000 people are this very minute suffering from cancer. Three people in every thousand are suffering from cancer. If you have a town of 20,000 there are sixty people in that town suffering from cancer and most of them are going to die of it because they won't attend to it early enough. When I was in New York last week I saw a woman looking hale and hearty as well as any woman I ever saw in my life. This woman had been operated upon, the abdomen had been opened down

in New Orleans and they have found enormous masses of cancer. The doctor said it was no use to do anything for you. This lady went to New York, found a plucky New York doctor and he said,"Well, let us see what we can do" so the abdomen was opened and the mass of cancer removed. Not all of it; some of it was left behind and then another operation was done later. I saw the doctor do the seventieth operation upon that patient. That patient has had eight years of splendid health, is enjoying life immensely , comes up there and gets her operation and in a few days she is off out enjoying life having a good time and she looks as healthy in her face,as happy and bright and cheery as any person I ever saw in my life so you see it pays to fight this thing. A person should not lie down and say it is no use to try to do anything. This woman is getting better. She has less cancer now than she had a year ago, far less than she had five years ago and she is actually getting better. She is gaining ground and not losing ground and so as I said it pays to fight this malady. When a person finds he has got cancer he should not say, "Oh, I have got cancer. I might just as well lie down and die." That is absurd. A very considerable proportion of persons can be cured and in some cases one can be absolutely perfectly cured. The disease can be fought off year by year and life can be prolonged for a good while even though the disease cannot be absolutely cured and now that the X-ray with its great improvements that are being made it is quite possible we shall be able to conquer the disease entirely if we can begin early but is necessary to do something more than operate. It is necessary to do something more than to apply the X-ray because there is something about an individual that renders him liable to this disease. While every seventh woman over 40 years of age dies of cancer there are six women who do not. Why not? Because there is something about that seventh woman that makes her susceptible and the other six women do not have that particular thing you see so there is something more than a mere disease. It is not because everybody doesn't have a chance to have it because all do have a chance to have it but it is because some people are not capable of

having it while other people are easily susceptible to it. This thing is known. If a man has got cancer on his thumb or one foot, if you innoculate the other thumb or the other hand from the cancer he will have two cancers. Experiments have been made on criminals and it was found that 20 cancers could be produced on the same man by innoculations in different places but if these same innoculations were made on healthy persons they would not have cancer. Cancer would not grow on a healthy person so the important thing is to build the body up, don't you see to increase the resistance and anybody who has cancer must not only have the disease removed as far as possible, have it treated by means of the X-ray, radium or both, but in addition to that, he must so relate himself to physiologic conditions that his resistance to cancer will be increased and his liabilities to the disease will be diminished and that can be done. One of the things necessary is to discard meat entirely. Why? Because meats rot in the interior of the body and pollute the body, contaminate the body with the products of decay and Dr. Ross of London, England, of the Leister Instite of Experimental Medcine of Londong, England, has shown that these products of tissue decay are a cause of cancer. He has definitely proven that, so it is a good thing to keep rid of decaying flesh. Then further, this doctor Wm. Lambe that I was telling you about applied the non-flesh diet for the treatment of cancer and he reported quite a number of cases of cancer that were acqually cured of cancer by the adoption of a non-flesh diet and there is a London doctor who at the present time, who has been using this method for a good many years and has shown cases of cancer cured by the non-flesh diet who had resisted all surgical efforts and had been given up to die. I have seen one or two cases myself.

Q. Where there is hyperacidity what kind of diet would you advise?

A. A laxative diet. This patient should have a soft diet for the hyperacidity but this soft diet need not be lacking in cellulose. For

example, Good Health Breakfast food which contains about twenty-five or thirty per cent. of bran may be used. This is an excellent diet for such a person. It is a soft diet that won't irritate the ulcer any and at the same time it is laxative. He may use Para-Lax freely or an emulsion of paraffin oil with great advantage and take a loosening diet but it ought not to be a diet that requirés chewing because that will make more gastric juice and aggravate his ulcer.

Q. What is indican?

A. It is formed from indol which is formed by putrefaction in the colon and is the thing that gives a dead rat such a horrible odor and the same poison is formed in the colon when one eats a dead horse or a dead cow or a dead animal of any kind and allows a portion of it to remain behind and decay in the colon which is certain to be the case. Then indol is produced which is absorbed into the blood and carried to the liver. You know the rest of the body converts the indol into indican which is a non-poisonous indol. The indican is the indication that there has been indol there and that this indol has been circulating in the blood doing harm and mischief before the liver had had time to change it to indican which is the harmless form.

Q. When a smoker stops the use of tobacco does he want to take a quantity of sugar?

A. It just depends upon what sort of candy or sugar? If it is malt sugar, it will be all right. It won't do him any harm at all. Candies made of malt sugar won't do him any harm. Cane sugar might do him harm because it is more or less of an irritant.

Q. What causes catarrh and does it make one nervous?

A. People suffering from catarrh are nervous. The disturbance of the body which gives rise to catarrh also disturbs the nerves. I think the principal sause, the real cause of catarrh, is the absorption of toxins from the

colon which over-stimulate the thyroid gland which is an antitoxic gland which has for its dumty to destroy poisons and when poisons are taken in in excessive amount the gland is over-excited and produces an excessive amount of thyroidin, a poison antidote and that is what is called hyperthyroidism or exophthalmic goiter.

Q. If one has valvular heart trouble in what part of the country is it best for him to live?

A. He ought to live where he will be happiest and most comfortable. There is no climate particularly adapted to these cases except that such a person ought to avoid very high altitudes because in high altitudes more work is required of the heart than in low altitudes and a person with valvular heart trouble has a crippled pump with a leaking valve so he must avoid any climate or condition which requires an extra amount of work of the heart.

