

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

Monday, November 12, 1917 at 8:00 P. M.

By

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I received today a very interesting letter from an inspector of institutions in New York State who was a patient here last summer. She had inspected an institution on Randall's Island in New York City for the care of idiots, epileptics, imbeciles and morons. She found the place in a clean sanitary condition which is very unusual for such an institution. She inquired into it and found that the custom was to have the children make four evacuations a day. This is a very interesting communication to me. I have learned in the study of this subject for a good many years four things that I think are important. First, that wild animals evacuate their bowels after each meal or three or four times a day. Second, that human infants evacuate their bowels in the same way after each feeding. Third, that wild men evacuate their bowels in the same way after each or three or four times a day. The Hottentots in South Africa, the Bushmen, the wild tribes in India and primitive people in various parts of the world have this practice and I have learned a fourth thing today and that is that idiots evacuate their bowels in that way. This is extremely interesting to me because it shows what is the normal rhythm of the intestine. An idiot doesn't know enough to restrain his bowels but allows them to act when they will. Wild and primitive people know better than to allow their bowels to be restrained.

A missionary doctor wrote me that it was a common thing for Arabs to say to him that they objected to living in a city of Aden because they could not evacuate their bowels promptly but had to wait until they could find a convenient place. In the case of the idiot, he has not mind enough to restrain his bowels. The primitive man has sense enough not to do it. The idiot has no sense at all so it is purely an instinctive process. The bowels move when they want to move. They move in a perfectly normal way. Another thing that impresses me very much from this letter is that idiots in this country get more intelligent care than bright children do, that we are doing better for our idiots in a physical way, feeding them better, caring for them better, teaching them better habits than our well children. How many teachers of the ordinary public schools know anything about the condition of the childrens bowels? It is much more important that the teacher should know the condition of the child's bowels than that the child should know about arithmetic, geography or anything else. It is of fundamental importance. The same is true of most parents. They give no thought to the matter. Sometimes they do. I remember a man about seventy years of age who came here about twentyfive years ago and he said, "Doctor, I have the most obstinate bowels that ever were. They are so obstinate that nothing will move them. " He said, "I have been taking medicine all my life. When I was a boy ten or twelve years old my mother had the custom of calling in the whole family every Friday night and giving them a dose of salts. Every member of the family had a dose of salts every Friday night. She said it was to get ready for Sunday. By and by I got so I had to take salts every day. Then I had

to take more and more. Now, he said, a half a pound of salts won't move my bowels." These children had attention. The mother appreciated the importance of making the bowels move but she didn't give the bowels the intelligent attention that the native Hindoo mother does. The native Hindoo mother begins before the child is able to walk to train the infant children in just the same way that these teachers on Randall's Island are training those idiots. It will be a happy day when a normal infant has as good a chance for its life and health as the idiot does. I have been asked to give you a few words on the normal rhythm of the bowel. This is the brief story of the itinerary of a breakfast. I think the average man knows very little about what is going to happen to his breakfast.

He knows he has got to eat and he eats, he gets is out of the way as quick as he can hurries off to his work and tries to forget it. Pretty soon, in many instances at least, the breakfast begins to make suggestions of various sorts. He begins to find out that there is something more to a breakfast than simply the swallowing of it. It has to be digested and perhaps the digestion does not go on all right. Then he hurries to a druggist, gets a dose of Stuarts Dyspepsia tablets or some other ~~xxxx~~ nostrum in the hope that this drug is going to do what his stomach cannot do in the hope that there is something in the bottle that will perform for him the miracle of the indigestible breakfast. That is the reason why some people come to the Sanitarium. When breakfast is eaten at 8:00 o'clock the stomach begins work upon it and ~~xxxxxxx~~ ^{spoons} it out through the pylorus periodically as the waves come down. Every third or fourth wave is accompanied by the opening of the pylorus which lets out a little of the liquid material of the stomach. It then passes quite rapidly down through the twenty two feet of intestines until it gets down to the ileocecal valve. At the end of four hours the stomach will be empty and the breakfast will all be down in the small intestine. Then pretty soon another meal is taken, say five hours after breakfast dinner is taken. Then a strong wave of contraction is sent down the whole alimentary canal and the breakfast begins to pass over into the colon. The valve opens and lets the breakfast go on through and in a very short time the breakfast is pushed down over into the colon and eight hours after breakfast, the breakfast will be found about this point. The breakfast g keeps working along till, when supper time comes at 6:00 P. M. the breakfast is down ~~xx~~ in the lower part of the colon and the residue of it and the dinner is passing through into the colon when the supper is taken. The dinner continues to pass on into the colon and the breakfast residue goes down and is deposited down in the pelvic loop of the colon. As it continues on by 10:00 o'clock the material should have a chance to such a point that dinner will be just v-ik

ready to enter the colon and the residue of breakfast will have disappeared. In other words the residue of breakfast should have passed out of the body, been ~~discharged~~ disposed of before one goes to bed at night, sometime after supper. In other words after each meal the residue of the preceding meal but one should be dismissed from the body. It takes a longer time for the food residue to make the transit of the alimentary canal than elapses between the two meals. Each meal taken pushes the preceding meal further along the road to the exit. At that time there are two meals in the intestine passing over into the colon. At six o'clock in the morning the dinner will be found in the colon and the supper residue just behind it. The activity of getting out of bed starts up a peristaltic wave so that with many people, it is normal to have a bowel movement before breakfast, and when this does occur the bowel movement before breakfast, it leaves only the supper residue behind. So breakfast is eaten with the supper residue here near the exit ready to be dismissed and the breakfast sets up a peristaltic wave that travels the whole length of the alimentary canal and dismisses that residue of supper of the day before. I have satisfied myself that this is probably the normal ~~xxxx~~ ~~xxxx~~ rhythm of the alimentary canal, and the nearer we can approach to this condition the happier we can be, not only physically but mentally and morally because if we will keep the alimentary canal free from putrefying ~~residues~~ residues. We start with the whole alimentary canal clear. By supper time there will be three residues in the body. When you go to bed at night there will be only two. When you sit down to breakfast in the morning there will be but one meal passing down the alimentary canal. This, I think, is the ideal condition so that at no time will there be more than three meals in the body at one time and breakfast residue, dinner residue and a supper residue not more than those three. But when the bowels move but once a day the X-ray ~~xxx~~ examination of a great many thousands of persons, I think four or five thousands or more, and the study of these cases ~~has~~ has shown

that when the bowels move but once a day the time required for a test meal to pass through the body instead of being perhaps sixteen hours or at the most twentyfour or twentyfive hours, is fifty hours or more. In other words, this test meal taken say this morning would not be dismissed from the body until day after tomorrow morning after breakfast. That is the observation with reference to persons whose bowels move but once a day and this is so universal that Dr. Hertz of London and, in fact most roentgenologists, have put themselves on record as believing that this is the normal rhythm of the alimentary canal because that is what they find and they find it universally. It is taken for granted that the one bowel movement a day is normal and that that is all that is required to keep the bowels in perfectly healthy condition. I think the majority of people who have one bowel movement a day feel that they have done their Christian duty to their bodies and have no occasion to worry or to be troubled. I want to show you that that condition must be a condition of auto-intoxication. A barium meal for instance if taken day before yesterday morning and after breakfast this morning the last part of the meal at least is down here in the pelvic colon ready to be dismissed from the body. We forget about the other meals, that they have eaten in the meantime. The test meal was taken day before yesterday morning. The same day a dinner and supper were taken and the next day breakfast, dinner and supper were taken and now breakfast is taken again this morning, and all these meals were taken after the test meal was taken consequently all these other meals or the residues of them are in the procession behind it. All of these residues are made up of putrefactive material. That is why bowel movements are fetid, loathsome, putrescent, toxic so extremely poisonous and powerful in their toxic effects. It is because they have been so long undergoing putrefaction in the body before they are dismissed and when the stools have a bad odor that means they have been retained for a long time. When an infant's bowels move after every meal, there is no putrefaction of bad odor but when the stools become dark colored, brown, black or very foul v-ik

then the experienced nurse knows and the Doctor always knows that the child is sick; is in a state of auto-intoxication of poisoning and something must be done for the child right away or it is likely to suffer seriously. The next thing mucous will begin to appear. The child will have colitis and will become subject to headaches, perhaps to diarrheas and dysenteries, because the colon is infected. It will be noted that the child is not gaining in flesh, growing stout, not growing as it ought to but is pale and is dwarfed. Millions of children are dwarfed in this way for their whole lives and become infected from their infancy and never recover from it. They carry that infection with them through their whole lives and never know anything about what it is to be thoroughly normal.

This is ^{the} a condition when a person's bowels move once a day. That is the ordinary person. People whose bowels move once a day are constipated. You say, "I spoke with the Doctor about that and he said if I have a well formed stool and my bowels move once a day that is perfectly normal". Now that is all the proof needed to prove that the person is in a state of chronic constipation. If the bowels move normally the stools would not have time to harden, ~~maximally~~ ^{sufficiently} to become a well formed stool. It is well formed because it has been stored up one after the other until the whole colon has been filled up like a sausage and then we have the well formed stool. It was supposed as I said before to be an indication of health whereas it is an indication of disease. But sometimes the bowels only move every other day and the person recognizes the fact that he is constipated. The entire colon becomes filled up and the residues of meal after meal are accumulated here. It may be the bowel movements instead of being a couple of days behind time, come to be three or four days behind time. ~~That however anykixxxxer~~ It isn't anything for us to see people here whose bowels move not more than once a week or twice a week at the most. In such a case you have residues of thirteen or fourteen meals retained in the intestine at one & time. We sometimes find in X-ray

examinations of cases in which the test meal is retained for four or five days in the body . Is it any wonder then that the patient is sick , has headaches, lack of appetite, has no disposition to eat, that his whole body is enervated, that he is tired all the time, has difficulty to concentrate his mind. He is drunk, intoxicated, drunk upon the products of putrefaction that are instilled in his own colon and the wonder is that we live at all under these abnormal conditions which are almost universally present among civilized people. The whole body becomes involved. The blood is rendered impure by the poisons absorbed from the colon . The result will be a coated tongue, the resistance is lowered, the blood ~~has~~ is unable to make saliva that will inhibit the growth of germs and keep the tongue clean. Then the tongue ~~has~~ and the teeth become coated, the gums ulcerated pyorrhea develops and various infections occur. The tonsils are infected, then rheumatism and neuritis appear and the whole body becomes despoiled by this neglect. After while when these irritating fecal matters lie in contact with the colon so constantly for a long time, the mucous membrane of the colon becomes infected and irritated so it contracts, just as your eyes fill up and contract when inflamed or exposed to the light. We have this spastic condition of the colon. When this spastic condition appears the bowels is obliged to labor very hard to dispose of its residues, is set up ~~a~~ in the transverse colon a reverse movement which carries material back into the cecum and the cecum becomes greatly distended and ~~a~~ that spoils the ileocecal valve, breaks it down so that the fecal matters are pushed up into the small intestine. Infections take place there, gall stones are formed pancreatitis occurs, inflammations of the duodenum, gastric ulcers, these troubles all come from infections which back up from the colon. Material is held back in the right side and the patient suffers continually from gas and is never free from it except when they take a dose of salts and get a tremendous action. In a short time all the troubles are back again. The only way the bowel can be unloaded in this case is by

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a tremendous action which you see illustrated here. Instead of a mass movement by which the whole contents of the bowel passes on at once rapidly by a strong contraction of the bowel, the hardened fecal matters are passed down one little lump at a time and painfully pushed along by a manipulation of the bowel just exactly as you would swallow. Suppose you swallow something that is ~~kw~~ too big and sticks in your throat and you keep swallowing and swallowing and swallowing by and by you manage to get it down and you feel greatly relieved. That is just exactly what is going on in the colon and that is why there is so much trouble and distress. When this state of things exist the fecal matters appear in small roundish lumps. They may be so dry and hard they remain ^{separate} ~~separate~~ after they are dismissed from the body or may be soft enough so that they are partly moulded together, but when examined this well formed stool will be found to be made up of these lumps that are more or less moulded together and that means always the spastic diseased condition of the colon. A state of colitis

When this state of things exists the fecal matters appear in small rounded lumps. They may be so dry and hard that they remain separate after they are dismissed from the body or may be soft enough so that they are partly molded together but when examined this well formed stool will be found to be made up of these lumps that are more or less molded together. That means always this spastic diseased condition of the colon, a state of colitis, infection and contraction which brings about the most obstinate forms of constipation that it is possible to have. In this condition there is a form of constipation that can only be relieved by a cure of infection and the more cathartics are given the worse the patient is because the cathartic increases the irritation. Cascara sagrada, salts, all kinds of laxatives no matter what they are of an irritating character increase this spasticity, contract the bowel wall, force material through it but only at the expense of making the bowel worse. These cathartics always increase the backward movement of the intestine or the reverse peristalsis. The only way in which these cases can be relieved is by the use of natural laxatives which are foods. Foods are the only natural laxatives. The bowel itself needs a lubricant. The appendix is a part of the lubricating system of the body. It pours out into the colon in a normal state a large quantity of highly lubricating mucus. The appendix becomes diseased. Dr. Will Mayo said in Chicago the other day in a very interesting address before the College of Surgeons that the appendix is always diseased in persons who have reached the adult age, that he believed every adult person in civilized lands had a diseased appendix, that there is no such thing as a healthy appendix in a person who is twenty-five or thirty years of age. In other words, a person who has

abused his appendix twentyfive or thirty years is sure to have a diseased appendix. It is not always dangerously diseased by any means but an appendix that has once been the seat of inflammation is crippled and disabled so that it is of no use and an appendix that has been removed, of course, is of no use, so that a great many persons are crippled because the lubricating apparatus of the colon has been crippled or removed or destroyed. In such a person the colon will always be deficient in lubricating material. The colon itself secretes a mucus which is lubricating but when the colon has been the seat of chronic inflammation for many years, when it has been exposed to the irritating influence of laxatives, various sorts of salts and various irritating drugs, when these drugs have been used year after year the colon becomes chronically inflamed and loses its power to secrete the lubricating mucus so the colon is dry. I have looked in with a proctoscope in many hundreds of cases, thousands of times I have inspected the bowel and in these chronic cases the colon instead of having a moist appearance as have your lips for example, the colon has as far as could be seen a dry appearance and here and there would be dry scabs or dry adhering fecal matter so that it was unclean. Underneath these scabs would be sore places. It is a very, very common condition this infected colon. Many times we find the colon contracted. Sometimes it will open up like a normal healthy bowel but in nine cases out of ten of chronic constipation, perhaps in nineteen out of twenty, the trouble is in the distal colon, a contracted condition of the bowel or some other crippled condition. Sometimes the pelvic loop which ought to rise falls over and becomes adherent so that it cannot rise. Then the bowel cannot be easily emptied. The only thing to do is to regulate it, to change your habits so that the bowel may have a fair chance. If

the bowel does not make the normal lubricant, we must find some other kind of lubricant. Many persons have taken linseed oil and olive oil in large quantities. Half a pint of olive oil or linseed oil has been introduced into the rectum at night in many cases. These methods have some advantage but in recent years it has been learned that paraffin oil is not a fat, is not a food substance, undergoes no change in the body and may be used as a lubricant. Treated like a mechanical substance it may be passed on down and used to lubricate the colon and take the place of the normal lubricating mucus and the bulk may be secured by adding bulky material to our foodstuffs. We have gotten into the habits of taking only purified or constipating feeds. We have somehow got the idea that bran was a very irritating substance, that these woody substances must be suppressed and kept out of the dietary and that we must eat nothing but absorbable feeds. Physiologists are largely to blame for it, because they have published books of various sorts and reports of experiments which of various kinds which showed that certain foodstuffs were absorbed more fully and completely than others. They have shown that fine flour bread and fine flour were absorbed almost completely whereas graham flour leaves a larger residue and, of course, if white flour is completely absorbed it must be better food. I think it is not necessarily so. Our bowels are so constructed that they need residue to stretch and stimulate the colon, particularly when we have this spastic condition. These rough indigestible materials are needed. A certain amount of undigested residue is absolutely necessary to distend the bowel, to stretch it, to cleanse the surface, to sweep it, to clean and scrub it out as one might also say. Sometime ago a man

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when he had taken a quantity of bran said he felt as though he had been swept out clean in this way without increasing the irritation of the bowel for wheat bran is not an irritating thing. Many cases of diseased conditions of the bowels may be improved so that the bowel may be made to resume its normal function and activities. I remember once seeing a notice as I was passing a dime museum in Chicago/^{that} there was a man inside eating glass. I stepped in to see if it was really true. I actually saw the man take tumblers and bite off pieces and chew them up and swallow them and lamp chimneys and various other things of that sort. A few cases occurred in which a few large chunks were swallowed and had to be removed by surgery. These materials would pass into the stomach, go through it and all the way down ^{through} to the intestine and be dismissed from the body without doing any serious injury. This has happened again and again. Certainly wheat bran has no irritating properties. Why is it so laxative then? It is by the titillating effect it produces. If you have some particles of bran left in the mouth your tongue does not rest until it gets them out. The same thing happens if you get a little particle in the throat. Every particle of bran, seed or something sticking in the throat makes a continual irritation until that particle has been disposed of. If it is near the mouth it may be brought up but if it has got by the isthmus of the throat it must go down. It is the titillating effect that renders bran a valuable laxative. I have never seen any irritating effects from bran. I do not hesitate to give bran even in cases of ulceration of the stomach or duodenum or bowel. I am satisfied that when properly used bran is often a good remedy in these cases. This condition must be cured. It never gets well of itself. The most effective way of dealing with it in the first place is to regulate the diet in such a way that the bowels are kept clean, emptied three or four times a day and that there is

no putrefying residue lying in contact with the mucous membrane. It is the poisons that are produced by putrefaction that irritate the mucous membrane. It is the germs which grow in these putrefying matters that infect the colon so we must first get rid of the putrefying material, then we must change the flora and in order to do this we must get rid of the putrefactive bacteria and restore to the intestine the normal bacteria. These are the ones that produce acidosis instead of those that produce ptomaines and toxins. If you put a beefsteak in one jar and a quart of milk in another jar and put them away for a week, then bring them back, there will be a very great difference between them. The milk has soured but the meat is in a state of putrefaction, is loathsome, horrible, impossible to tolerate for a moment. The milk one could drink without any difficulty. Many people are fond of sour milk. Butter-milk made at the restaurant is nothing more than sour milk which has been churned up and made smooth in this way. This is almost a universal practice nowadays. There is nothing poisonous about it. It is entirely wholesome but the beefsteak that has rotted for a week in a warm place is a horribly loathsome repulsive thing. What happens to these saline materials outside the body in the same way happens inside the body. The milk sours because it has sugar in it. It has four percent of milk sugar. If sugar is present in the proportion of two per cent. then souring will always occur no matter what kind of germs are present but when the sugar is not present and the protein is present, albumin as in meat, for instance, or anything of that sort, then we get putrefaction instead. If you put beefsteak into a quart of milk in a jar with a pound of beefsteak in the jar immersed in the milk, the meat will not putrefy. The sour milk will preserve the meat from putrefaction. In our cooking school department I have a beefsteak that I put into sour milk some years ago, Yogurt buttermilk, and it intact today. There is not the slightest taint of putrefaction about it. Of course the buttermilk is

quite frequently changed. By introducing these acid-forming bacteria into the colon we may get rid of these putrefaction products after while and change the flora. When you have weeds in your front yard you have a bad flora. When you have flowers you have a beautiful flora. If you have flowers in your front yard and neglect your flower garden, the weeds will gradually work their way in and instead of flowers you will have weeds. That is the condition of everybody who is suffering from chronic disease, who has constipation or colitis. He has weeds in his flower garden. We have got to get rid of the weeds to change the character of the bacteria which are growing here. Bacteria are not flowers but they are plants for they belong to the vegetable kingdom. The flora may be changed by introducing cultures, bacillus Bulgaricus, bacillus bifidus and the bacillus acidophilus, that is the bacillus which loves acids. This bacillus is normal to the colon. When an infant is born in six hours in summer time and twenty hours in winter its intestine becomes filled with organisms, the bacillus bifidus which grows and lives in the colon and produces acids so preventing the putrefactive germs from growing there. If the child is fed on unclean, impure cow's milk or allowed to infect itself with the dust of the street, putrefaction may develop and the child may become sick. That condition may remain with the child as long as he lives. Our troubles of this sort begin in childhood and are increased with a bad diet. Sometimes we get hold of a stale oyster swarming with the worst kind of germs or some canned salmon that is a little off or some chicken pie that is made up from very ancient fowls that should have been buried a long time before or at least buried in some other place than in your stomach. In that way the alimentary canal gets infected with worse germs, with more virulent organisms. A person who has an attack of typhoid fever has these same germs left behind and they may trouble him for years afterwards. One who has had an attack of dysentery or bowel trouble of any sort has left behind some new kind of weeds that have

gotten in there. That is the condition of most people who have reached adult age so it is quite a task to get rid of these organisms. We have gradually developed a plan here that we find works very well. I have been studying all these things and have traveled all over Europe and visited the Pasteur Institute several times and all the men who have made any discoveries that I could hear of in relation to these intestinal bacteria. I have carried on extensive research work in our own laboratories and gathered up all the knowledge I could and I wanted it for my own benefit as well as for yours for I was thoroughly convinced that Metchnikoff was right, that these colon germs have more to do with our welfare, with the extending of our lives or the shortening of them, with chronic illnesses than any other one thing. I tried every sort of thing. I still found myself with a coated tongue. I could not get it clean. I had a bad taste in my mouth sometimes in the morning and I was mortified beyond measure. I tried every sort of thing I knew of to remedy this condition and I found myself disgraced now and then by this condition. One day it occurred to me to make an experiment with bran, fruit and paraffin oil, taking them all in large doses. I ate nothing at all but bran, fruits and paraffin oil for several days and to my astonishment and great delight on the third or fourth day my tongue became clean and it has not had a coat on it since. I then began making observations upon other people and found it was possible to organize a bill of fare consisting of bran and fruit eating ad libitum in any quantity a person would wish to take it and with a certain amount of paraffin oil to act as lubricant and by this combination I found it was possible to change the flora, to get the tongue cleaned off in most cases in three or four days though it sometimes requires a week. If one is fleshy this diet may be followed a week or ten days or even two weeks with great advantage because flesh will be rapidly reduced and at the same time there will not be a great amount of weakening. If one

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is thin we may add to the dietary the malt sugar or milk sugar in sufficient quantity to keep the strength up and to avoid the loss of flesh. By the free use of fruits and malt sugar we get down into the colon the materials which will not support the growth of putrefactive bacteria but will encourage the growth of the fermentative bacteria which produce acids. We find also that by the free use of fruit in this way we can by and by starve out these bacteria in the colon so that the friendlygerms will take up their abode there and this process can be facilitated by giving along with the diet larger cultures of the friendly germs and so administer what we call a culture of the bacillus Bulgaricus and the bacillus bifidus and the bacillus glucobacter a sugar-making bacillus and the bacillus acidophilus. These four are the only friendly germs I know of that are known. By giving these at the same time with the diet they are rapidly carried to the colon, take up their abode there and if the diet is regulated in such a way as to avoid the introduction of the pernicious bacteria, they will continue to grow and develop and a person will keep himself free from the life shortening and disease-producing organisms. Another plan by which the flora can be changed is by the milk regimen but this alone often produces chronic constipation, but by combining bran and agar-agar and paraffin oil with the addition of fruit also to the milk regimen we are able to overcome this difficulty and by giving a sufficient amount of milk the milk sugar is carried down into the colon and the fermentation is produced and we get rid of the unwholesome bacteria.

Q. What is hemoglobin?

A. It is the red coloring matter of the blood, the green coloring matter of the plant, is the chemical laboratory of the plant. The light breaks up the corpuscles and liberates the oxygen.

The chlorophyll of the plant corresponds with the hemoglobin of the blood which carries oxygen in the blood and so feeds the tissues.

Q. What does deficiency of hemoglobin indicate?

A. It indicates that there is an impoverished state of the blood, that there is not enough blood. The blood normally contains five million of these little red cells in each minute drop. They drop one-twentyfifth of an inch in diameter or rather a cubic twentyfifth of an inch or a cubic millimeter as the French call it contains five million of these corpuscles and each one contains a certain amount of hemoglobin. It absorbs the oxygen from the air and carries it to the tissues. When you find hemoglobin deficient, when the cells of the body are deficient then the blood is impoverished. There should be normally five million of these cells. Yesterday I met a woman who has only one million of these cells. I am glad to say they are increasing. Her hemoglobin is twenty per cent. That is, she only has one-fifth as much as she ought to have.

Q. What would be the consequence if this deficiency is not remedied?

A. The same thing as though you were smothered. If you cannot absorb more than one-fifth as much oxygen as you need, it is the same thing as though the air contained only so much oxygen. The life processes of the body will be depreciated because it is oxygen that keeps alive the fires of the body. Life is a burning, a combustion. There is a kind of fire that burns in our bodies which constitutes the life processes. Oxygen is necessary to support these processes. How can a deficiency be overcome? By getting more blood. It is necessary to get the power to assimilate the food and to make use of it. It does make a difference

whether we eat food containing no iron or food containing an abundance of iron. Sugar has no iron and fine flour bread has very little iron. There is practically no iron at all in fat meats, butter and fats of that kind. The iron in meat is not easily available. The most available source for iron is green vegetables and green leaves. That is why the ox has such red blood because he gets the iron from the green grass. Green leaves are just ^{as} much better for us as they are for the ox. The ox could not get much good out of the iron in meat and we get very little benefit from it comparatively. Milk contains a small amount of iron of very excellent iron, iron of such choice quality that a smaller amount will suffice.

Q. What is systolic and diastolic blood pressure?

A. Systolic pressure is the highest pressure reached during the beat of the heart. When the waves of blood are sent into the arteries the pressure rises. The highest point to which it rises is the systolic pressure. The diastolic pressure is the pressure between the beats.

Q. Does boiling roast beef diminish the amount of protein?

A. No, but it renders it somewhat less digestible. It is not the quantity of protein so much as the quality which is important. Recent observations show that the protein of nuts is of the very finest quality, that ^{it} is more than ~~the~~ equal to the protein of meats in quality. In other words, it is a complete protein.

Q. When one has had high blood pressure can they ever lead an active life with safety?

A. That depends on how high and what is the cause of the blood pressure and how much damage has been done by this high blood pressure. Every case is an individual case that needs special study.

Q. What is the cause of the fingers and hands becoming inflamed when I take a large amount of fat and protein?

A. These elements probably encourage putrefaction in the colon.

Q. Why does one blush when in an embarrassing situation?

A. I do not know. Some people do not do it. Some people blush when they are not embarrassed, when they are happy and pleased. Blushing occurs usually under pleasant emotions while under unpleasant emotions the opposite condition occurs. One who is very angry is generally pale. A person who is happy is likely to have a flushed skin and face. Some people blush simply a little spot on the cheek. Some people have a reddening of the ears and in some people the blushing extends to the chest and even to the arms and the hands but this is an individual matter that nobody can explain. It is simply the influence of the psychologic state upon the vasomotor centers which are nerve centers that control the size of the blood vessels. Somehow we do not know why or exactly how certain emotions affect the vasomotor centers so as to cause dilatation of the blood vessels in certain areas. We do not know why sugar is sweet or why lemons are sour. Some people like sweet things, some people like sour things. Nobody can tell why.

Q. I often have a sensation of oppressive fulness very soon after eating. What is the cause of this?

A. It may be too much dinner but it is possible it may not be too much dinner. When the stomach is empty it is not an aching for it. It is shut up just as you might shut up your hand. When food comes down into the stomach the stomach begins to expand and it expands from above downward. As the food is introduced the stomach gradually fills and is relaxed in order to be filled in this way. When a person has a dilated stomach it begins filling at the bottom but the stomach has to stretch, to

open up to let the food in. When food is taken into the mouth and swallowed the esophagus does not open up like a tube and let the food drop down into a cavity but the esophagus lays hold of it just as your hand or mouth would do it and it is moved along down as you might push it along through a rubber tube. When it gets down to the stomach the stomach does not simply open up like a cavity and let it drop in but the stomach lays hold of it and moves it on down and packs each little bit in a corner where it belongs and the next morsel is packed in the same way and the stomach opens up little by little to accommodate more food. Sometimes you have sat down at the table and do not know whether you have an appetite or not. By and by you begin to get an appetite. You eat all you can eat and wait a little while and you discover there is room for a little more. This is because the stomach has opened up to accommodate a larger amount. The physiology of the stomach is extremely interesting.

Q. What makes some men bald and what will cause the hair to grow on bald heads?

A. I just wish I knew. I do not know. Baldness is due to malnutrition of the scalp, to the perishing of the little follicles out of which the hair grows and there is nothing that will make the hair grow on a shiny pate. If there is some fine downy hair growing on the scalp, it is possible that ^{it} there may be in some cases stimulated to more excessive growth by exposure of the scalp to the sunlight, to the actinic ray or the chemical rays of the sun, the so-called mercury light, by massage, by hot and cold bathing of the scalp it may be somewhat stimulated.

Q. Is pyorrhea in a mild form a menace to one's general health?

A. It certainly is. In a mild form it means you by and by have it in the worst form by the swallowing of germs which are generally there in the diseased surface and the absorption of poisons from the germs and the germs themselves getting into the blood stream, they travel in the blood,

locate in the nerves and set up neuritis or get into a joint and set up rheumatism. It is astonishing how rapidly rheumatism disappears sometimes when pyorrhea is cured or a diseased tonsil is removed.

Q. Why cannot some people stand massage?

Q. Why cannot some people stand massage?

A. Sometimes the massage is not given as well as it ought to be and sometimes it may be a persons nerves are in such a state that massage is not indicated or is contra-indicated.

Q. What causes angina pectoris?

A. Hardening of the arteries of the heart. The use of tobacco is one of the most common causes. The disease is very much more common in men than it is in women for that reason. It may be caused, however, by poisoning absorbed from the colon.