Q. Is the Battle Creek Sanitarium a paying institution? Has it a bonded indebtedness? What is the amount?

A. The Battle Creek Sanitarium is not a paying institution. It does not pay anything to anybody. This institution belongs to the state of Michigan. It is controlled by a Board of Trustees. These Trustees hold the property in trust and have no interest in it whatever. No living person has any interest whatever in this institution or anything pertaining to it or belonging to it. The entire property is held in trust for the public by a Board of Trustees. That is the situation. It is not a paying institution, cannot be made to pay anything to anybody. It has a bonded indebtedness of $750,000.00. It is trying to pay it off. We are making very slow progress but little by little the debt is being diminished. The bonds are well secured and the bond holders are not worried so we hope to be able to get the bonds paid off within the next ten years when they mature.

Q. Do you consider it possible for a lion to be strong and healthy on a strictly vegetable diet?

A. Certainly. I think a vegetable diet would make a lion a better lion than he was before. I am sure he would be better natured and I am certain he would have more endurance and I am certain his breath would not be so bad because the lion suffers dreadfully from autointoxication. It has terribly bad breath and the emanations from his body are something awful. He has a terribly bad flora. That is why he has a terribly bad aroma because he has germs which are producing horrible poisons. A man went into a circus sometime ago, stepped up to the lion's cage when the lion was asleep and he thought he knew the lion and the lion would recognize him but the lion was asleep and he touched his body and before he could get his arm out of the cage the lion laid hold of his arm and crushed it. Three days afterwards the man died in the hospital swelled up beyond all recognition and microscopic examination showed that he had Welch's bacillus which he got from the mouth of the lion and the lion got it from the meat which he ate and every pound of beefsteak you ever ate had that Welch's bacillus in it. That is the reason why the lion gets autointoxication.

Q. What would you do for obesity?

A. Eat less and work more. These are two things to do. Electric light baths, sweating baths, swimming, walking, the Bergonne treatment that exercises the muscles by electricity in a painless way and other things are useful.

Q. Is radium good for anything besides cancer?

A. Yes, it is used to remove birth marks and things of that kind.

Q. Could one have anything wrong with the stomach when there is no gas, no spitting of food or bad taste in the mouth, no sign of pain in the region of the stomach?

A. Yes, I have known a person to have cancer of the stomach when they didn't have pain in the stomach at all, never knew a thing about it but that is not likely to be the case. If the doctor has examined you, made a note of your symptoms, made an examination of the stomach and finds nothing wrong with the stomach, you may be sure the probability is ver y very remote indeed that there is anything the matter. Oneshould not imagine he has trouble when he has not. However, a test meal mgy show trouble which is not felt by any symptom relating to the stomach at all. It may show the stomach makes too little hydrochloric acid or makes none at all. I have met persons who had no stomach symptoms whatever whose stomachs had actually retired from business, were not doing a thing at all, the pylorus wide open so the food passed into the stomach and right on out into the intestine without receiving any attention whatever. The stomach was worn out.

Q. Does mental inactivity increase blood pressure?

A. It may if the activity is sufficiently active.

Q. What is a convulsion?

A. It is sudden, automatic, involuntary contraction of the muscles.

Q. Do you advise the use of good sauer_kraut? How about dill pickles?

A. No I cannot recommend dill pickles but sauerkraut is really not so bad. There are other things better, I think, than sauerkraut and the sauerkraut that get a little old is something very disagreeable but sauerkraut that is really made right is simply a kind of koumiss. It is a kind of Bulgarian buttermilk. The sauerkraut is simply cabbage cut up and put away under conditions that produce lactic acid fermentation and this preparation of cabbage is a little more digestible than raw cabbage. Raw cabbage is more digestible than cooked cabbage. I have proven that by experiments and I think for the poor that the cabbage used in this way is like the farmers putting

down their greenstuffs in a great tower, what they call a silo, you know. That is the same thing we have in sauerkraut. If the cabbage is prepared in this way it can be kept for a longer time perhaps than if it had not been prepared in this way and so may be wholesome food for the poor especially who cannot afford lettuce and things of that kind in the winter season. It must be a great blessing to the Russian present question.

Q---What is the use of olive oil in the system?

A---Olive oil is a food. It contains the fat elements in just the form in which they are found in the body which is true of vegetable fats in general. They are exactly the same kind of fats the body itself produces so are best adapted to the body needs. When one eats animal fat this fat is transported into the body, deposited in just the form in which we take it. In other words, if we eat tallow, you get tallow in yourself. If you eat mutton tallow you get mutton tallow. If you eat ox tallow you get ox tallow in your body, in your own tissues. It is put down into the body in just the form in which you take it in. If one makes his fat out of starch, this starch is converted into human fat which is just like that of our own bodies but if you eat the fat of another animal, that comes in just as it is deposited so when a dog in the laboratory---sometimes the physiologists feed the dog on mutton fat---by and by that dog gets hard like a sheep and they call him a mutton dog. So you see a man that eats mutton becomes a mutton man and the man that eats ox becomes oxified as Bronson Olcott used to say.

Q---Which is best, raw food before or after meals?

A---Raw food before meals, in the meal, during the meal and after the meal. That is the best way for fruits.

Q---Is yogurt buttermilk too rich for one with fissure?

A---No.

Q---Can gastric ulcer be cured without operation? If so, how long does it take on an average?

A---Probably there are at least five hundred gastric ulcers cured without operation where there is one cured by operation. Most gastric ulcers get well of themselves with the doctor or surgeon being consulted. It is not the surgeon's knife or the doctor that cures but Nature. Nature can cure a sore inside of the body just the same as a

sore outside of the body. If you have a sore on your finger, you would give it a chance to heal. You would not right away have that finger cut off, so if you have an ulcer of the stomach, you don't want to urge the surgeon to perform an operation and cut it out right away. The chances are at least nineteen and twenty that the ulcer can be healed up and kept healed. If you will have the ulcer healed than live right and cut out beefsteak, mutton chops and all the things that go to make cancer and ulcer and things of that kind and live the simple life, you need not be afraid of anything under the sun. I thank you.

End.

v-p

The Stomach

A Stereopticon Lecture at the Sanitarium Parlor, Battle Creek, Mich.,

Thursday, February 5, 1914

at 8 P.M.

by

J. H. Kellogg, M.D.

We are going to talk about a very practical subject tonight, a subject which lies near to everybody's heart,--the stomach, but we are not going to talk so much about the stomach as about what we put into it. First we will talk a little bit about the American sweet tooth which is a monsterous affair. Do you know how much sugar the average person eats a day? More than a quarter of a pound. The average man, woman and child, including the babies, eat a quarter of a pound of sugar every day, more than the people of any other country of the world. Something like eighty-five pounds of sugar is the average per capita consumption of cane sugar in this country every year. In Italy the per capita consumption is only about ten pounds. There is no country in the world where the amount of sugar consumed is so large as in America. I suppose that is the reason why the politicians give so much attention to the question of tariff on sugar, because it is something that comes close to home, to everybody. Now I believe you will be surprised when I tell you that cane sugar is not a good food. It is not a natural human food. It is a drug food as supplied to us upon our tables; it is an artificial product and it is not well received by the body. It often becomes the source of very serious injury. The natural sugar to which the body is adapted is meltose. It is called "maltose" because this sugar is produced in the process of malting. When any kind of grain or cereal is moistened and begins to sprout, there is a ferment just underneath the envelope or bran of the grain which converts some of the starch into sugar and the sugar which is formed by this fermentation is meltose or malt sugar. That is the name of it. Now this very same sugar is produced in the mouth when we take starchy foods that have been cooked and chewed in the mouth for a little while. A sweetish flavor is produced and can be noticed and this sweet flavor is due to the action of the saliva which contains maltase and amylace, a ferment which

converts the starch into sugar, so we have a sugar factory in our bodies. In fact, we have more than one. The saliva acts upon starch and converts it into sugar and when it gets down into the stomach it keeps right on acting for an hour and a half or two hours. If we chew food long enough, mix with it a good lot of saliva, half the starch we eat may be converted into sugar. That is, if we eat half a pound of starch, we may get more than half a pound of sugar from that starch, but if some of the starch escapes from the stomach and is not digested there, when it gets down to the duodenum it meets the pancreatic juice which converts starch into sugar just as the saliva does and does it better and does it faster and if anything escapes the pancreatic juice, further down in the intestine it comes in contact with the intestinal juice, and the intestinal juice converts starch into sugar and so there are three sugar factories in the body, and that is not the end of it, because after the dinner is absorbed, it is taken into the blood and carried to the liver where the sugar is converted back to starch again to store it up. That is a little trick which the maple tree has and every other plant and it is interesting to see that the thing that is hapening in our bodies, is happeningin all the plant world. When all the trees of the wood get ready for xxxx winter, they store up a lot of starch in their roots and this is manufactured up in the leaves of the trees where the sugar is converted into starch. That is a backward digestion, if you please. It is converted into starch and this starch is deposited into the roots of the tree. That is why starch is stored up in the potato, in the parsnip, in the beet and all the rest of the roots and the tubers that we depend upon so largely for food. This starch is stored up there for the use of the young plant when it comes to starch in life. It is a capital that is stored up, a legacy that is passed down to the progeny of that plant, so that it shall have something to start out in life with before it has got its leaves and grown bark and the chlorophyl with xxxx which to capture sunlight and convert it into food to produce its own sugar and to have something to start with out of which to build its stems, leaves, twigs and branches. So it is stored up in the roots. In the meantime, the tree must have new leaves. It has to depend on leaves for making its sugar. It has no leaves. Hence how is it going to make leaves, how is it going to get material out of which to build leaves with which to make sugar with which to grow. It must have a supply stored up for it in the fall, so it is stored up in the roots and in the springtime when the sun shines

on the earth and warms up the earth, the roots go to work and convert starch into sugar which circulates up through the tree. And now comes the woodman and he bores a hole into that tree and puts in a little pipe, a trough and out runs the sap. Then he boils the sap down and gets the fine Vermont maple sugar that we are so fond of that is multiplied so extensively all over the country. This sugar made by the maple tree and by the hickory tree, for that makes sugar also, and in fact nearly all trees make sugar, this starch and sugar process is duplicated in the body, for the sugar that is carried to the liver, it is captured by the liver and stored up in itself for future use just exactly as the maple tree stores it up for use for the coming spring.