Q. Why is it the average patient leaves the Sanitarium in a weakened condition?

A. I do not think that is the case. The average patient is the least able to get away. Nevertheless there is something in this question that is worth while to know. Some people go away from here not feeling quite so strong as when they came because the first thing we have to do for them is to begin the process of rebuilding. The first thing it to tear it down. That is what the chronic invalid has to do. You have to put the old man off before you can put the new man on. Sweating baths, eliminating baths and all the different things you are doing here, first of all have the effect to tear down the old structure before we can build up the new. The lady who came in yesterday said, "Doctor, I am so awfully nervous, do you think you can do something for me"? I said, "Certainly". She said, "What can you do"? I said, "We can build a new constitution and nerves for you". She said, "Doctor, I am going to stay two weeks and I hope at the end of that time I will be able to take a trip to California I have been planning on for some time". She is willing to have new nerves but she wants them constructed in two weeks. We may not be able to do that. The average patient stays four or five weeks. The men stay on an average four weeks and the women stay with greater wisdom five

weeks so we have always a few more women than men in the institution. They come in about equal numbers but there are more women than men because they stay a week longer. If we could get everybody who came to this institution to stay with us three months this place would become so famous inside of two years that Battle Creek would not hold the people who would come. We do not succeed in keeping only now and then a patient long enough to accomplish any completed results. The wonder is there is so much home to attract and so many plans for one who needs so many things that need attention, the world is going on so fast nobody has time to give attention to their health. If we could get men and women to attack this problem in a practical business-like way and when starting out to get health go in for all the health there is instead of just the smallest bit you can possibly get along with. If people were as anxious to get health as they are to get wealth it would be an entirely different situation. We have no difficulty in keeping men and women long enough to accomplish some real results but as soon as one gets over every pain she wants to go home. He comes here, his head is all confused but as soon as he begins to see straight and to think straight he wants to get back home. He has been years and years ~~s~~ cultivating and appetite for business and he has got himself trained to it. He is trained to his duty to his business and the mother of the family is trained to do her duty to her family and that is the inspiring thing in their life. The great motive of their ^{living is} ~~having~~ ~~xxxx~~ to make the business succeed, to do the right thing for the family, to make the family succeed, to make them happy and comfortable so when they stop a little while to give a little attention to health, they want to get back to the life job as quickly as possible. It is a hard thing to keep anybody here long enough to do them any good. I am writing home to the Doctor several times a day, "Mr. So and So, your patient, has returned home, but she did not stay long enough to accomplish permanent results or to enable us to do anything of what we might do if we had an opportunity". Suppose

the patient has a blood pressure of 200. We might get it down to pretty nearly normal for the condition if the condition has not existed very long. Every point we can get it down means adding perhaps weeks to that persons life. Every single point we get it down means adding to the time we are going to live. We can just as well as not multiply the number of years that person has to live by three or four is we only keep them long enough. The chronic invalid is going down hill. He needs to be awakened. He needs to be gotten just as far up the hill as possible. He can never get clear back to the top of the hill but he is going to slide down again sometime because old Father Time has found your weak spots. If it is your heart, if it is your kidney or your liver that is ~~is~~ diseased, old Father Time has found it. He has made a creak in the wall and by and by he will make an attack that will be a success and drag you down. That happens to us all sometimes and we know it has got to come. ~~the same~~ The thing is to fight old Father Time off as long as we can. If you are way down hill and we can get you back again, the point is to get as far up as possible. As I said before people are not willing to take the time. If we could induce people to make a business of getting well, what we could accomplish would seem nothing less than miraculous in a great number of cases.

Q. Is it not a fact that the diet of the Sanitarium constitutes by far the chief factor of treatment?

A. There is no doubt about it. If you can get yourself trained to the right diet a diet that will make the bowels move rythmatically, three or four times a day then go home and follow it right up, you will get more good from ~~that~~ that one thing than from all the other things put together. But there is this to be considered. When a person has got seriously diseased he is ^{like} ~~not~~ the man who has fallen into a pit. In order for him to be delivered from the situation he has gottento be taken out of the pit first. You say to that man" You have got to be careful where you sit. He may be ever so

The treatment is

to lift you out of the pit and give you a new start and there is no question about the benefit of baths and other treatment to cleanse the skin, to exercise and properly to develop the muscles.

Q. How long should Oatmeal be cooked?

A. About six minutes, thats long enough. The Scotch people have been using Oatmeal longer than anybody else and they know how to do it. I find in looking over some old books that were published two hundred years ago the Oatmeal was scalded in Scotland. They turned some water into a pan, stirred up the Oatmeal, put it on the stove, pouring in some boiling water and stirred it up and just as soon as it thickens they put it on the table. Prepared in that way, it is entirely palatable and a small amount of uncooked starch which is of great value. It finds its way into the colon in this undigested state and so feeds the friendly germs in the colon helps to make the bowels active.

Q. What treatment would you advise for curvature of the spine in a girl 20 years old.

A. I should advise that she be put under orthopedic treatment, She needs gymnastic treatment to strengthen the muscles of the body. If the matter is tended to right off she will be saved from being a life long cripple. If it is allowed to go until she is twentyfive years old, she cannot be helped.

I thank you for your attention.

END.

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

Monday, November 26, 1917 at 8:00 P. M.

By

J. H. Kellogg, M. D.

When the cause of disease is removed the natural powers of the body restore the body to its normal condition. Suppose you tear the skin. If you keep irritating it every day it will not heal but if you protect it Nature builds a new skin over the raw surface. Suppose one is suffering from tobacco heart as a result of smoking which causes degeneration of the heart muscle. If that man keeps on smoking the tobacco heart will never recover in the world. The first thing of all necessary for him is to stop smoking and then Nature cures him. The simplest case of a cure I know of is when Nature cures a man of his breakfast. Everytime you eat it makes your stomach sick in a certain sense. When food is taken into the stomach the whole mucous membrane of the stomach becomes congested and this condition causes a copious outflow of gastric juice. If this congestion lasts too long, it becomes more or less permanent and that is disease. At the end of four hours normally the stomach is emptied and then in an hour or two it recovers itself and is ready for the next meal. Suppose after one has eaten breakfast in about three hours he takes luncheon and gives the stomach a new job and at one o'clock, say, or twelve o'clock his stomach is not empty; there is food still in the stomach and the stomach is not ready for another meal. Suppose the same thing happens in the afternoon and the stomach is never empty but is congested all the time. Gastric juice is present in the stomach all the while and the mucous membrane

is subject to irritation. If that thing exists continually from eight o'clock in the morning till ten o'clock at night, as a result the stomach will become permanently congested and catarrh of the stomach and gastritis will by and by result. The stomach has no chance to rest. Suppose one uses his eyes day and night continually and goes without sleep. By and by the eyes become red and inflamed. The eye needs rest and every part of the body needs rest. If we do not have it, by and by there will be a diseased condition. In the same way the liver and the kidneys become diseased. The kidneys have for their function to eliminate poisons. In order that they should keep intact it is reasonable that they should have only a normal amount of work to do. The kidneys have something like three thousand cells. Each cell is supplied by an artery on one side and on the other side is a vein. While the blood passes through the kidney cell the poisons are taken out and the blood is sent on purified. The blood that leaves the kidneys is the very purest blood in the body because the kidneys remove the poisons. Venous blood leaving the kidneys is better than any other blood in the body. Suppose the kidneys are overwhelmed with poisons of coffee, tobacco, alcohol, and various other poisons. They get worn out and these three million little cells that do the work of the kidneys are impaired and some of them destroyed because of overwork. Each kidney has a million and a half of these cells and each one can do only a certain amount of work. The life job of one of these cells is to make a tablespoonful of urine, that is, its work for sixty years. It requires one of these cells six weeks working hard day and night to make one drop of urine. It isn't any wonder then that when we send through the kidney and compel it to filter out such coarse and virulent and toxic substances as nicotine that it is overworked. Why, nicotine kills snakes as well as men. It is a powerful drug. It isn't any wonder then that when we send alcohol through the kidney it gets shriveled up. When it is abused in this way it gets worn

out earlier than it ought to. One of these corpuscles can do only a certain amount of work in a life time. One tablespoonful of urine representing a certain quantity of poisons does three times as much work as it ought to do. Somebody has said a man is as old as his arteries.

The reason is because when a man's body has been saturated with poisons to such a degree that his arteries are hardened, his whole body is degenerated. His kidneys are destroyed, the heart is worn out, the liver and every other organ of the body is in the same state of degeneration, and that is the reason it is proper to say a man is as old as his arteries. It is just as reasonable to say a man is as old his kidneys or that he is as old as his heart. We can say also a man is as old as his lungs because when the lungs fail, the man fails and we can say a man is as old as his skin. If you have a degenerated skin you have a degenerated liver, heart, blood vessels and you are a degenerate. That is, you are degenerated at any rate. The body structures are wasted and aged. This is the question that will interest you. Can one be regenerated? I am glad to tell you that one can. A missionary in the South Sea Islands many years ago said that he found a peculiar kind of land crabs when he was located there. He noticed one morning that one crab had come down one morning to the shore to get his breakfast and in going back had somehow fallen into a mud puddle and had gotten its legs all dirty so it pulled itself out of the puddle and nipped off all of its legs and then painfully dragged itself by means of its nippers to its hole. It stayed there in the hole six weeks and then came out with a brand new set of legs. Lobsters and crabs are terribly wreckless of legs. If a lobster gets scared by anything he will shake off a few legs in a perfectly wreckless manner. People are just as wreckless. They throw away

livers, kidneys, lungs and things just as wrecklessly as crabs throw off their legs. A German physiologist some years ago opened a rabbit's body and cut out half of its liver. He sewed the rabbit up, waited two or three months and then looked inside to see what had happened. He found the a portion of the liver that had been cut off had been entirely replaced. It looked just as good as ever ^{so} before he cut off the other half, sewed up the animal again, waited another three months, opened up the rabbit and found it had a brand new liver. In other words, the liver had entirely reproduced itself. This power of the body to reconstruct, restore and reproduce itself is something marvelous. If you lose a finger it is gone forever. If you lose a kidney the other kidney will grow to twice its normal size so that the kidney power is restored again. You have not got so many kidney cells as you had before but the cells that are left are larger and are working harder. The one kidney takes on the function of the two kidneys in a remarkably efficient manner. Here is a wonderful thing that happened just last week in our hospital. A man had an ulcer on his duodenum so it would not empty. Almost nothing at all went through. The test meal was still in the stomach twentyeight hours after it was eaten. Four days ago we operated upon this man. We made a new opening into the stomach. His old pylorus had been spoiled and we made a new opening. This is the thing that has happened to that man but old mother Nature has made a new pylorus for him. It works just as good and as well as the old one did. That is one of the most wonderful things I know of. I dropped into to see him this morning and found him eating a nice bowl of soup and I said to him, "How are you getting along?" He said, "I am having a banquet every three hours". He is just enjoying life. He had not been able to eat anything and was getting worse all the time but now he is able to eat meat and the food passes along and everything is working beautifully and Nature has made

a new pylorus for him. There is a creative power that works within our bodies. The same Almighty power that made us is at work within us. The Apostle Paul said, "Know yet not that your bodies are the temple of the Holy Ghost." The Holy Ghost to the Hebrew meant the Almighty power, the great power that created the universe and holds everything in order throughout the whole great universe, the power that made us and keeps our functions all in order as well. It takes the same power to keep a man alive that it did to make him. We do not remain alive without an effort. It takes just as much Almighty power to keep a man alive as it did to make him in the first place. I remember a woman who came to my office one day and wept. By and by she said she was weeping because she was disappointed in life and believed that God had forgotten all about her and she could not believe that God had any interest in her. I said, "I can prove to you that God is interested in you and is thinking about you." She said, "If you can prove that to me, I will be the happiest person that lives." I felt her pulse. I said, "Your heart is beating." She said, "Of course my heart is beating." I said, "But your heart doesn't beat by itself. It doesn't beat of course. Tell me what keeps your heart beating. She said, "I don't know but I suppose you know." I said, "Suppose you make your heart beat a little slower." She said, "I can't make my heart beat slower." I said, "Well, then hurry it up a little and make it beat faster." She said, "I can't do that." "Well, why can't you?" "Why does your heart beat at all?" She said, "I don't know but of course you are a doctor and you know." Some people think the doctors know everything. I want to tell you they don't. They know but precious little more than the rest of the folks. I confess I could not explain the heart beating only in just one way. Your heart is beating and you could not make it beat faster nor beat slower. What is a person's heart? It is nothing but a muscle. It is a long muscle rolled up together. It is a live pump that is hollow and contracts to drive the blood out of it. The heart does not do that of it-

self. What makes the muscle of your arm work? How can you strike
beat with your fist? It is simply because there is an intelligence,
a will here that orders that muscle to contract. There is an intelligence
that directs the contraction of the muscle. There is a will behind every
act. There must be a will behind every voluntary act. When you contract
your muscle it is your will that orders it and it is the intelligence that
directs it. That same is true of the heart. Every heart beat has to have
an order to make it beat. Every time your arm strikes there has to be an
order. Every time the heart beats the heart has to have an order just the
same. It doesn't beat like an automatic machine at all. A little impulse
or order comes down to it to tell it when to beat, to set it off. Above the
heart is a great artery that carries off the blood and a great vein that
brings in the blood. There is a little knot of nerve cells at the top and
and a nerve that carries the impulse from that point to the heart. Once
every second on an average there is an order sent down to the heart to beat.
Where does that order come from? What creates it? What starts it? There
is only one explanation for it. The same power that made the heart rules
the heart. There is a will behind the heart that keeps it beating. It is
not my will for I haven't any control of it, but there is an intelligence
behind that will. The heart beats without my consciousness having anything
at all to do with it. I can hunt up my pulse and feel it beat but other-
wise I do not know that the heart is beating. If my hand is in motion I
know it but I do not know that my heart is beating unless I look for it.
There is an intelligence in the body that is caring for it. This is just
as true of the stomach, the liver, the kidneys and every other organ as of
the heart. The heart beats while we are asleep. The lungs contract and
move while we are asleep. We go to sleep but we do not wake up. There is
something that wakes us up. There is a Power that watches over us, that
cares for us, goes through the whole life time with us and that is the

Power that made us. It is the cause of the creation of eight million blood cells every second of our lives to keep us going. Eight million blood cells die every second and are removed and carried out of the body and eight million new cells must be made to take their places. If we get an attack of pneumonia or something of that kind, millions and millions and millions of white cells are created on the spot to capture the germs and fight off the pneumonia. If a new disease comes it is a most marvelous story. The phenomena of living intelligence within the human body, The same Power that made us dwells within us, keeps us alive. When we are sick it heals us and that is the reason we get well. Doctors cannot cure anybody. I believe I have cured a few corns but I never cured anything serious. I have not the power to do it and no doctor or medicine has the power to do it. No baths will do it. It takes Almighty Power to heal sick man. That is the only way anybody can get well. That is the reason why you cannot get well without reforming your life. The old prophet said, "Cease to do evil and learn to do well." Just as long as you are fighting against Nature you cannot believe you are going to be cured of your troubles. As long as you are cultivating death you cannot expect to have new life develop in you; It is impossible. God is doing for us all the time, call it God, the unknowable, the infinite, anything you like. It all means the same thing; the great Power that made us and dwells within us and is always with us. This is the power that heals us and it does always all it can for us. When we are cultivating disease it cannot do much for us but if we are cultivating health, if we put ourselves in harmony with this great Power and co-operate with it, in other words, if we live in tune with the infinite, then this wonderful Power can do wonderful things for us. That is the philosophy of getting well. It is simply obedience and co-operation.