Sugar stored up for use in the body for the next hour. When you eat the food is taken in and if it was all taken into the general circulation at once it would be largely lost because we could not use it at once. Then we would be starved in the hours to come for sugar is one of the most essential of all our foods. We must have sugar. We can get along without fat; we can get along without protein for quite a while but we must have sugar. It is the one essential element upon which we live. Every heart beat burns sugar; every heart beat is the result of a combustion of sugar. There is a little explosion of sugar. That is what makes the heart make that little jump. It is an explosion of sugar. That is what happens in the muscles when your muscles contract and you strike a blow. There is a big explosion of sugar in your arm. Every muscular movement, all the activities of the body are based upon the oxidation or consumption of sugar in the body. The starch we eat is all converted into sugar. It is stored up in the liver of an adult to be used as a sort of automatic stroking arrangement so that the body will get each second just the amount of sugar it needs for work in the different processes of the body. This process as I said is conducted in the liver. The sugar is converted into starch, then by the liver it is converted into sugar again, then it is carried in the blood to the muscles and in the muscles is stored up in the form of starch again,--animal starch called, glycogen. So this sugar is there all ready for use when it is needed. Then when we want to make a muscular contraction, right immediately, instantly, just that very moment, some of that starch is adjusted quickly and converted into sugar. Then the sugar is burned and the muscular movement occurs. Now let us see how many sugar factories the body has. There is one in the mouth; there is another one in the duodenum; there is another further down in the intestine, another one in the liver. That is four andanother one in the muscles of the body and that is five. So there are factories for making sugar in the body. We do not need to eat much do we when we have got five sugar factories of our own and can make home made sugar. We certainly don't need to eat much sugar. And then besides, we consider oatmeal, for example, and cereals are more than half starch and all of that starch is converted into sugar in the body. Every bit of it is converted into sugar in the body, so we can see that to add sugar to oatmeal is

like carrying coals to New Castle you see. New Castle is the greatest source of coal supple for the world; or was for many generations. It was where all the ships were loaded up with coal, from New Castle, and nobody would ever think of sending a trainload of coal to New Castle where there were great holes in the ground out of which coal had been pouring in great streams for many decades. Now it is perfectly absurd to add sugar to cereals because those cereals are sugar already, potential sugar that only needs to be acted upon by the saliva and the pancreatic juice and the intestinal juice to make it real sugar. Now as I said before, the natural sugar of the body is the kind of sugar that is made from starch and this sort of sugar that is made from starch is found in all fruits. The sugars of fruits are the sugars that are made from starch. That is the way they are made. In an apple, we have green starch, in an immature apple. In a green apple, there is an abundance of starch. Taste it and it is not sweet. Take the sweetest apple you ever saw, when it is green and it is not sweet at all. It has an unpleasant flavor. It is bitter, there is no sugar in it, but by and by when the time for ripening comes, under the influence of the &tinic rays of the sun, this ferment which converts sugar into starch in the apple is set to work so that the starch is all converted into sugar so when the apple is ripe there is no starch there at all but sugar instead. So when we eat the apple, we eat sugar. So with the orange, there is sugar in it. When the orange was very green before it began to get ripe and mature, it was not sweet, it was sour too, but a transformation has taken place and the sour orange has become sweet, because the sugar is produced in it. So the unripe cherries are sour and bitter, but by and by when this sugar-making time comes, a little ferment in the little twig close by the cherry, as the sugar comes in from the tree, it is carried in there and the cane sugar is converted into fruit sugar. which is the sort of sugar the body utilizes. The body cannot make any use of cane sugar any more than it can utilize starch. If you put starch into the veins, it would be a damage to the body and would be treated as a foreign body, that is, cane sugar, but if you put malt sugar into the veins, it is utilized for it is the native sugar of the body. Now I am going to give you in a few words, some contrasts between cane sugar and malt sugar. Meltose is the term we use to represent the product of malt sugar made for our use at the Sanitarium. I became convinced of the truth

of what I am telling you almost forty years ago, and I began xxxfixxxxxx experiments to find some way of furnishing this natural sugar to the body so we would not have to use cane sugar to satisfy our sweet tooth because the sweet tooth is a real natural thing. It is purely human and distinctly human. It is perfectly natural for a child to love sweets and the sweet is attractive and wholesome provided he takes the right kind of sweets. It is gratifying of the sweet tooth with unnatural sugar that does the harm and not gratifying it in a natural way. Now see some of the contrasts between cane sugar and malt sugar or meltose which is the sugar which we furnish on our tables here in the form of malt sugar or malt honey. The commercial name for this is"meltose"and this is the difference between the two. Cane sugar is not well adapted to the human nutrition. On the other hand, meltose is perfectly adapted to digestion. It is always produced in the small intestinesafter a meal containing starch and so is a natural diet. The cane sugar found in course roots and grasses and the sap of trees is the food of frugivorous animals. It is not found to any extent in our natural food stuffs. We do not find cane sugar in apples, peaches, plums, cherries or various other fruits. The sugarx of these fruits is fruit sugar, the same kind really that is produced by the digestion of starch in our own bodies. Cane sugar is digested only after much delay and sometimes not at all. It is not assimilated or absorbed without digestion. It must be digested before it can be assimilated Cane sugar is not digested in the mouth, it is not digested in the stomach and it is not digested in the upper part of the intestine. It is only far down in the intestines that the cane sugar can be digested. In fact, the digestive agent for cane sugar seems to be in the intestinal wall itself. Mx Meltose may be absorbed and utilized without intestinal digestion because it can be used in the body. Cane sugar is an irritant to the gastric mucus membrane. Prof. Ogata, a European investigator made a careful study of this subject with dogs. He arranged dogs so that he could put things into their stomachs and watch the effects. He put into a dog'x stomach a two per cent. solution of sugar and after a while it made irritation. Then he put in a five per cent. solution and that made more irritation. Finally he put in a ten per cent. solution and that made the whole inside of the stomach look as though it were a bloodshot eye. When he put in a ten per cent. solution, the dog made such a terrible outcry and showed such misery and distress

that he brought the experiment to a termination. Now just think of what you are doing when you eat candy, take it into your mought and swallow a saturated solution of it. You are treating yourself worse than that investigator treated that poor dog. Thousands of people are made dyspeptic, get gastric ulcer, gastric catarrh and other distresses as the result of eating candy. It is one of the pernicious habits of the American people. I would not say it is quite so bad as tea or coffee drinking or the use of alcohol, but it produces in the stomach a condition almost as bad. It is an irritant to the mucus membrane. Hundreds of people know by experience that they cannot eat cane sugar. The more that cane sugar is taken into the stomach, there is such irritation, such distress that they really suffer. Meltose does not cause irritation in this way because it is natural sugar. Cane sugar gives rise to gastric catarrh and permits acidity, and so causes indigestion. Meltose may be eaten freely and without any injurious results. Cane sugar is highly detrimental to diabetes and various other maladies. Meltose may be used in conditions in which cane sugar is highly injurious, although it is not to be recommended for use in diabetes. Cane sugar is condemned by eminent authorities as a cause of rickets and other disturbances while meltose contains bone building salts and lime and does not cause rickets or other deformities. The meltose contains along with the sugar, the lime salts and other elements associated with them in plants. Meltose may be eaten in any quantity from one-fourth of a tablespoonful to several ounces. It represents the digestive carbohydrates and the soluble salts of the grain. A good way to use meltose is to take an ounce or two an hour or two after meals. If you want to gain flesh, that is a splendid way to take it, because it slips in and is not counted. It requires no digestion and if you take too much at meals, it may disturb your appetite somewhat, but if you take it an hour or two after the meal, it does not disturb your appetite and is quickly digested. Any sort of fruits may be combined with it. It combines beautifully with all sorts of purees, sliced apples, peaches or any sort of ripe fruit. I should say that some persons who suffer from hyperacidity should combine butter or cream with the malt sugar when eating it. Now I am not presenting this to you as an inducement or an advertisement of malt sugar or cane sugar but simply to give you the information. After I have given you the information, the responsibility is on your own shoulders. You have it at the table here

and you can use it as you want on the table, and if you go home you can have it in syrup form or in packages in the dry form, either way as you like it. A very small amount of cane sugar used with food stuffs probably does no harm, but when it is used largely as many people do, in coffee or cereals and in such ways, it becomes really detrimental to health and an injury especially in the case of children who need lime salt because it does not furnish any lime at all. Here are some flesh foods. Porterhouse steak has a food value of about one thousand calories a pound. Now if you have to take two thousand calories a day, you would have to eat two pounds of porterhouse steak. Now what would that cost you? I suppose it costs, perhaps, forty cents a pound. It depends in what part of the country you life doesn't it? Now if one is short of brains and needs to eat some animal brains, he would have to take four pounds of brains, don't you see to get the two thousand calories. That would be about the weight of the human brain wouldn't it? Cuvier's big brain weighted 64 ounces and you would have to eat four pounds of brain, a whole big brain, you would have to eat every day to get your day's ration. Liver has six hundred calories to the pound and sweet breads eight hundred, but this doesn't say anything about the uric acid you remember. You remember there are seventy grains of uric acid in a pound of sweet breads and you would have to eat three pounds and a half daily or three and a thind pounds in order to get your day's ration, and that would be over two hundred grains of uric acid in a day and the body only eliminates six grains in a day. So you see a person would get gout pretty fast if he lived on sweetbreads. Dried beef has about one thousand calories to the pound. Head cheese seventeen hundred; ham eleven hundred; smoked bacon two thousand; chicken five hundred. Chicken is not worth as much as brains you see, has a very low nutritive value; goose twelve hundred and goose has fifteen hundred calories to the pound because it has a large amount of fat; pork one thousand; black bass four hundred and fifty-five. See how little nourishment fish contains. One would have to eat six pounds of codfish to get a day's ration you see, or six pounds of mackeral or salmon three pounds; mackerel, oysters have two hundred and thirty calories and one would have to eat eight pints of oysters or four quarts of oysters for a day's ration. Well if one should swallow so many live oysters as that, they might be running away with them. Refined tallow has four thousand calories to the pound, but one could not life on tallow.

Beef juice has only one hundred and fifteen calories to the pound. It is not worth while is it, for two thousand calories you see would have to take just a trifle less than eighteen pounds of beef juice for a day's ration if you are going to live on beef juice. People generally have the idea that beef juice is so very nourishing. Beef juice is chiefly composed of urine. That is what it is. It is the extract of the tissues. Now the urine is an extfact of tissues. The kidneys separate this extract from the blood, separated out by itself but when you take the tissues of an animal and squeeze the tissues with a lemon squeezer or something else, you get the urine out without the aid of the kidneys. The urine simply represents the waste matters of the body and that is what you have in beef juice. Eighteen pints of it would be nine quarts or two gallons and a quarter a day. When one eats flesh foods, they eat something besides flesh, there is something besides food. Now we don't object to eating flesh simply because it is not esthetic to do it, but because it is not the natural diet of man. That is sufficient objection for me, but there are other objections of a very serious and I may say of a sanitary nature.

Sometime ago a young man was studying in our laboratory across the road who was the cheff of one of the hotels of the city. I won't mention which one for they are all alike in this particular. I asked our laboratory man, our bacteriologist, Dr. Nelson, to get this young man to bring up some sample of meat which he served upon the table just as they were served. I asked him to do this because it was one of our best hotels in the city and I knew pains would be taken to get the best meat for the table and that it would be inspected meat and it would be edible meat that was actually served and eaten. I was lead to do this by the fact that Dr. Nelson has just been down to Johns Hopkins' University in Baltimore studying there under Prof. Simon and others and Prof. Simon in the course of his study remarked to him one day, "I would not dare to publish what I know about codfish, macherel and such things." "Why," he said, "They are just swarming with germs."