Q. What is the best thing to do when one is catching cold?

A. You do not when you are catching cold. What you feel is that you have caught cold or rather that the cold has caught you. It is a very simple thing. We are always right on the verge of catching cold all the time. We carry in our throats and nostrils the germs that produce colds. Colds are closely allied to influenza, the gripp and other infectious diseases. Cold is the most common of all infectious diseases. Nobody would have colds if it were not for the germs within your throats and nostrils. There are islands in the sea and mountains where no one ever has a cold. People who have colds have caught cold either from themselves or from somebody with whom they have come in contact. It is possible that we get free from the germs occasionally but we come in contact with somebody who has the germs in virulent form and we get them again. But it takes something more than germs to give one a cold. One must have low resistance and be susceptible. It isn't cold air that causes the cold but it is the susceptibility, the predisposition. If we could go outdoors and expose ourselves to all the great outdoors and let the wind blow on us from every direction, we could not get any cold at all because the whole body would rally to fight off the invader but there is a little knife blade of cold that comes through a crack in a car window and strikes the back of your neck and the next morning your neck is stiff, you cannot move your head because the hot air of the car reduced your resistance. That knife blade of cold did not rouse the whole body to resistance but took advantage of your unpreparedness and that is the reason you got cold, you caught cold. The only way to avoid colds is live above them. If you have a coated tongue the gates are all wide open. The walls and fences are down and the hogs can swarm into your cabbage lot and do you all

sorts of harm. Mr. Dooley said, you know, or rather the doctor said to him, "The trouble, Mr. Dooley, is the weeds have gotten into your posy garden." It is because of putrefaction inside. The germs that produce lactic acid are harmless germs and when they grow in abundance in our interiors they keep the bad germs out. What is the best thing to do when you catch cold? I remember one lady who had taken cold and she thought she was catching it from the window and I had to hold a handkerchief in front of the window to show her that the air was going out of the window instead of coming in. A man in a New York hotel had an attack of asthma at night. He begged a friend with him to open a window. The friend fumbled around, didn't find the light but finally found the window. He couldn't get it open and his friend was gasping his last breath and begged him to break out a pane of glass. He smashed out a pane and the sick man was relieved right off but he wasn't quite completely relieved. So he told him to smash another one. He did so and then the patient felt completely relieved and dropped off to sleep and slept soundly all night. In the morning they awakened and discovered they had broken into a bookcase yet the man had been perfectly relieved. Some people think they are sick when they see anything around that can possibly make them sick. Some people are just as easily cured when they see something that might cure them like the man who was cured of cholera by taking what he thought was cholera medicine in the night but found in the morning he had taken ink from the ink bottle instead of the cholera medicine. In a large audience one day a man felt as though he was taking cold and he got up and said, "Is there a Christian Scientist here?" A man stood up on the other side of the room and said in an impressive way, "Yes, I am a Christian Scientist." The other man said, "Won't you please change seats with me? I am afraid I will catch my death of cold from the air coming in through the open window here." The Christian Scientist sat right down in the seat where he was,

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never made a move to rescue the dying fellow. That is the trouble with these Christian Scientists. They have got the power to heal all the sick people in the world but they do not do it without the pay for it. If I had that power I would go right to work right away and set it going. Christian Scientists want five dollars or fifty dollars or one hundred dollars per.

Q. Why is barley not more extensively used as a food product?

A. I suppose the brewers get it all for one reason. The fact is barley is chiefly used for malting purposes. Barley is sprouted and that develops the diastase which is used for converting the starch of corn into sugar which is afterwards fermented. Barley is next to wheat the best bread-making grain. It contains quite an amount of gluten but not so much and not so good as wheat. Barley and rye and wheat can be made into raised loaves. It has not so large, plump and nourishing a kernel as the wheat and is not generally quite so well liked but it is a wholesome grain.

Q. How much protein do growing children require?

A. Sometime ago I talked with a gentleman about protein that adults require. He didn't think I knew much about it and doubted very much the soundness of the low protein ideas we talk about. Finally I assumed a very serious air and said, "You think I don't know anything about it. Do you suppose God knows?" He said, "Of course God knows. He knows everything." "All right. God does know and I found out what God thinks about it." He said, "That is preposterous". "Well," I said, "I have. I found out just exactly how much protein one ought to have. I got the information from the Almighty." He thought I was getting almost irreverent. I said, "Didn't God make mothers?" "Yes." "Didn't he make babies?" "Yes". "Didn't he make food for babies?" "Didn't he know exactly what kind of food a baby needed and how much ^{it} he needed?" "Of course." Then all I have got to do is to

find out how much food a baby gets and I will find out what God thinks about it. He hadn't thought about that. I said Professor Rubner, the world's greatest food scientist made a study of that subject and found out that a baby gets one calorie of food then per day for every pound of body weight. The baby has to use almost half his protein without building up the body. Adults have the body already built so they need only half as much as the baby does or half a calorie per pound of body weight per day. That is simply and positive. It is the exact fact of the case but the protein of vegetables does not all pass for its par value so we have to take a little more when we eat vegetable protein than if we take our protein in the form of milk so if one living on a non-flesh diet calculates one calorie of protein for each pound of body weight per day, he is getting all the protein he needs anyhow. He is getting a double dose and all that can possibly do him any good. If he takes any more than that it is worse than wasted because it is treated as so much poison and must be eliminated from the body.

Q. How many months must one wait before attempting swimming five minutes a day after having suffered ten months from a strained back.

A. I think we would have to apply calculus to that. Get some mathematician to figure it out. I should say if this person should come to see me I will see if I cannot find out what the answer should be.

Q. How long from the time the food passes into the mouth until the unusable residue should be dismissed from the body?

A. I think the normal period should be fourteen to sixteen hours. In barnyard fowls the time determined by the United States Government is three hours and a half. Extensive observations upon human beings have convinced me that ^{sixteen} ~~fifteen~~ hours is about the normal time. Four hours in the stomach, four hours more till the food reaches the colon and it has traveled twentyeight feet out of the thirty feet of

alimentary canal when it reaches the central loop of the colon and there is only two feet more. If it makes the journey of twentyeight feet in eight hours, it ought to make the journey of two feet in six or eight hours more. Certainly it should not be lying around there two or three days. The residue of breakfast should be dismissed before you go to bed at night, the residue of dinner before breakfast, the residue of supper after breakfast and then the king's highway is clear for the new food of each day.

Q. Is diabetes ever cured?

A. Yes, we have quite a number of cases on record that have been treated and remained well for a series of years but these cases are rare.

Q. If the ileocecal valve is incompetent, can one be restored to health without operation?

A. The ileocecal valve cannot be restored but it is possible by very careful regulation of the diet and the life to live well and comfortably even without operation in nineteen cases out of twenty, at least, perhaps a larger proportion. Operation for the ileocecal valve alone is seldom if ever required because this condition does not exist along by itself. There is always a diseased appendix or a colon, an adherent pelvic colon or some other trouble along with it.

Q. Would swimming be beneficial for one having a prolapsed abdominal viscera? Would it also be beneficial for one having colitis?

A. Yes. It is all right. Any kind of exercise that will strengthen the abdominal muscles will be useful.

Q. If the human race is to be deprived of salt, even for a period of a few months, said a doctor, we would not only lose a healthful natural/incentive for our foods but disease would spread with such relentless speed as to defy all the efforts of the most skillful

doctors of the land because there is in the body a deficiency of chloride of sodium and Nature excites the desire for it. Salt is essential to health and life and is as much a food as bread or flesh.

A. This is beautiful nonsense. It is astonishing how much rubbish labeled health talk and hygienic advice and all that sort of thing the newspapers contain these days. Health talk is really getting to be the most popular kind of newspaper talk. Unfortunately there is an enormous amount of ridiculous notions getting around. All sorts of absurd things are published and this is one of the most absurd. It is true that the body cannot get along without salt but it is equally true that everything we eat has in it salt and any wholesome diet capable of supporting life at all that contains other elements essential to supporting life will contain as much salt as the body absolutely needs. All vegetables contain salt and the proof that they contain all that is necessary is to be found in the fact that most animals live without adding any salt to their natural food. Man is practically the only salt eating animal. Other animals do not eat salt unless they have acquired the artificial habit. Central Africa swarms with antelopes but there is no salt there. The great family of beetles, for example, and insects of all kinds, more than two hundred thousand of species of beetles alone, and not one of them will eat salt. Flies hover around the sugar barrel but you never saw a fly eating salt yet. A great many animals do not eat salt. Birds do not eat salt. Some years ago we had quite a disturbance in this town because a lady had fed salt to her neighbor's chickens. The chickens ate the salt and some of them did not go home. Any considerable amount of salt is not good for bipeds whether they have feathers or not. A lady some years ago fed her canary some baker's crackers and the bird promptly died. Salt is not good for birds but you say farmers have to salt their cattle but they don't. Most cattle raised on the western plains don't get any salt at

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all but you say the buffalo and the antelope visit Salt Lake. Certainly they do. People do also. I know a place called French Lick Springs which is a kind of salt lake and there are any number of people going there all the time to drink that salt water. Cattle go to salt lakes just for the reason that people go to various watering places. They go there in the spring. In the winter time living on their dry herbage the animals become very constipated and they go to visit these salt lakes in the spring for the very reason that people go to these salt springs and watering places. The salt lakes are the mineral springs for the antelope. Some of them get troubles with parasites, worms of various sorts. In other words, they take the salt for medicine and not for a regular diet. You cannot imagine that these antelopes will travel in great droves hundreds of miles before breakfast every morning or three times a day to get some salt. Once or twice or three times a year they go. I suppose some wise old antelope got the habit and inoculated other antelopes with it. Animals do not use salt. In England I learned many years ago that the counties that produced the finest cattle no salt at all is given to the cattle. If you will go out to my house and look at my herd of a dozen deer, you will see they are fine looking deer. They never have had a taste of salt in their life. They were all born on the premises. They have been there and they can jump the fence and go away and get some salt if they are awfully hungry for it but they do not do it. Once in a while a dog gets in and chases them around and they get crazy and jump over the fence to get away from the dog but the next day they are back again begging to get in. When Mr. Thompson Seton was here sometime ago we offered them some salt and they found what it was, sniffed at it, turned about and went away. Not a single deer touched its tongue to the salt, not one. Mr. Seton was very much surprised. We gave them some apples and they were very glad to get them. Mr. Seton said all that proved was that the deer liked apples

better than salt which I told him I was sure was true.

Q. Are strawberries a healthful food?

A. Yes, they are wholesome.

Q. Do you disapprove of taking a tablespoonful of Pluto in a glassful of water every morning?

A. I am sure it does the work. It is like other saline waters, and laxatives but it is no better laxative than any saline laxative you buy at the store. The fact that it is natural water makes no difference whatever. It is no way better than seltzer or any of the saline laxatives of various sorts that are used but it is not to be recommended for the reason that it always produces a disturbance of the stomach and congestion of the mucous membrane, a catarrhal condition of the colon, colitis, finally and a most obstinate form of constipation, a spastic form of constipation which is the most obstinate of all. Constipation is not a disease of the stomach or small intestine. It is a disease of the ^{last} ~~largest~~ two feet of the colon. Of the trouble in constipation I think I may say in 99 cases out of 100 it is within two feet of the exit. Then what sense is there in sending medicine the whole length of the alimentary canal making it travel twentyeight feet to reach the trouble clear down to the other extremity. The whole alimentary canal is disturbed. The stomach and ~~digestion~~ digestion is upset. The small intestine is irritated. The colon is disturbed and irritated and a wretched condition is produced in the colon that is very serious. The irritation produces a spastic condition. The colon becomes contracted so that it is almost impossible for anything to get through it. This is the result of the irritation of the laxative. ^{Under} ~~Naturally~~ the powerful wretching of the laxative the colon is emptied but it is left in such an irritated state that it contracts and want move at all without the use of the laxative.

I remember a poor fellow from Grand Rapids who could take half a pound of salts without moving his bowels. The final result is a most lamentable one. The opposition to the forward movement of material in the colon is so great that the colon is thrown into a state of spasm and the material which ought to be propelled enmasse is carried along in lumps and is carried on down to the colon in this way in lumps. Each particular little bolus has to be carried along by itself. These are the most obstinate of all forms of constipation. When this condition exists a backward movement is set up which finally results in extreme dilatation of the cecum and the breaking down of the ileocecal valve so that fecal matters pass right up through the small intestine to the gall-bladder and duodenum and produce duodenal ulcer, gallstones, diabetes and various other distressing disorders.

Q. What is the cause of mucus rising in the throat, especially on a milk diet?

A. The abundant gastric secretion taking place will have a tendency to increase the secretion of the mouth.

Q. What is the most practical for a business man who is has nerve troubles, neurasthenia and denatured bowels, one week at the Sanitarium ^{twice a year} / or two weeks once a year?

A. Here is a man suffering from New Yorkitis and he has got it so bad it has affected his eyesight so that he cannot see that his greatest interest, the most important thing he has to attend to in this world is to be good to himself, to take care of himself. His great concern about his business has made him clearly forget himself so that he really feels that if he spent two weeks in looking after his own personal welfare once a year that would be a most extravagant thing for him to do. A man would take more care than that of a dog. A friend told me one time of a friend in New York that had two fine boys and four fine dogs. He took

care of his dogs himself and turned his boys over to a tutor. His friend expostulated with him for giving his dogs personal attention and turning his boys over to a tutor. "Oh", he said, "You see my dogs have a pedigree. The boys haven't any pedigree." It is amazing how utterly inconsiderate we are of our greatest interests. A man that has a business dependent upon him cannot do anything for that business that is more important than to increase his own personal efficiency than to keep his own body in such fine training that he can give his business the finest thought his brain is capable of, that he should have endurance, power and concentration, discrimination, the finest judgment he could possibly exercise and all that depends upon his physical condition, the state of his liver and stomach. It is astonishing how much our mental condition depends upon our physical state. Bishop Vincent told us sometime ago that ^{some} people even thought they had experienced religion when they had only had a bilious attack. Many a man thinks his business is all going to pieces and it is simply because he is bilious all the while. I am sure the average business man could with greatest profit spend a month at the Battle Creek Sanitarium every year, and should be good to himself and put himself into the finest possible condition. Most people think they must take a vacation but if a person will take a vacation in a rational way and instead of sitting or lying about in a disorderly way, will systematically, scientifically work for health and train himself, he can make his rest worth a great deal more to him than it would be if he simply sat about and did nothing but simply rested. It is positive thing, a thing we have got to work for and we cannot have just about as much health as we want. These soldiers at the camp here are getting health, vigor and endurance, are growing in their bodies every day and in a few weeks from now they will be reconstructed men and the United States Government is already making plans for building great reconstruction hospitals for the soldiers when they come back from the war broken-down men. This is a reconstruction

hospital. We are in the business of taking broken-down men and making them over. The business man who is way down far below the level of the soldier who enters the army whose body is so unfit that he could not possibly get admission to the army comes here to the Sanitarium and in just one week twice a year he expects to be put up into the finest possible condition to fight the battles of business and to fight the greater battles against the causes of disease that are all about us. I want to say to you, my friends, we have got to give more attention to these questions of health, to see and realize that it ^{has} is a most important relation to every human interest; that it is a business asset to be well, strong and clear headed. In St. Louis you will find one of the most successful business houses in the United States, the Simmons Hardware Company. If you will ask Mr. W. D. Simmons what made his business a success he will tell you his own personal health is one of the greatest elements in it. Ten years ago he came here so wretched, nervous and depressed that he wasn't fit for business at all. When he had been here a couple of weeks he got thoroughly converted to the Battle Creek idea, simple living, and sent for his wife and children; had them come here and they all learned how to live Battle Creekwise. Three years later I called on him at St. Louis and I found one of the most vigorous active business men I ever saw. He was a regular dynamo and he had that great business, twenty thousand men in his employ, and everything in complete command and he has doubled his business since he returned home and since that time he has doubled it several times again and is simply just going right on. He said, "Doctor, I wish you would take dinner with me. I think my wife thinks we do a little better in our home than you do at Battle Creek." I tell you, my friends, this is a business matter. The matter of getting well is a business matter. The average man cannot afford to be sick. We cannot afford to allow our bodies to fall into innocuous desuetude. We cannot afford to let our bodily machines

fall into a state of premature decay. Why should we do it? Why shouldn't we try to keep our bodily mechanisms in just the finest possible condition? I do not recommend to you anything that I do not try my best to do myself. Every minute I can spare for my service to you I give the best way I know how to try to keep myself in just the finest shape I can and every time I get a chance to get a little out of doors I do it and I sleep every night with my head out of the window, so to speak. I do all in the way I can in living out these principles of simple living and I find it pays tremendously. I am about sixtysix years old and I do not feel so far as I can discover older than I did when I was thirtyfive. I do not know that I feel quite as old as I did ten. I am able to do just as hard work and as much work and can stand as much hardship as I did in my life and I am sure all the ability to work that I ^{have} owe to these principles of simple living and do not recommend to you one single thing that I do not do myself and that I do not consider it well worth while to do. If you come up to my home you will find my whole family doing the things I am trying to persuade you to do. We are trying to get everybody else we can to do it and we find it pays. We see the advantage of it as the years go by. We become more and more convinced, see more and more clearly how well it pays to give attention to these God-given bodies. When God made man in His own image and then put Himself into him and animated him and made him a living being, why shouldn't we co-operate with that great power that made us and obey all these good beneficent laws that ~~work~~ relate to wholesome living and in that way get the greatest possible blessing from our lives and the greatest fruit from ^{opportunity} our ~~efforts~~ to live in this world.