If the public knew about it, it would break up the business. Well Dr. Nelson told me that and I said, "Let us let the public know just as fast as we can because that is just the business we want to break up. We don't have any scruples at all upon that subject, so to verify these observations I said, "We will go a little further and examine all kinds of meats found in the markets as well as the mackerel and cod fish which we examined and found to be just as Dr. Salmon said, so the young man brought up from the hotel some specimens of meat and we examined them in our laboratory. Now a gram is one thirtieth part of an ounce. It takes thirty grams to make an ounce and these figures show the number of germs shown in a gram, one-thirtieth of an ounce so you can see a large sausage here showed four hundred and twenty millions of germs to one gram; small sausage six hundred and sixty-three million; a round steak five hundred and sixty million roast beef five hundred and sixty millions; smoked ham forty-three millions. Some of the germs could not stand the smoke. Hamburger steak showed one hundred and twenty-nine millions. You know hamburger steak is---well I won't say just what it is. Some of you know---one hundred and twenty-nine millions; pork one hundred and twenty-six millions; porterhouse steak thirty millions; surloin steak three hundred and thirty-eight million. It was purely an accident that these different kinds of steak differed so much. Some were still young in their plan and others had advanced far along down the line toward senility and decay. Tender loin well done. Some of you are comforting yourself that your steaks are well done, but here is tenderloin steak well done with twenty-five million germs in one-thirtieth of an ounce. Suppose you only ate an ounce. That would be seven hundred and fifty million germs that you eat if you eat just one ounce and if you ate four ounces it would be three billion germs in one quarter of a pound of meat. Tenderloin rare showed one hundred and sixty-eight million. When these are kept over night at ordinary room temperature you see how fast the figures are doubled up. Smoked ham at the end of twenty-four hours had seven hundred and fifty million; pork that had only one hundred and twenty-six million had one billion germs at the end of twenty-four hours. Porterhouse steak had seven hundred million instead of thirty million. You go to the best meat market that you know of and get the very best meat you can and you won't get anything any better than those. That is just what you will get and just what you eat.

Now just a word about cereals. Cereals contain various elements. Among other things they contain cellulose and this list tells us something about the proportion of cellulose found in grain and that is a very important thing for people should recognize the fact that intestinal activity is just as necessary as stomach activity. Cereals, bran contains forty per cent. cellulose. Cooked oatmeal has ten per cent; dried peas five per cent; lentils four percent; rye three per cent.; cooked wheat two per cent; cracked wheat two per cent; granola, cornmeal, corn flakes and graham bread all contain about two per cent; wheat grits cooked one per cent; dried beans three per cent; polished rice contains seven tenths of one per cent; and fine flour contains three tenths of one per cent. Here is a table showing the number of ounces necessary to furnish three hundred grains of cellulose: Six ounces of oatmeal, ten ounces of peas, fifteen ounces of lentils and thirty ounces of cooked wheat or rye, forty ounces of corn flakes or corn meal, sixty ounces of whole wheat breat, polished rice eighty-two ounced, fine flour bread two hundred ounces. You couldn't eat enough of it, you see. Two hundred ounces would be twelve pounds of bread and you could not eat that much in a day. Fortunately threr are other things besides cereals. Fruits are among the most delicious and wholesome of foods and it is as natural for us to eat fruits as it is for us to breathe. A baby will reach out its hand for fruit, but a baby would not reach out its hand for a live oyster nor for a pig. A baby will make up an awful face if you try to put an oyster into its mouth. Try it sometime if you want to see whether it is natural food or not, but if you have a peach or cherry or paar or any other delicious fruit, you never found a baby yet that would despise it. We have a naturally implanted instinct in us to reach for all these lovely things that grow upon the trees, those lucious fruits and seize them and utilize them as foodstuffs. Now look at the fruits. You see they contain a considerable amount of nutritive value. Some fruits like plums, pineapples, persimmons, prunes, etc. have as high a value as fish have. A pound of prunes is worth more than a pound of fish or as much as a pound of fish. Watermelon is worth more than beefjuice. Beef juice has one hundred and fifty calories to the pound, and watermelon one hundred and forty calories to the pound. So if you have got your choice between watermelons and beef juice, take the watermelon every time for you haven't got any urine in the watermelon and the beefjuice is almost nothing else. Strawberries have one hundred and eighty calories

raisins sixteen hundred calories. That is almost equal to ham, don't you see. A pound of raisins is almost equal to a pound of ham. You remember ham was seventeen hundred calories in a pound and a pound of raisins equals it in value. Here are prunes, fourteen hundred calories. A pound of prunes you see is worth as much as three pounds of fish, three pounds of trout or salmon for which you would have to pay a good big price and a pound of prunes is equal to three pounds of nutritive value. Even the despised persimmon is worth more than fish. Oranges two hundred and forty. Oranges are worth as much as oysters. Oysters were two hundred and forty you remember and here an orange is as nourishing as an oyster. A pint of oyster juice has just as high a nutritive value as a pint of oysters and certainly oranges juice is more reasonable and sensible and more cleanly for food It has sixteen hundred calories. Fruits have a very large percentage of cellulose. I should say with reference to the grains tha cereals, that the nutritive value of cereals ison an average about one hundred calories to the ounce. That is the way cereals run. Pretty uniformely, about one hundred calories to the ounce. Fruits contain a very large amount of cellulose. Raspberries for instance, have 7.4 per cent. quite a large amount; in huckleberries we have twelve per cent. Huckleberries have a larger per cent. of cellulose than any other natural food. So fruits are of very great value. Then there are the nuts. Here is a nut eater, a squirrel who knows the value of nuts. What is there in all the food stuffs that we eat that is as delicious and sweet as a nut that is so really luscious and see what a wonderful nutritive value they present.--Nuts and nut foods. Almonds three thousand calories to the pound. Just think of it! Why is that? Because it has such a large amount of fat you see. Almost fifty-five per cent. of fat and protein 21 per cent. Now beefsteak only has 19 per cent. The nutritive value of beefsteak is only 19 per cent. protein and almonds are 21 per cent. protein, so there is more beefsteak in a pound of almonds than there is in a pound of beefsteak and there is almost a pound of butter in addition. At least two thirds of a pound of butter. More than a pound of beefsteak and two thirds of a pound of butter and a quarter of a pound of bread in one pound of almonds. Just think of that! The price of almonds is much cheaper than the price of meat when we come to compare the nutritive values. Then we have Brazil nuts with a still higher nutritive value, 3200 calories to the pound; butternuts 3loo calories; hickory nuts 33oo calories; filberts 3200 calories; pine nuts 2800; pecans 3400; walnuts 3200.

Of all foods

that grow, nuts are the most highly nourishing and the most easily digestible if thoroughly chewed and eaten at the proper time. If one eats a large quantity of nuts and fails to chew them properly, especially if late at night, he is likely to have a nightmare before morning, but it is because the nuts were swallowed without being properly masticated. Nuts and fruits taken into the stomach without thorough mastication are absolutely indigestible. Nuts and fruits are not digested in the stomach but lower down in the intestine. So it is very necessary in eating fruits and nuts that they should be thoroughly chewed, should pass out of the stomach quickly and not be long retained as they must be if they are not properly chewed. Vegetables you see have a large amount of cellulose, Peas, cabbage, parsnips, kohlrabi, brussels sprouts, turnips have a large amount of cellulose. If you run down through the column, you will see that on the whole they average higher than the cereals, so it is very necessary to make large use of fruits and vegetables in order to simulate peristalsis. Meats contain no cellulose at all; meats are entirely digested leaving behind almost residue so they do not encourage peristaltic activity. Another thing of very great importance is the facts that these foods have different values as regards the metabolism of the body. The products that are taken into the body in the form of food are all converted into poisons before we get rid of them. It is exactly the same as it is with the fuel we put into our stoves and furnaces. Here is a piece of wood, simple pine wood. Nothing could be more neutral or harmless in its relations to the body. One could grind up the pine wood into very fine flour and swallow it and it would not do him any harm taken in a moderate quantity. There is nothing obnoxious about it, but we put that wood into the stove or put coal into a stove and let it burn there and there will fall down in to grate below ashes which are caustic, a powerful chemical and out of the chimney comes gasses which are poisonous and if we pass them through the condenser, we would find carbolic acid, creosote, empyreumatic oils and they are corrosive and they all come out of the wood by the process of burning. The same thing is true with reference to foodstuffs. We take these into our stomachs, simple bran substances and in the process of digestion, changes take place in the tissues. These foods are oxidized and converted into poisonous substances. If this oxidation is complete, then the poisons are of less harmful character. Carbon dioxid is one of them and it passes out through the lungs. That is entirely harmless. Urea is another. That is a comparatively harmless poison. It would have to be taken

in very large dose to ptoduce ill effects. It produces internal poisoneus effects when retained in the tissues, but when taken into the body, it is eliminated and comparatively harmless and in that form is not very poisonous, but there are other substances produced in the body which are highly toxic. If this process of burning is not quite complete, then various acids are formed in the body, acetone, diacetic acid and betaoxybmutyric acid are among the substances that are formed and many others, the exact nature of which is not fully known. These poisonous substances are found in the tissues and when they accumulate they produce very grave effects. In abiaity to sleep at night is one of the consequences of the accumulation of these poisons irritating the brain and nerve centers and produce irritability, moroseness, melancholy, depression of spirits, extreme nervousness, a condition people sometimes call biliousness, inability to sit still, all of these are the effects of these poisons upon the central nervous system. You can go to a drug store and buy drugs that will produce the same effects. Some of these poisons are stupifying poisons and when they accumulate, they produce drowsiness and in cases of diabetes, these poisons accumulate in such degree that they produce by and by a condition known as acidosis, and finally the condition of coma and ultimate death. It is important then to get rid of these acid poisons which threaten us continually. It is the accumulation of these acid poisons in the body that causes hardening of the arteries and brings on old age. These same sort of poisons, including the indol and skatol absorbed from decomposing matters in the colon produce pigmentation of the skin, brown spots upon the skin, bad odor of the body. These are natural results of the absorption of these poisons. Some of our foodstuffs contain bases which neutralize these poisons and encourage their elimination from the body. These are particularly fruits. All the various sorts of fruits and vegetables have these bases which are highly beneficial, benificent and useful in character. On the other hand, meats contain an enormous amount of the acids. Lean beef contains 1000. On the other hand, among vegetable products, it is only the cereals, corn and wheat and the breads that are acid. Corn breads of various sorts and eggs white, these are highly acid, and wheat is acid, all the aereals are acid, even rice. The acidity of rice is quite high you see. So it is very important to bear this in mind and persons who have high blood pressure and want to get the acids down xxxxxx who have a tendency to ■ insomnia, who are nervous, neurasthenic, who have hardening of the arteries and who want to keep young, should avoid