END.

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

Monday, December 17, 1917 at 8:00 P. M. By

J. H. Kellogg, M. D.

Q. How does your colon treatment effect a cure and is it permanent?

A. I must confess that we haven't any specific cure. All the world is probably still looking for a panacea. Ponce de Leon you know expected to find the source of eternal youth. There isn't any such thing as a cure-all, a permanent cure. The method we employ in treating chronic colon inactivity is based upon physiologic principles and is the result of forty years experience and experiment. First of all, we must know the cause of the constipation in the individual case. The fundamental principle in our treatment is to find out what is the particular thing the matter with this particular man. Ordinarily constipation is treated on general principles. Nobody knew what was the cause of constipation and nobody knew the reason why certain remedies were apparently beneficial but now we are able to put the treatment of this condition upon a rational basis. The information received within the last ten or fifteen years from experiments of Cannon of Harvard, Hertz of London, Heltskrecht of Vienna and Dr. Case of our own institution, have given us the facts necessary for a logical and rational method of treating this condition. One of the first things we found out was that we had been dreadfully ignorant concerning the physiology of the colon. Nobody knew how the colon acted normally. Nobody knew, in fact, very much about how the alimentary canal as a whole behaved. It was only by the most laborious, complicated and ingenious experiments that we gradually got the simple information which enables us to deal with this condition in a rational way. The colon is a part of the alimentary canal which is some thirty feet

long. The stomach, the pylorus, the small intestine, the ileocecal valve, the cecum, the ascending colon, the transverse colon, descending colon, pelvic colon and the rectum constitute the alimentary canal. From the stomach to the colon is twentytwo and one half feet. The colon is about five feet long and the rest of the alimentary canal is comprised of the esophagus, the stomach and the rectum. This alimentary canal is simply a muscular tube. It wriggles, twists and contorts very much like a snake travels. The alimentary canal has movements which are very much like those of a snake. The movements are peristaltic. It has longitudinal muscles and circular muscles and it is by the combined action of these two kinds of muscles that the movement passes along the whole alimentary canal. The movements begin in the stomach, travel down the small intestine to the colon and beyond. The ascending and descending parts of the colon are adherent to the walls of the body. The rest of the colon is movable, the cecum, transverse colon and the pelvic colon. The rectum is embedded in a solid mass of fat. When food is taken into the stomach within four hours it is found that it has passed out spoonful by spoonful into the intestine. When it drops ^{down} into the cecum so that the cecum is well filled and distended the cecum rises up and pushes the food over into the corner into the transverse colon. This action does not take place continuously but at intervals of a few minutes. At intervals between these movements there is an action in the opposite direction or a reverse peristalsis. The purpose of this is to hold the liquid material in the cecum until a portion of the water has become absorbed so that ^{the} liquid material does not pass on at once. Otherwise, there would be a continual condition of diarrhea and there are some people in whom this is the actual condition so such a person will eat a meal and half an hour afterwards perhaps part of that meal will be dismissed from the body. It is because this restraining reverse movement in the first half of the colon does not take place. After the food is pushed over from the cecum it comes down to the pelvic colon. As the pelvic colon is filled it gradually rises

and when it is completely full it rises up high and the fecal matter is retained until the bowels move. The rectum should be always empty except during bowel movement. If there is any restraint or obstruction in the colon the movement that starts in the middle colon is greatly exaggerated so that material is pushed back into the upper part of the colon in abnormal quantity and the colon becomes so stretched that the ileocecal valve is destroyed and then fecal matters pass down into the small intestine. Sometimes the pelvic colon falls down, becomes caught and does not rise again. That is very likely to be the case in cases of colitis so in a person who suffers from constipation by and by there will be infection; then will come colitis, then adhesions, then there is obstruction and then the fecal matter is forced back and the ileocecal valve is broken down and the putrefying materials are pushed back into the small intestine and the infection may travel back as high as the gall-bladder and produce gallstones or ulceration in the duodenum, in the stomach and inflammation may extend to the liver and there will be jaundice or it may extend to the pancreas and cause diabetes. Besides, these poisons are absorbed into the body and produce premature senility. Unquestionably these poisons absorbed into the colon are one of the most common causes of premature old age. Millions of people are becoming old at fortyfive and fifty when they ought to be still fresh and young because these horrible poisons absorbed from the colon set up degeneration, cause hardening of the arteries, pigmented skin, dark circles around the eyes, dingy skin, coated tongue, bad breath, and all the symptoms found in chronic auto-intoxication. Suppose as a result of constipation the colon is infected and some germs get into the appendix and set up inflammation there and we have appendicitis and adhesions form all about the appendix and the cecum so that the cecum can no longer contract to force the material up into the bowel but it remains stationary so that it now ^{becomes} an inert pouch and the materials come down into the cecum and remain there until the cecum becomes so full that some of them are pushed over into the trans-

verse colon and so carried on. This is a very obstinate form of constipation. Such persons are often are not relieved much by enema because there is another condition present, a contracted state or a spastic condition of the bowel so that material does not pass readily along the lower half of the canal but is held back. There is both a crippled state of the cecum and an exaggerated anti-peristalsis resulting in the stagnation of a large amount of material in the right side of the colon. When an enema is taken the water passes over the colon but does not return. It is held in the colon and will be absorbed and dissolve a large quantity of poison and the patient feels worse afterwards than before because of the quantity of poisons dissolved in the enema and absorbed. Constipation may be the result of exaggerated anti-peristalsis. When the cecum is not adherent it sometimes becomes so enormously dilated that it is nothing but an inert pouch that has no contracting power at all but is simply like a sack. The pelvic colon may fall down and become adherent and in this way we may have constipation. We may have constipation due to a pouched cecum, to a spastic colon, to an adherent pelvic colon. If we go back into the history of the case we always find there was constipation before any of these troubles arose through neglect. The cecum became filled, was neglected and material was allowed to remain in the lower part of the bowel through neglect and as a result we have a loss of sensibility and a paralysis of these parts and that is the most common of all forms of constipation. The great majority of cases of constipation are due to trouble in the last foot of the intestines. There is a paralysis perhaps, then come adhesions of the bowel causing colitis and a spastic condition of the colon, a contracted colon, then afterwards comes this pouched condition of the cecum so in constipation it is very important to know what is the exact condition that exists; whether the trouble is due to a paralyzed rectum, to an adherent paralyzed colon or to

an adherent prolapsed colon or to colitis and a contracted descending or ascending colon or to a pouched or adherent cecum or to some other conditions or combination of conditions. The treatment must meet the different conditions. If there is colitis present, we must treat the colitis because spasms will exist as long as the colitis does. In such a case the colon contracts so small that material cannot get through except by being pushed along one lump at a time. In such cases the bowel movements consist of lumps. Each one of these lumps has been pushed down the bowel by itself by a tedious laborious process. This contraction of the bowel must be overcome before the constipation can be relieved. This condition can always be made out with the X-ray but if not it can be made out by palpation with the hand. A dull pain on the left side is very common and backache is more often due to colitis than to any other cause. Then we must cure the infection and the colitis. When the colitis is cured the bowels will open up in a normal way and the contents of the colon will be moved along ^{hard} en masse instead of being moved along laboriously in small/lumps. If we have a pouched dilated colon the most important thing is to keep the colon empty so that it will have a chance to contract and to return to its normal dimension. If it is a prolapsed pelvic colon we must try to lift it up and get it into its normal position. It may be only caught or incarcerated or it may be adherent. Whatever the condition is we must endeavor to overcome it. If we have a paralyzed condition of the bowel, which is often the case even when the other conditions are present, this must be overcome by applications of electricity and other normal stimulants which will arouse the inner nerves to their normal degree of activity. In the majority of cases of constipation we find these conditions present together and we have to use combinations of remedies. There is infection, colitis, a spastic condition of the colon, a dilated condition of the cecum and ascending colon,

a prolapsed pelvic colon, a prolapsed condition of the lower bowel. The first thing of all to be done is to remove the causes so far as we can. One of the chief causes is neglect. The person must be trained to teach the bowels to move normally on rising in the morning, after each meal and before going to bed at night. It is astonishing how the movement of the bowels comes to be associated with certain habitual acts. There is a psychologic factor in bowel movements that is exceedingly interesting. There is a country in Africa in which the tribes have in their villages two trees which are planted for the purpose of relieving the members of the tribe of this great inconvenience. One tree is at one end of the village for the women and at the other end of the village is another tree for the men and the persons whose bowels are inactive have only to visit this tree and touch a branch of it and at once the bowels will be prepared to move. This remedy is found very successful. It could not possibly have existed for ages and have remained in popular use unless there was some value in it. An old English doctor gives a very interesting account of a mother who suffered greatly from constipation and who could find relief in only one way and it was to give a dose of castor oil to one of her children. Whenever she found herself to be in need of a cathartic she simply gave the castor oil to one of her children and that would move her own bowels. If she took the castor oil herself that would have no effect at all but was tremendously active when she gave it to one of her children. When one acquires the habit of moving the bowels at definite times, the bowels are ready to move at those times. For instance, a person is accustomed to move the bowels after eating and he will find after a little time that the act of eating, no matter where it is, whether at meal times or between meals or whenever food is taken into the mouth and eaten the effect will be to stimulate the bowels to action. I know a man who got his bowels so trained to act when taking his clothes off at night that he had to take his clothes

off in the day time to make his bowels move so there is a psychological element in it. We must take advantage of this psychological element by giving the bowels an opportunity to form this peculiar relationship of habit in connection with other common acts of life. In other words, whenever we go to bed, the bowels should have an opportunity to move even if there is no inclination in that direction, and on getting up in the morning the same thing; after every meal do the same thing and it is remarkable how easily the bowels will be trained to fall into line and do their duty. In order that the bowels should move it is necessary that some physiologic conditions should be complied with. One of these is that a sufficient amount of bulk should be supplied. Why is bulk necessary? Bowel movement depends upon muscular action. Nature is wonderfully wise and does not waste any energy if she can help it. How do we know how to adjust the amount of energy we use to each particular act? It is due to the fact that the muscle possesses a peculiar sense. When I place my hand about a glass and touch it I know I am touching a glass. I have the sense of touch in the skin of my hands. If a pin is thrust into my skin, I know it is a pin because of the sense of pain it produces. We have also a special sense in the muscles, a muscle sense by means of which we know whether we are lifting a heavy object or a light object. We know whether a large amount of energy is called for or a small amount of energy. This muscle sense is the only sense the muscle has. The intestine is all muscle and it has this muscular sense very highly developed. In consequence/when the bowel lies empty the intestine is inert, quiet, resting. If there is a small amount of material in it, it might be stimulated to a very small amount of effort but if instead of a small amount we have a large amount so that the bowel is stretched, then the muscle sense is aroused to a high degree and causes the bowel to contract with much vigor and in that way the bowel is stimulated to action. That is the philosophy of movement along the alimentary canal.

If the bowel becomes over-distended, there is a large amount of gas and the bowel contracts with so much violence that a cramp is produced in the bowel. If you ever had an attack of colic you know how painful it is. It is simply a state of cramp in the colon and it is just like a cramp in the calf of the leg or any other part of the body. It is due to a violent contraction of a muscle and the cause is over-distension of the bowel so you see that bulk is absolutely necessary. Nature has provided man with a long alimentary canal which requires a great deal of stimulation in order that the material passing through it shall travel with sufficient velocity to get through before putrefactive or injurious fermentative changes have taken place. The foodstuff when it is taken into the intestine is harmless generally, in a perfectly wholesome and pleasing condition, in an agreeable condition, or it would not be received. After it has been digested and the useful parts absorbed and the residue is cast into the colon which is the sewer or garbage box of the body, then it becomes dangerous, useless. It is no longer of any value and should be gotten rid of as soon as possible. It takes only eight hours from the time when we begin eating our food for the residue to be cast into the colon ready to be dismissed from the body. If the residue is allowed to stay in the colon for two or three or four or five days or a week, you can readily see what happens to it. It is not only the residue of one meal but of anywhere from three to fifteen or twenty meals which may be all piled up in the colon at once. In persons whose bowels move once a day the usual time required to get rid of a meal is fifty hours which means the residues of six meals in the body at once time and the person is continually subjected to the poisonous influence of products due to putrefaction which are being absorbed into the body so we must have bulk enough to stimulate such a degree of activity in the colon as will carry off these residues before they have had time to undergo putrefaction

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er fermentation and that means twelve to fifteen hours. The residues never ought to remain in the body longer than sixteen hours. In other words, if a meal is taken at six o'clock in the morning, ten o'clock at night the unusable part of the meal should be dismissed so that when you go to bed there will remain in the colon the residues of supper and dinner only so that under no circumstances should residues remain in the intestine longer than from eighteen to twentyfour hours but we find instead of that four and five and six days and that is the reason why we find so many persons suffering from chronic headaches, coated tongues, dingy complexions, pimply skins and skin eruptions. Most all of these troubles as well as depression of spirits, bad breath, premature senility, in the great majority of cases grow out of neglect to dispose quickly and promptly of the food residues. Bulk is obtained only in one way, that is by eating and taking with our food a certain amount of indigestible material. It is interesting to note that all animals appreciate instinctively the need of bulk. For example, a barnyard fowl takes gravel or fine sand that cannot possibly be digested. I had a letter from a lady in Minneapolis sometime ago who said she made a great discovery. She had been experimenting on her husband who suffered from constipation for years and she found there was nothing so good for him as rather fine gravel and she urged me to recommend it to my patients and she thought it would be a good thing to put it on the market. And actually a few years ago I saw an advertisement of gravel to be used by dyspeptics. That is no discovery of ours. Suppose the mother hen with young chickens cannot get gravel, then what? She picks the feathers off her body and you sometimes find fowl that have not been properly supplied with roughage pretty nearly denuded of feathers. A dog eats grass. What for? Because he has more sense than his master, many times. The farmer feeds bran to his pigs, horses and cattle. When they get a little out of condition they get off their feed but think of the thousands of people who

are off their feed who have lost their appetite and exactly for the same reason. They are saturated with poisons to such an extent they have no relish for food. All in the world they need is a clearing out of this horrible accumulation of food residues lying about there. There is just one thing that can furnish bulk and that is cellulose. It is the one indigestible element of our foodstuffs. Animal foods - meats are completely digested except the bones. The pig eats part of the bones. The lion eats a good deal of the bones and they act as stimulus to the alimentary canal for the carnivorous animal. Human beings do not eat the bones and all the rest of the flesh that is eaten is completely digested and leaves no residue behind, only small fragments of meat, and these undergo putrefaction in the colon and produce ammonia and ammonia paralyzes the bowel so that meat becomes a very constipating foodstuff. It not only furnishes no laxative element but it does the opposite by undergoing putrefaction, produces ammonia which is an alkaline and this paralyzes the bowel. The bowel is stimulated by acid but paralyzed by alkalis so you can readily see how the ordinary bill of fare is anything but physiologic. A man sits down to his morning breakfast of buttered toast, poached egg, and perhaps a bit of bacon, griddle cakes, molasses or maple syrup and a cup of coffee. What is there in all these things that could assist bowel action? Not one single thing. The whole bill of fare is constipating to the highest degree. The millers and the cooks have conspired to produce this universal condition among civilized people. Among the peasantry of Europe this condition does not exist to any high degree. The German peasants, for instance, have been accustomed for ages to live largely upon black bread. That keeps them in good condition so they are very careful to keep themselves supplied with "Swartz Bread" or pumpernickel. This bread although it has less nourishment to the pound than fine flour bread than the white bread is

nevertheless more wholesome because it contains this large amount of indigestible material. Cellulose is found in vegetable foods only and it is the only part of the vegetable foods that is indigestible. It is found in the envelope of fruits of various sorts and in the skins of vegetables, in the seeds of certain fruits and it also forms the framework which holds together and gives proper form to the whole mass of the vegetable and fruit kingdom. Such substances as beets, greens, dandelions spinach, beet tops and things of that kind contain a very large proportion of cellulose. Bran is scarcely half cellulose but contains also a considerable amount of starch but it is a valuable source of cellulose. We need a good deal of bulk. I think the amount required could be represented by about two ounces of bran a day. A pound of bran would last the average individual about a week. You say that is an enormous amount. A teaspoonful of bran is not going to accomplish much. It must be a sufficiently large amount to stimulate the stomach and bowel so that ^{it} they will contract with vigor. The bulk alone is not sufficient. We need besides lubrication. All machinery needs lubrication and the digestive machine does not differ in that respect from any other machine. Nature provides a natural lubricant in the mucus. The saliva you know is limpid. It is lubricating. We have it to facilitate the movement of the tongue so that we can talk and chew and make the various movements of the tongue, lips and teeth. This mucus is formed by little glands in the mouth which are found all the way down the intestine everywhere. One of the most important things of all is the appendix which is a large mucus follicle. When foodstuff is coming into the intestine the appendix pours into the bowel a constant stream of very limpid mucus which acts as a lubricant for a mass of foodstuffs and facilitates its movement through the colon, through the rectum and particularly near the outlet here are some little pockets all the way

round the sphincter muscle that pour out a highly lubricating mucus to facilitate the dismissal of the fecal mass from the body. This lubrication is just as essential as bulk. If we have bulk without lubrication it is likely to accumulate. Some people have the misfortune to lose the appendix. I remember a lady who felt very proud of herself that she had been so wise as to have her appendix removed when she had an operation. She had it removed and she knew she could never have appendicitis but she had gotten rid of a very important part of her lubricating system. An automobile, you know, requires lubrication for every bearing. The alimentary canal requires the same thing. The bile is a lubricant. The pancreatic juice is a lubricant. There are little oil cups all the way down and when they come down to the appendix we have a source of lubrication which is of very great importance and pours a great quantity of mucus into the intestine. When that is gone this person is very likely to suffer from constipation because of the loss of lubrication afforded by the appendix. Then if you have this pached cecum or stretched cecum this would cause degeneration of the mucus glands so there would not be the proper amount of mucus formed. If colitis has existed for a long time a great number of these mucus glands have been destroyed so that the proper amount of mucus is not produced. If the rectum is diseased we have the same thing. I have examined some thousands of colons by means of a little tube passed up into the colon and have found this surface is as dry as the skin, so dry that material was adhering to it in spots here and there like scabs upon a dry skin. In such a condition a normal amount of lubrication of the bowels must be absolutely impossible because the material adheres to the surface and does not pass readily along as it would if the whole surface were lubricated. What are we going to do when we have a crippled colon that no longer makes the proper amount of lubricating material? Nature has stored up in the earth a fine supply of lubricants for automobiles and for crippled colons. If it were not for

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paraffin we would not be able to run our automobiles. It has fortunately been discovered that paraffin is as good for lubricating the colon as for lubricating any piece of machinery. It is not fat, it is not absorbed, it is not acted upon by the digestive juices but is just as neutral in relation to the body as it is to the bearings of a machine. It does not attack the metals in any way so its effect upon the body is simply mechanical. It is simply a lubricant. A person who cannot take olive oil to any considerable extent, who cannot take fats without producing biliousness or indigestion can take paraffin oil because although it is called an oil it is not a fat but simply has the form of vegetable fats or oils. It is so-called mineral oil and it is entirely neutral and inert in relation to the body so if we desire to do so, we can easily add to our diet no matter what it may be, in other respects, the necessary amount of bulk and the necessary amount of lubricant. That is a thing that everybody who suffers from chronic constipation has gotten to do. These things constitute a very important part of the Battle Creek methods of dealing with these chronic cases but you say, isn't this unnatural to take so much bran and isn't it unnatural to take so much paraffin oil? Certainly it is, but it is unnatural to have a crippled colon. A man who has lost one leg has to use crutches. It is most assuredly unnatural to walk with crutches or with a cane yet it may be indispensable to a man who has a crippled leg so it is with a man who has a crippled colon. Paraffin is an artificial remedy, it is true, but nevertheless it is invaluable and it serves the purpose and that is one of the most fortunate discoveries that have been developed in modern times. In fact, I hardly know where we would have been by this time if it had not been for the discovery of paraffin.

How long will one have to use these things? Forever, which means as long as you last. You have a crippled colon and have got to use them just as long as the one legged man has to use a cane or a crutch. It is absolutely essential to help out your crippled machinery. You have lost the power to make lubricant so you have got to buy it or supply it from an outside source. Your lubricating factory has gone out of business. Your colon has been neglected so long that it requires a larger amount of indigestible material than the food ordinarily contains. There isn't enough of the wood and indigestible material in an ordinary bill of fare. If you had always been healthy and never had neglected your colon in any way, ordinary foodstuffs would contain enough material but you have reached a point in disease where the colon has become crippled so that it has to be stimulated to ^athe higher degree than ordinary food will stimulate it. So you must add bran or agar-agar to obtain cellulose in some form. How often is it necessary to use it? If I take bran for breakfast, isn't that enough? No. If I take paraffin for supper, isn't that enough? No. It is necessary for complete results that this bulky material and lubricating material should be taken at every single meal. They should not be regarded as medicines at all but as supplementary foods or complimentary foods. They are foods in a particular sense because they are an essential part of a rational normal dietary and must be taken at every single meal. If they are not taken at every single meal, the thing that happens is that that particular meal being concentrated will bank up somewhere and just form a plug and produce an obstruction. More likely the plug will occur in the colon so the result will be a headache, coated tongue, in the morning a loss of appetite, an obstruction that it takes several days to get over. A great many people suffer because of not understanding this point. Every single meal must be provided for. The lubricating material and the bulky material must be supplied at every single meal. It should be taken before or after the meal?

The best plan is to take it with the meal and distribute it all through the meal. The paraffin oil may be taken a spoonful before the meal and a spoonful afterwards or a tablet before and one after but the best way is to spread it all through the meal because, if it is taken by itself before the meal, it may pass on before and leave this poor neglected meal behind or if it is taken after the meal, it may not mingle with the entire meal so as to give the lubrication to the whole meal. The best way I know of is to take the paraffin in the form of a caramel and cut it into a half a dozen pieces and take a bit at intervals during the meal until the whole is taken. In this way it will be mingled through the entire meal. This paraffin melts at the temperature of the body. Various things are employed for treatment. For colitis the first thing is to keep the colon completely empty. It must be emptied once or twice a day by enema so that no material will be left behind to produce irritation by putrefaction. Then we must introduce into the colon every day a culture consisting of friendly germs. The normal colon is inhabited by acid-forming germs but ⁱⁿ persons suffering from constipation the colons are inhabited by alkaline substances which produce putrefaction. Putrefaction cannot take place in the presence of fermentation. Silage is to the cow the same thing as sauerkraut is to the Russian peasant. Sauerkraut is a buttermilk or lactic acid fermentation and silage is also a lactic acid fermentation. If you put beefsteak into a quart of buttermilk and put it away and change the milk once or twice a week the beefsteak cannot undergo putrefaction but will keep perfectly sweet indefinitely. I have a beefsteak that was put into buttermilk ten years ago last June so if we can get these friendly germs into the colon and restore them and get rid of these wild, putrefactive germs that do not belong there, then we will remove one of the most serious and obstinate causes of constipation. This can be done by administering buttermilk and friendly germs, the bacillus bifidus,

the bacillus Bulgaricus and the bacillus acidophilus. We now know how to cultivate them. The bacillus Bulgaricus was discovered by Greigerhoff about twenty years ago. Tissier of the Pasteur Institute made the discovery that the bacillus Bulgaricus had the power to correct a putrid condition of the colon, drive out the wild bacteria and restore the normal acid flora of the colon. This idea was taken up by Metchnikoff and exploited. Metchnikoff himself kept a quart of buttermilk in his laboratory and took doses of it every little while for the purpose of combating these friendly germs but he forgot to do something else. His friend, and colleague, Prof. Tissier, in reply to a question which I asked him about this, said, "Prof. Metchnikoff eats a pound of beefsteak and lets it rot in his colon, then drinks a pint of sour milk to disinfect it. I am not such a fool. I do not eat the beefsteak. That is where Metchnikoff made his great mistake and why he died at seventy years of age when he hoped to live to be a hundred. He neglected a very important factor. He kept on feeding the unfriendly germs which were encouraged more by the beefsteak than they were discouraged by the friendly germs. To make sure that we drive that away, the wild flora, we not only give the cultures by mouth but give a bottleful of actively growing culture which is known as Tissiane, named after Prof. Tissier who is the real discoverer of this particular thing we are talking about. Many of these germs find their way to the colon but many of them die before they get there and it occurred to me some years ago that it might be a sensible thing to introduce friendly germs by the shortest route instead of compelling them to travel about thirty feet before they get there so the culture introduced by this colon treatment is for the purpose of supplying the colon at once with a great flood of friendly germs to take the place of the wild bacteria that are making trouble there, producing ammonia, paralyzing the colon, producing

spasticity of the colon, keeping up the colitis and producing typhilitis, appendicitis and all the other mischiefs common to this part of the body. Massage is applied also for the purpose of pulling the colon out of its prolapsed condition and putting it up into its normal state. If application is made with the body in this dependent position, the so-called knee chest position because the bowel will have a tendency to drop up into position, then by passing the hand up getting hold of the side of the bowel it is possible to lift it up and restore it, at least partly, to its normal state as to overcome the mechanical obstruction which exists. Then electricity and other means are applied to stimulate the nerves of the lower bowel and restore its activity. Probably nineteen out of twenty - I think probably forty-nine out of fifty of all people who come to this institution are suffering from this very thing and will be more benefited by increasing the intestinal activity and changing the diet than by any other one thing. The majority of chronic ailments can be cured as nearly as possible by these methods. Three things are necessary to change the intestinal flora. The first is a change in diet to a laxative-antitoxic diet of food that will not putrefy. Another thing necessary is increased intestinal activity to be accomplished by the use of lubricants, bran and a laxative diet and the third thing is supplying the friendly germs to take the place of the wild bacteria.

Q. What is the effect of excessive water drinking?

A. Water drinking stimulates intestinal activity and supplies moisture to the bowel. Free water drinking is valuable, not only to encourage bowel action but also to disinfect the stomach. Drinking water freely about an hour before each meal is a very valuable means of disinfecting the stomach. A couple of glasses of water about half past eleven or twelve o'clock every forenoon and five o'clock in the afternoon is a good plan. Water drinking is a very useful thing. Every one of you ought to drink two or three quarts of water a day. Take your choice of hot or cold water. If you have pain in the stomach hot water will generally be most comfortable.

Q. Is it not possible that disease may be spread by means of bed bugs cockroaches and other household vermin?

A. It is possible. Bed bugs spread infection because they bite. They may inoculate a person with tuberculosis. Cockroaches are vegetarians which is very fortunate, so they are not so dangerous as some other parasites.

Q. A patient had an operation performed for gallstones two years ago. The patient now has the same trouble again.

A. That is the trouble. If we simply remove the gallstones there is likely to be another crop of stones formed in a year or two if you do not remove the cause so in general it is better to remove the gall-bladder for gallstones are evidence of a diseased gall-bladder and the whole gall-bladder ought to be removed. The operation is done in twenty-five or thirty minutes and the gall-bladder can be removed just as safely as the appendix. There is no more danger in this operation when done by an expert than in removal of the appendix.

Q. Are tonsils valuable when healthy?

A; Yes, indeed. They are lymphatic glands and are placed where they are to fight off germs which are taken in with the breath in great numbers. When they are diseased, of course they are of no use.

Q. What is best food for a man of fifty years of sedentary habits? Oranges or Grape fruit?

A. I should say grape fruit one day, oranges the next.

Q. I thank you for your attention.

END.

THE VIRTUES AND DANGERS OF MILK AS A FOOD.

Read at the National Milk Congress, Rochester, N. Y., in 1917.

No other single substance can compare with milk as an article of food. It is the choicest product of Nature's laboratory. It is, indeed, the only sort of animal food especially and exclusively designed by Nature for food. The flesh of animals and eggs perform other functions in the economy of Nature for which they are specially designed, and if they possess food value, it is only incidental and exceptional. The vegetable kingdom is the original source of all foodstuffs. Through the marvelous chemistry of plant life, the energy of the sunlight is captured and stored in the living substance of grains, fruits, nuts and vegetables, corn, cottonseed, roots, grass and other edible substances.