meats entirely because of this acid-producing tendency and should take cereals rather sparingly. I made the mistake of living almost entirely on cereals for a good many years and I got in consequence of it, a little nodule on two or three of my figers, and I simply present myself as a horrible example of a wrong diet. If I had known what I know now, I would not have had that bunch on my little finger which I am very much ashamed of and I would not present it except for the teaching of this lesson to show that I know from my own experience. Now I found my joints were beginning to swell up and I began looking the matter up and I found about fifteen years ago that Prof. Bunghae (?) who first called attention to this important fact stated that cereals contain an excess of acids, so I discarded cereals. I had been ignoring the vegetables and I substituted vegetables for bread and found a very prompt change for the better. The soreness disappeared and I found a very great advantage in that one thing I was in error. It is necessary for us to obey the whole law, Every biological principle that relates to our bodies we have got to observe and our business in this institution is to study physiology and biology and find out what is good for man, find out what is good for a person to eat, what is good for a man to wear, to find out ~~what~~ how he ought to behave in every particular of his life. A horse behaves properly and knows how to behave, behaves just as a horse ought to behave, but a man instead of behaving as a man ought to behave, behaves like every other beast in the world. He eats like a hawk, cultivates a turkey buzzard appetite, eats everything that every other animal eats and wants to eat everything that every other animal does, so he makes a general all around, well I don't like to say exactly what I think, and it is because of this: The human race is degenerating. A horse behaves like a horse. You don't see a horse acting like a dog. You never saw a horse eat what a dog eats, so it is with every other creature. Each creature follows the biologic laws which ~~x~~ relate to it, but man pays no attention to biologic and physiologic laws which relate to him as a species, as an animal. He ignores them and pretends to believe he can ignore them with impunity, but he can't. That is why men are dying off in such millions from Bright's disease, hardening of the arteries, premature old age and maladies which he never ought to have. It is very important then to regulate the diet in relation to acids and bases if and if you wish to regulate your diet on that point, call for one of the white bills of fare which contain these two columns showing the reaction balance of various foods. I am prescribing every

day for patients to take a basic diet. For myself I do not eat anything but basic foods because I propose to keep the acids down as long as I can. They accululate any how as we go on in years in spite of all that we do because the oxidation is not so complete, the tissues are not so completely purified and the acid wastes accumulate and that hardens the arteries and brings on old age. We ought not to hasten that process any more than we can help. Now there is something besides the nutritive values of foods to be considered. There is the digestibility of foods as well. Food may have a high nutritive value and great indigestibility. For example, we found tallow had a nutritive value of 4000 calories to the pound, but its digestibility is very low. It is very hard to digest. Roasted pork had a very high nutritive value, about 1700 calories to the pound you remember, but it takes five hours to digest it. On the other hand, here is rice with a nutritive value of about 1600 calories to the pound, and it digests in just one hour, so in two hours with rice you can digest more food than you can digest in five hours in the form of pork, you see. So with many foods here. Here is veal. People think veal is a very delicate food. Broiled veal takes four hours to digest. People think roast duck is a very nice thing and fried chicken and things of that sort, but it requires four hours and a half to digest these things and a oyster which is supposed to be so digestible that it will almost digest itself and raw oysters require three hours; stewed oysters three hours and a half and sometimes they don't digest at all. Ripe, sweet mellow apples require only an hour and a half to two hours and barley and tapioca, boiled milk and all those things are very easily digested. The superiority of vegetable food applies not merely to carbohydrates and fats which are fuel, but to proteins as well. The following table shows the cost of one pound of protein purchased in different forms. A pound of protein in peas cost fourteen cents; a pound of protein in bread costs thirty-six cents; in milk it cost fifty-two cents; in a pound of protein in the form of beef cost sixty-four cents. Now for fourteen cents, you can buy a pound of protein in the form of peas which would cost you sixty-four cents in the form of beef, so you see it is cheaper in every way, but there is still another matter of economy which is of far more importance. That is, in the economy of bodily energy and vitality in dealing with the waste products of these various foods.

When a person is fed upon an ordinary mixed diet, and that is what we would call ordinary meat, a protein diet according to Prof. Folin, the kidneys have to remove this amount of waste matter from the body in one day. You see the quantity of urine is 1400; on the low-protein diet, it is only two-thirds as much, 1000 instead and the acidity is 2 in the high-protein diet and less than 1 in the low-protein diet. The total nitrogen is sixteen on a meat diet and only six on a natural diet. The urea is 29, almost 30 on a high-protein diet and only eleven and one-half on the low-protein diet, about one-third as much and here is the ammonia which represents the acidosisx I was tell you about a little while ago, almost four xxx times as much on a meat diet. The chlorids are higher. Here are phosphates more than double and so it gxix goes all the way through. We come down here to indican, 77 on a meat diet and only 5 on a proper diet, and it is really not at all when the bowels are properly regulated, so you can see the work required of the kidneys is scarcely half as much on a low protein xixx or natural diet as on the ordinary diet, so it is no wonder the kidneys wear out so fast with so many people. Now there is a baby that was born into the world with a splendid heritage. It is not necessary to be told that. We know by the looks of the little fellow that he is brim full of life and snap and vim and energy and I suppose that is the way most of us were born. Why don't we feel that way all of our lives? How do we get to feeling so old and wretched and miserable? Simply because we have wondered away from the path of rectitude, because we have violated nature's laws and biologic and physiologic laws which are as immutable as the xx law of gravitation. We have forgotten that we are amenable to these laws as we are to the decalogue, so we are suffering in consequence. Now let us try to live naturalx let us try to seek out what is physiologic and follow that. Let us try to find out the truths and the laws of life which we must regard. I thank you for your attention.

v-p