An animal is a mechanism for using the energy which the plant gathers from the sun. When used for food it supplies nothing useful which was not derived from the plants on which the animal was fed, and as eaten by man, it is an incomplete food. Vegetable foods contain everything that animals need for their various bodily structures and when the food is eaten it is distributed to the several parts. The albuminous part goes to the brain and muscles, the oleaginous portion to the fat and the lime to the bones. So to get back from the animal all it received from the plant, it is necessary to eat the whole animal, bones and all. This the lion does, leaving only a few of the larger and more resisting bony structures, while the python swallows the rabbit whole. Flesh is not a complete food, and in recent times Chittenden and Fisher of Yale, Folin of Harvard, Sherman of Columbia, Zuntz of Berlin, Hindhede of Copenhagen, and numerous other eminent physiologists have shown by exhaustive and most conclusive experiments upon human beings that the flesh of animals cannot be freely used without great injury.

The excessive meat eating must be recognized as the cause of many and most formidable maladies, that the free use of meat lessens strength and endurance

endurance and shortens life, because it supplies the body with an excess of unusable and very harmful protein, an albuminous substance which readily undergoes putrefaction in the body as well as outside of it, and in so doing produces highly virulent and deadly poisons which are known to be the cause of Bright's disease, hardening of the arteries, so-called "biliousness," and premature old age. Almost without exception meat-eating animals are short lived. A meat-eating dog is old and rheumatic at ten years while the vegetarian donkey is still frisky at thirty. The elephant lives and works two centuries. The experienced hunter eats the game himself and feeds his trained dogs on their accustomed diet of porridge and biscuit. The famous fox hounds of the South get scarcely a taste of flesh. The Scotch shepherd dog eats brose, bannocks and potatoes like his master and is never allowed to develop the carnivorous appetite which might tempt him to devour the sheep instead of guarding them. That the moderate use of meat is consistent with average health and activity is admitted, but its free use is objectionable and dangerous, and there are abundant reasons, economic as well as hygienic, why its use should not be increased, but should be more and more restricted. The example of the whole German nation not only existing but exhibiting most astonishing efficiency on a meatless diet is a lesson in dietetics which the world will never forget. But this is no new idea; the old Greeks built their peerless empire on a meatless diet. The armies of the Caesars achieved their military victories on a ration of wheat. The fleetest and most enduring animals and men are sustained without meat. The mighty hunter, Roosevelt, wrote from East Africa that a horse with a heavy man on his back could run down a lion in a mile and a half. The famous bandit, Villa, has a body guard of Tarahumara Indians, the fleetest and most enduring men who live and whose diet is parched corn and beans.

These facts are presented not as an attack upon flesh foods but to place in a fair light, the superior claims of milk as a staple article of food.

Milk differs from meat and from every other food substance known in the fact that it is a complete food. If, in the case of adults it needs to be supplemented by other foodstuffs, cow's milk is for the young infant, when properly modified, a perfect food. It contains in excellent proportions, all the elements needed by the growing child. This is not true of any other substance known.

The fuel element is represented in milk by fat and sugar of milk. That fat is of a sort easily utilized by the body.

Why Milk Sours While Meat Putrefies.

The sugar of milk is a special product exactly adapted to the needs of the body, far superior to cane sugar and free from the unwholesome properties of the products of the sugar cane. It is found nowhere else in nature except in the milk of animals. Milk sugar is slowly digested and absorbed. This enables it to reach the lower intestine where it is converted into lactic acid and so prevents the putrefaction to which modern science has traced a great number of the maladies of both infants and adults.

It is due to the presence of lactose that milk sours while meat putrefies. Nearly ten years ago, I placed in a jar of buttermilk a raw beefsteak to which no antiseptic of any sort had been added. The beefsteak is still intact, thanks to the anti-putrefactive properties of milk sugar and the acid-forming bacteria it feeds. The reason for this anti-putrefactive property of milk was discovered by Kendall of Harvard, who a few years ago demonstrated that in the presence of sugar even highly active putrefactive organisms produce harmless acids instead of noxious toxins and ferments. This is certainly a most beneficent provision of nature whereby the normal food

of the young infant is kept in a wholesome state while undergoing the processes of digestion and absorption in the intestine.

In the casein of milk is found material for growth and repair, and in a form favorable for prompt and complete digestion and assimilation. There are also other proteins in milk which serve the same purpose.

MILK RICH IN SALTS.

Cow's milk is very rich in salts, containing four times as much of these mineral elements as does mother's milk. Milk is particularly rich in lime. A pint of milk contains 11 to 16 grains of lime, more than is found in a pint of lime water. Note the contrast in this regard between milk and beefsteak, or flesh food of any sort. Meat supplies only half a grain of lime to the pound, although containing twice as large an amount of solids as does milk. The reason for this is obvious. Milk is a substance provided by Nature as an exclusive food for a growing animal, and so must furnish lime for the bones as well as protein for the muscles. Meat represents only some remnants of the original foodstuffs.

Kind Nature has supplied us in milk with bones, muscles, brains, nerves, every bodily structure in solution, and in attractive form, a most delectable and tempting nutrient unsurpassed by the daintiest products of the culinary art, or any achievement of chemical knowledge and skill.

Milk Rich in Vitamines.

Another notable quality of milk is its richness in vitamins. In this respect also milk is unique and superior to all other foodstuffs. Of ordinary foodstuffs each provides its own sort of vitamins. These remarkable and magic working substances are, according to Funk, the discoverer, produced only by vegetables. Each plant produces its own sort of vitamins. The vitamins of milk are not produced by the cow, but only collected by her. As she browses about the pasture and selects the various sorts of grasses, twigs, leaves and stems which suit her needs and with them gathers a fine assortment of cell stimulating life-saving vitamins which are borne by the glistening streams which pour from her udder and impart to this wonderful foodstuff a potency as a body building agent possessed by no other known substance.

It should be mentioned right here, however, that these remarks are true only of clean cow's milk as it flows from the original fount, and do not hold for milk which has been boiled or pasteurized, or doped with alkalies, which several processes destroy the precious vitamins and deprive the milk of one of its most unique and valuable properties.

Milk a Live Food.

But there is something more to be said of the food properties of this fascinatingly interesting product of maternal providence. Milk is a live food. Of course it is not alive in just the sense in which a growing animal or a plant is alive, but still it possesses certain properties which are peculiar to living things, and which serve the body in a most remarkable manner.

The Digestive Ferments of Milk.

Milk contains certain digestive enzymes or ferments, galactose, oxidase, and reductase which aid the processes of digestion. It is important to note, however, that this is true only of fresh milk which has not been sterilized by boiling. These useful ferments, like the subtle

vitamines, are destroyed by heat. This may be easily shown by a simple experiment known as Storch's test for heated (boiled) milk. Shake five c.c. of the milk in a test tube with one drop of 2 per cent. hydrogen peroxide and two drops of 2 per cent. sol. paraphenalcine-diamin. If the milk has not been heated, a dark violet color appears at once, but if it has been pasteurized or boiled, no color appears.

The Antitoxins of Milk.

There still remains a final word to be said about the wonderful properties of fresh cow's milk. Milk is a sort of fluid tissue and like other tissues is prepared from the blood; hence it is not surprising that the profound scientific study to which this remarkable food substance has been subjected within recent years has brought to light the fact that milk possesses some of the properties of the living blood from which it is produced. While still warm with animal heat, freshly drawn milk, like the blood, possesses the power to combat and destroy germs. Milk contains various anti-bodies which are found in the blood, agglutinins, antitoxins and opsonins. It must be admitted that these last named elements of milk have been so recently discovered that their relation and value to human life and health are not yet fully understood. It cannot be doubted, however, that future researches will show their function to be important, and there is ground for believing that they may play a part of some consequence in preparing and maintaining the defenses of the body against disease.

Now that we are prepared to appreciate the superior value of milk as a foodstuff, let us consider some of the practical questions relating to the dietetics of milk. In order that milk shall fill the important place as a nutrient which its natural properties render possible, it is essential that certain conditions respecting its use should be complied with.

Injurious Effects of the Sterilizing or Pasteurizing of Milk.

1. Milk should be alive, or at least uncooked. Pasteurizing, that is, heating to a temperature of 158 degrees Fahrenheit, destroys the anti-bodies of milk. When the milk is heated to a temperature of 176 degrees Fahrenheit the digestive ferments which it contains are destroyed. The boiling of milk modifies in a harmful way nearly all its ingredients and considerably reduces its nutritive value. Rats fed on boiled milk grow to only half their normal size. Scurvy sooner or later appears in babies exclusively fed on pasteurized or boiled milk. The subtle alchemy by which milk is prepared in the laboratory of Nature is upset by the crude process of cooking. Boiled milk will sustain the life of rats but it will not enable them to grow to full development, and reproduction fails altogether. Science is teaching us every day that the fine adjustments and adaptations of nature cannot be safely ignored. We are gradually learning through the loss of millions of lives which have perished through our ignorance, that the foodstuffs which nature designed for our use are not the haphazard products of wild and incoherent forces but are wrought out by a subtle and infinite wisdom which fits them to our needs so perfectly as to transcend our highest knowledge and defy the profoundest analysis.

Who's Your Milkman?

Another defect of the pasteurizing process is found in the fact that it is not absolutely certain. In order that every disease-producing germ shall be destroyed, it is necessary that every drop of milk should be subjected for a sufficient length of time to a temperature sufficiently high to make sure that the germ is destroyed. That this is true of all pasteurized milk is certainly not the case. In fact, more than one case has been reported in which tuberculous disease has been communicated by pasteurized milk. The writer has recently received information concerning a herd of registered cattle in which the United States Government inspectors

found a calf suffering from tuberculosis, although it looked to be a picture of health. When killed, however, it was found to be suffering from tuberculosis of the intestine. This herd is tested regularly every six months by the United States Government and it was not supposed possible that tubercular infection could occur but on inquiry it was found that, on account of the great demand for certified milk which this dairy produced exclusively, some pasteurized milk had been purchased for feeding calves. This milk was pasteurized twice and it was supposed to be absolutely safe but evidently a sufficient number of tubercle germs survived to produce infection and the owner narrowly escaped the infection and the destruction of an entire herd.

Another matter of much significance which must be borne in mind in relation to pasteurized milk is the rather surprising fact that, if not handled with very great care, pasteurized milk is likely to develop within a short time more bacteria and bacteria of a dangerous type than are found in ordinary raw milk. The reason for this is that most of the bacteria found in ordinary raw milk are of the acid-forming sort, that is, they are of the kind that are commonly known as buttermilk or sour milk germs, so-called friendly protective germs. So long as these bacteria are dominant, the growth of putrefactive germs in the milk is prevented. These acid-forming germs are destroyed by the pasteurizing process but the spore-forming putrefactive organisms are not destroyed and hence grow with greater facility in milk which has been pasteurized than in milk which has not been pasteurized.

It is evident that pasteurization does not solve the milk problem. When scientifically done, pasteurization does mitigate some of the evils associated with unclean milk but the only true solution for the problem is clean milk.

Man has been defined as a "cooking animal" and for ages the culinary art has been highly cultivated and made the means not only of utility but of harmful luxury. Through modern scientific research, we are coming to know that notwithstanding its great service to the human race, the art of cookery has associated with it many perils, one of the greatest of which, the most recently recognized, is the destruction of its vital elements which so modify the food as to greatly impair its nutrient value. The beasts of the forest, and to a large extent also the primitive savage, take their food directly from the hands of nature, unsophisticated and uninjured and as a result enjoy an immunity from disease and acquire a vigor and toughness of constitution which are unknown to civilized man. The chef of the future will display his finest talents, not in the compounding of complex combinations of foods with non-foods and poisons, into disease-producing entrees, ragouts and dyspepsia-breeding desserts, but in selecting and serving in wholesome and attractive ways the pure products of nature's great food laboratories-- the garden and the farm.

Milk, fresh from the bovine fount, with its rich store of vitamins and enzymes, with the finest quality of protein for brain and muscle building, salts to stiffen the bony framework and fats to brighten the vital fires of the body, is a natural product which not only is not improved by the art of cookery, but is actually damaged by it and rendered incapable of supplying in the highest degree these subtle elements which are, we now know, so essential to good nutrition.

Milk Must Be Clean.

The chief reason assigned for the pasteurizing or sterilizing of milk is the presence in the milk of large or small quantities of filth which should have been left in the stable or the barnyard. Combe and others have shown that the germs associated with this putrefying filth

are the most prolific source of diarrheas and other intestinal disorders which annually carry off so many thousands of infants during the summer months. These same putrefactive germs are likewise the cause of intestinal toxemia or autointoxication. Entering the body through the medium of milk, they take up their abode in the colon where they grow and multiply to the extent of hundreds of billions daily, producing poisons which are akin to the venoms of serpents, and which, when absorbed into the blood, give rise to an almost infinite number of distressing symptoms, and several crippling and even fatal maladies.

Clean milk obtained from clean cows kept in clean stables, collected in clean receptacles and distributed in clean vessels, is the choicest of all the infinite products of the laboratory of nature. Dirty milk, corrupted with gleanings from the dung heap, the chicken coop, the pig pen, and other sources of pollution, is a veritable poison cup, and is doubtless responsible for the loss of at least nine-tenths of the 300,000 infant lives which are every year sacrificed to ignorance and neglect.

Infection Due to Unclean Milk.

Milk must be free from the germs of disease. In addition to the common organisms which give rise to putrefaction and with which the milk becomes contaminated through careless dairy methods, milk may contain germs of various specific diseases such as tuberculosis, typhoid fever, diphtheria, scarlet fever, sore throat, Malta fever, maladies originally derived from human beings suffering from the above named disorders and with the germs of which the milk, by direct or indirect contact, becomes contaminated.

Milk may also communicate to human beings various disorders which originate in cattle, but which may be communicated to human beings by making use of the milk of sick animals, such as foot and mouth disease, and perhaps other maladies.

The public has been taught to place too much faith in sterilized or boiled milk. It is true that pasteurization or boiling of milk, destroys certain specific disease-producing organisms such as those of typhoid fever, tuberculosis and diphtheria, but these processes at the same time destroy certain highly essential, vital properties of milk, but as already pointed out, fail to destroy the spores of putrefactive organisms, which probably are, on the whole, the cause of far greater mischief and many more deaths than the organisms which give rise to tuberculosis, typhoid fever and other specific organisms. If left to itself, raw milk does not decay but sours. Boiled milk rots. The acid-forming organisms which find their way into the milk from the air thus exercise a protective influence, preventing the toxemia which results from intestinal putrefactions. When an infant is fed upon sterilized milk, the stools, which are naturally slightly acid, quickly become foul smelling through putrefaction and the infant is thus exposed to highly potent disease-producing influences against which it is protected when fed upon natural, clean milk. A temperature of 240 degrees for half an hour is required to destroy the spores of putrefactive germs and even such milk is likely to promote putrefactive processes in the intestine, especially in the case of young children. It is thus apparent that pasteurization and boiling of milk should be regarded only as makeshifts which mitigate to some degree the evils resulting from the use of milk contaminated with barnyard filth but are not by any means a substitute for clean natural milk.

As the public becomes better informed respecting the dangers and the causes of tuberculosis through the efforts of boards of health and anti-tuberculosis societies, the apprehension of danger from the use of milk is going to be greatly increased and this will naturally lead to

less consumption of milk and dairy products. The average citizen is daily becoming wiser in relation to foods and he is no longer willing to close his eyes and swallow without question whatever is presented to him.

The Greatest Obstacles in the Way of the Dairy Business.

In my opinion the greatest obstacle in the way of the dairy business in this and other civilized countries is the prejudice which in recent years has been developing in the public mind against the use of milk containing barnyard filth with the germs of barnyard and pest-house diseases. The chief opponents of the dairy business are the manufacturers of baby foods. Physicians are continually warning mothers to beware of the milk supply and the manufacturers of baby foods are waxing rich from the sale of wheat flour with various slight modifications at prices a hundred times the original cost and actual value. When dairymen are able to supply the public with clean milk, free from barnyard dirt and disease-producing germs, baby foods will disappear from the columns of the country newspaper and from the shelves of the corner drug store, and the consumption of milk will increase many fold.

The prejudice against commercial milk on account of the bacteria which it contains is certainly well founded, but the discrimination in favor of meat is most unfair. The truth is that the very worst milk to be found on the market is clean compared with the best sausage or the best prime beef. It is rare that anything is said about the bacteria of meat, and the reason seems to be that the facts are so appalling that the bacteriologists are afraid to let them out for fear the whole meat business will be destroyed. All meat which has been kept for a few days is simply alive with bacteria and not the innocent acid-forming germs found in milk which is a little stale, but the sort of germs that are found in a dead rat or the carcass of a dead calf rotting in a fence corner. Hamburger sausage

always contains from 3,000,000 to 10,000,000 or more bacteria to the cubic centimeter or ten to fifty times as many germs as the dirtiest milk allowed to be sold. All meats which have been kept long enough to be tender contain many times more bacteria and of a far worse sort than are found in milk. The same is true of salted and dried fish of all sorts. Eggs also are very likely to introduce bacteria in countless numbers and germs of a sort which produce acute bowel and other disorders. The United States Department of Agriculture states that when special care is taken it is possible to prepare canned eggs containing no more than 5,000,000 bacteria, including 100,000 colon bacilli, to the gram (cubic centimeter).

So milk, even at its worst, is far cleaner than meat and is more wholesome than eggs.

No disease has ever been traced to the free or excessive use of milk. The free use of meat and eggs is a recognized cause of grave disease.

Milk may be made in some cases, an exclusive article of diet, for weeks, not only without injury but with greatest profit. An exclusive meat diet is most injurious and hazardous, a real hardship and peril.

Popular Errors About Meat.

Another obstacle which needs to be overcome is the popular but wholly mistaken notion that meat is the most important of all staple foods, and that it is essential to good nutrition. This is a pernicious error which is one of the greatest causes of the disease and poverty rife among civilized people. The fact is that flesh food does not belong to the natural bill of fare of human beings. Man is a primate. The orang-utan, chimpanzee and gorilla are other members of the same biologic class. None of these are meat-eaters. The use of meat serves only to satisfy an acquired appetite and not a great physiologic need. Meat may be dropped from the human bill of fare not only with perfect safety, but with great advantage in lessening disease, increasing efficiency and endurance

and lengthening life. This has been definitely proven by the experiments of Chittenden and various other eminent physiologists. In the light of modern scientific inquiry, in other words, beefsteak, roast beef, chops and similar viands must be regarded as luxuries rather than necessities and as harmful and even dangerous luxuries if not used with great discrimination and moderation.

Milk, on the other hand, is biologic, safe - when clean - and a food which is both complete in itself and capable of serving a most useful complement of other foods.

How to Eat Milk.

Milk must be eaten, not swallowed as a beverage. It must be chewed. All foods must be masticated. The calf and the nursing infant chew the milk which they draw from the maternal font. The movements of the jaws and the sucking movements executed by an infant in nursing induce an abundant flow of saliva which mixing with the milk, properly dilutes it, and to a high degree promotes its digestion. Milk when swallowed rapidly as a beverage is likely to form in the stomach large and hard curds which are very slowly digested. Many persons who suffer from taking milk in this way imagine themselves to be unable to take milk and so abandon its use. The remedy is simple. Milk should be sipped slowly and with sucking movements of the throat or taken through a straw so as to secure a liberal admixture of saliva. By this means the formation of hard, indigestible curds may be prevented.

Milk must be taken in right quantities and in right combinations. It cannot be denied that milk digests better when taken by itself or in very simple combinations than when mixed with a large variety of other foodstuffs. In some instances, also, a large quantity of milk is more easily digestible than a small quantity. When the stomach produces a large amount of highly acid gastric juice as is usually the case with persons who have been accustomed to a hearty meat diet, the curds formed

when a small amount of milk is taken will be large and tough, whereas if a larger amount of milk is taken, the curds formed will be smaller and softer. Hence, the proper remedy in many cases in which a person complains that he cannot take milk, is to take more milk.

Milk and Meat Do Not Agree.

The taking of milk with meat is perhaps the worst of all dietetic combinations. The reason for this was made clear by Pawlow, the eminent St. Petersburg physiologist, who showed that meat requires a highly acid gastric juice for its digestion and that the stomach produces this sort of gastric juice when meat is lean, while milk demands a gastric juice low in acid. It is, of course, impossible for the stomach to make at the same time gastric juice suited for the digestion of meat and at the same time gastric juice suited for the digestion of milk. The interesting discovery of Pawlow perhaps explains the ancient prejudice against the use of milk and meat together embodied in the Hebrew law, forbidding the seething of the flesh of the calf in its mother's milk.

Milk Does Not Disagree with Fruits.

When milk is largely used as a nutrient, the balance of the diet should consist chiefly of fruits and vegetables for the reason that milk contains an excess of lime and is deficient in potash and soda which are necessary for perfect human nutrition. The last named elements are abundant in fruits and vegetables, particularly in the potato, which is also very rich in salts of potash. A diet consisting exclusively of milk and cereals is less satisfactory. Such a diet often gives rise to scurvy in infants. Cereals are deficient in the alkaline elements which are needed to neutralize the acid products developed in the body. The popular idea that milk and fruits do not agree is wholly based upon the observation that the acid juices of fruits when added to milk cause it to clot or curdle. This does no harm. The gastric juice is highly acid

and the milk always curdles at once after entering the stomach. If the milk is curdled by fruit juices it is less likely to form large tough curds in the stomach.

It is well to remember also in the use of milk, especially when it is freely taken, that one may easily by this means ingest an excess of fats. The milk of certain breeds of dairy cattle is exceedingly rich in fat. The use of such milk in some persons, and especially in infants and young children, gives rise to symptoms which are sometimes denominated as biliousness, but which are not directly connected with the liver, being due to putrefactive changes set up in the intestine by the presence of an excess of fat. Breeders of dairy cattle have labored to produce strains in milch cows which produce milk containing a large amount of fat because they are more profitable, but for table use, milk containing a smaller proportion of fat is much to be preferred. It may be on this account, suggested by Rosenau, that the milk produced by the Holstein cow is much better adapted to the human stomach than is that of breeds which produce a milk containing a larger proportion of butter-fats.

Modified Milk.

When employed in artificial feeding of infants and in some cases in the feeding of invalids, cow's milk must be especially modified. Ignorance of this fact and of the proper method of feeding milk is responsible for the deaths annually of a great multitude of artificially fed infants. Of the 2,500,000 infants born in the United States annually, not less than 250,000 die as the result of improper artificial feeding. The mortality of bottle-fed infants is more than four times that of breast-fed infants. Cow's milk differs very decidedly from mother's milk. It contains four times as much lime and three times as much protein and only about two-thirds as much sugar. Protein and fat are the elements of cow's milk which are the greatest source of trouble in the human infant. Each animal produces milk exactly adapted to its own young, calculated to

promote the development of its digestive organs in a normal way. The milk of the whale and the seal contains 50 per cent. of solids and an enormous proportion of fat which the young whale needs to protect it in the icy waters in which it lives. Cow's milk contains a large amount of protein and lime to support the rapid growth of the calf which attains puberty at the end of two years, about one-seventh of the time required for the human infant to reach the same stage of development.

Various formulas have been devised and recommended for the modification of cow's milk in artificial feeding. The most of these are more or less complicated. Recent experience has shown that a very simple method is much superior to the complicated measures which have been developed. It is only necessary to add two things, water and sugar, either milk sugar or malt sugar to render cow's milk suitable to the use of the very young infant; malt sugar is preferable because it is free from germs which are often found in milk sugar in great numbers and is much more easily assimilated.

A Person May Be Sensitized to Milk.

Another point to which attention should be called in the interest of both infants and invalids is the fact that certain persons become sensitized to milk as well as to other forms of protein, and to a person who is sensitized, even the smallest amount of milk gives rise to highly poisonous and even fatal symptoms. Many infants die annually from this cause. This fact should be borne in mind in changing the infant from the breast to bottle feeding. The milk should first be given in very small quantities, a teaspoonful in half a glass of water, the proportion being gradually increased until the proper dilution is reached. The same method should be pursued with individuals who have learned by experience that unpleasant symptoms are noted after the use of milk. The adult or infant who is sensitized to milk may be cured by the administration of milk in graduated proportions, beginning with extremely small doses. Such a case requires the personal care of an

experienced physician.

Medical Uses of Milk.

Milk is not only useful as a nutrient for healthy persons, but by proper management, may be made to play a highly important role as a curative agent.

The "milk cure" in one form or another has been practiced from the earliest times. It was known to the early Greeks and was recommended by Hippocrates several centuries before the Christian era. He especially commended milk as a remedy for phthisis and for gout. Hippocrates was perhaps the first to recommend the mixture of water with the milk (hydrogala) as a means of increasing its digestibility.

Aretaeus, a Greek physician, who wrote an extended treatise on acute and chronic diseases in the second century of our era, recommended as a remedy for phthisis the free use of milk directing that the milk should be prepared by the addition of a fourth part of water and boiling until the mixture was reduced to one-half its original bulk.

Galen highly commended milk as a remedy for various diseases and refined the method by requiring that the cow producing the milk should be fed upon certain special herbs.

The renowned Hoffmen in the sixteenth century recommended milk as an exclusive dietary and insisted that the "cure" should be long continued to obtain the best effects.

Sydenham and other eminent physicians of his time made large use of milk as a remedy.

Galen made use of cow's milk, of the goat and sheep, and even woman's milk. He especially recommended the milk of cows fed in pastures which abounded with lotus and polygoum. As the patient improved in health he was allowed to sail down the Tiber and use milk from the cows of Strabiae.

There is no better means of inducing a rapid gain in flesh than by liberal milk feeding. A patient may easily make a gain of a half pound to a pound a day by milk feeding and in favorable cases an even more rapid gain of flesh may be secured. Milk feeding has often failed, however, through neglect of one or more of the important principles which have been above outlined. To be successful as a fattening diet, milk must be taken regularly and in small amounts but in large aggregate quantity. The amount required per day is from an ounce to an ounce and a half per pound of body weight. A glassful of milk every half hour is the usual routine. Twice a day the patient should eat freely of fresh fruits and such fresh vegetables as lettuce or celery. The sugar of milk, which such a regimen supplies in large amount, finds its way into the colon, sets up there fermentation processes which give rise to an abundance of lactic acid by means of which putrefactive processes are prevented and thus the wild bacteria largely derived from meat and unclean milk are prevented from developing. The stools lose their foul odor and acquire the character of an infant's stool. The foul coat disappears from the tongue, and the unpleasant odor from the breath. The skin clears, the patient gains in flesh, and a state of high health rapidly replaces one of invalidism and disease.

Employed in this way, milk becomes a most effective means of combating many forms of neurasthenia and other chronic disorders accompanied by autointoxication and emaciation.

The Free Use of Milk the Remedy for Lime Starvation.

Again, the free use of milk is useful, almost necessary remedy for lime starvation which, according to Prof. Sherman of Columbia University, is coming to be almost universal in this country, and is doubtless largely responsible for the early decay of the teeth noted among American children. Medical examination has shown decay of the teeth in

95 per cent. of the children in our public schools. The body requires daily to make good its mineral losses 15 to 20 grains of lime and smaller amounts of associated minerals. The sugar, white bread, rice, meat potatoes, butter and other articles which constitute the staple food-stuffs of the national bill of fare contain less than a third of the required amount of lime. Wheat contains one-half grain of lime to the pound, potatoes and rice about the same amount. Cane sugar, molasses, butter and lard contain practically no lime at all. Milk, on the other hand, contains 11 to 16 grains of lime to the pint. Thus an ounce of milk contains as much lime as a pound of fine flour bread. Wheat bran is rich in lime, containing about the same percentage of lime as milk. It is evident then that the American people stand greatly in need of more milk and more bran to complete the national bill of fare. An extra pint of milk and three or four ounces of bran added to the daily bill of fare of the average American would in a few generations add two or three inches to the average height of the American people and would produce an immensely great gain in constitutional vigor and stamina.

The number of additional dairy cattle required to produce daily the additional 50,000,000 quarts of milk, my expert hearers will be better able to estimate than I can do. I merely drop the hint that the best way to promote the dairy business in this country is to first induce the American dairyman to produce clean milk, free from stable filth and disease from cows, and then to convince the American people that the readiest way in which they can escape becoming a toothless, boneless and spineless nation is by the increased consumption of milk.

Milk Ranks Highest of all Animal Foods from an Economic Standpoint.

Ten cents will buy in the form of milk more than twice as much food as in the form of beefsteak, nearly 10 times as much as in the form of oysters, and 3 times as much as is supplied by 10¢ worth of eggs, so that milk is really by far the cheapest of our ordinary animal foods.

When we consider the amount of tissue building material which may be produced on a given area of land, the economy of milk as a foodstuff becomes still more apparent. By a simple calculation it may be shown that the same area of land which in pasture will produce 40 pounds of beef protein per annum will produce 375 pounds of wheat protein and 400 pounds of milk protein.

Dean Henry in his monumental work "Feeds and Feeding", calls attention to the fact that the cow is a most remarkable mechanism for converting vegetable foodstuff into animal. According to Prof. Henry, 100 pounds of feed fed to a cow will produce more than 18 pounds of solid food in the form of milk (about 150 pounds of milk). The same 100 pounds of foodstuff fed to a steer will produce, according to Prof. Henry, only 2.8 pounds of food. In other words, the milch cow is six and one-half times as efficient as a food producer as is the steer.

In the year 1910 the 21,800,000 milch cows of the United States produced an average each of 3,663 pounds of milk, having a food value of 1,200,000 calories. The same food fed to a steer would produce only 200,000 to 300,000 food units, or less than one-fourth as much. It is evident then that if the farmer would double the number of his milch cows and raise fewer beeves, the result would be a great economic gain. A careful computation shows that an exchange of half the 47,000,000 cattle other than milch cows for milk producers would supply food for 25,000,000 people without any additional outlay for raw food material.

The future is certainly with the milk producers. As the population increases, the necessity for economic farming will increase. Meat is rising in price and will continue to rise. The opportunity of the milk producers is now at hand. The dairyman must be educated to apply scientific methods so that he can supply a clean wholesome product. The public must be educated respecting the great advantages of milk

as an article of food.

The present is a most opportune time for a vigorous campaign of education, the results of which will bring to every conscientious and scientific milk producer an ample reward for his foresight and his enterprising efforts.

To accomplish this I understand to be the purpose of this association, and I wish you God speed in your beneficent work.