LECTURE TO SENIOR MEDICAL STUDENTS.

By J. H. Kellogg, M.D.

April 4, 1904.

Pneumonia.

I think we were discussing Dr. Senn's prescription for pneumonia. Thirty grains of quinin; a couple hours afterwards thirty grains of quinin, or strychnia, or digitalis, so as to strengthen the heart against the extra labor it has to do; also saline injections. We doubted whether there was any value in salt. Since the session yesterday I have consulted Prof. Harris on the chemical question we were talking about, and he convinced me that water is decomposed in the operation of hydration. I think somebody contended that the water must be decomposed in the tube, but did not give a good reason for it. The reason Dr. Harris gave I saw in a moment was correct, was that water can not enter into combination with anything, because it is a saturated molecule H_2O. The hydrogen has nothing to hang on by, nothing for oxygen to hang on by unless the water and the hydrogen are held together. The hydrogen and oxygen have no further power of combination except by decomposing the molecule of water. The water does not remain as water, but there seems to be some kind of a change that takes place, and the question might arise whether that sort of change might not take place inside of the molecule without any evolution of energy. Probably it does. One can hardly imagine that there would be any giving off of weight or energy, as there would not be any loss of heat or lowering of the temperature. I have never seen any evidence. There is no reason why there should be because there is no

energy taken in from the medium, and none given out to the medium, because the whole thing takes place within the molecule. It is simply a rearrangement. I think that water and oxygen should be regarded as exceptions to the general law, because they are essential to the manifestation of life. Water is a vehicle, and enters into the combination of all the elements of all the tissues of the body. Water is a neutral substance, however, quite different from other chemical compounds, which seems to be peculiar. Hydrogen occupies a peculiar relation in the list of elements.

We were talking about pneumonia. Let us look at the positive side of it a little bit. Dr. Senn's idea was that the patient suffering from pneumonia ought to be fortified against the evil day that is coming. That is correct. Is there anything we can do to fortify the patient, right at the beginning of the pneumonia, now? How would the wet hand rub be beneficial? The patient has a hard chill, and there is intense congestion, there is coughing, and irritation of the blood. If you should give such a patient a wet hand rub, or a wet towel rub, or mitten friction, what do you think would be the effect on the symptoms? He would feel better when you got through. At first it would increase the congestion. Is there anything better? Some hot treatment as fomentations to the lungs, or the leg pack would would be first rate. A wet sheet pack, fomentation to the back, and cold to the chest would be first rate. Any of those things or all of them would relieve the patient. It would be well, however, if you are going to give the patient cold mitten friction,--how would it do to put a hot fomentation over his chest? He is coughing; what would be the effect of that fomentation over the chest? What is the physiological effect of a fomen-

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tation over the chest? What will that fomentation do? It will divert some of the blood to the surface. What portion of the pulmonary tissues will be influenced in that way? What portion of the lung tissue would be influenced in ~~the~~ a derivative way, the derivative effect? —The internal branches, the pleural branches of the artery, the internal mammary. When you put a hot application on the chest that produces hyperemia of the skin. What would that be in relation to the pleura? When you dilate one branch of the artery, what do you call that? Collateral hyperemia? When we put a fomentation on the chest we have collateral anemia. What effect does it have on the lung itself? The reflexing has dilated the arteries of the lung, and what good would that do? Would there be any good of that. If you dilate the blood vessels, what is the effect upon the blood? It slows the current. Would not that tend to increase the stasis? It would not be a good thing to keep it on indefinitely. Is there any immediate good that you can see would come from the hot application? It encourages leukocytosis by slowing the blood stream. That would be good. Is there any other good? What is one of the things that is most distressing to a person suffering from pneumonia? Coughing, and pain. Is there anything else? Dyspnea, cough, and pain. What influence does a hot fomentation to the lung have on these things? It relieves the pain. How?

It is worth while to give careful note to this discussion because we are getting into the very heart of hydrotherapy in this thing. One ~~evil~~ evil thing is it increases the amount of blood in the lung. The lung has too much blood in it already; it further increases it, and dilated the vessels

which are already congested and dilated, and it slows the blood current; but the blood current is already slow, and it increases that stasis; but there is one good that comes out of it, and that is, leukocytosis. You see it relieves pain. Tell us how it relieves pain when it increases the amount of blood. How can it relieve pain? When you have pneumonia down in the center of the lung there is not much pain about it; so the pain is in the pleura, and it relieves that by means of the derivative effect. The question is, Is there any more good? However, it would not relieve the pain of the visceral pleura, would it? The application of fomentations to the chest would not relieve this pain by derivative action, because the circulation of the lung itself, as has already been stated to us, is not connected with the chest wall; so there is no chance for relief that way.

The reason why the constriction which follows a hot application made to the surface is beneficial, is that while the surface effect is that of extreme heat, the blood going below quickly carries the heat away and lowers the temperature, so that in a very short time the nerves are tired out, and the depressant effect of heat steps. There is no explanation for it. It is the inhibitory effect of heat. That operates reflexly. Here is a force that comes in that only very recently has been brought out by a German investigator; but it completes the picture, completes the philosophy in a very admirable way. There may be something more in the hypothesis as yet, but I think clinical experience proves it,--heat has a reflex inhibitory effect. It inhibits pain in the viscus as well as in the chest wall. The direct effect of heat is exciting. Apply heat

directly to a nerve, and it excites that nerve; but apply cold, and it lessens the excitation of the nerve. Apply heat directly to a muscle, and it excites the muscle.

The other day, one of our little girls at the Haskell Home had cramps of the hands and feet. The nurse put her into a hot blanket pack, and it increased the pain at once, it was very much worse. The nurse took her out and put her into a cold wet sheet pack, and the pain was immediately relieved. That was the opposite of what we might expect. In that case the temperature was already high, 104 or105, and the hot application raised the temperature a degree, and excited the muscles still further. The muscles were already excited by the high temperature of the blood; but the cooling off gave immediate relief.

While heat is directly exciting, it is indirectly, or reflexly inhibitory. The direct application of cold to the tissues, to the cellfiber, or muscle, or nerve, is directly sedative; reflexly cold is exciting. See how that operates. If you make a cold application to the chest, what is the immediate effect? Suppose you go right into real cold water in the early summer, before the weather gets warmed up, and as you walk into the water, you remember it increases the breath movement. You can not help it, it is absolutely impossible to help it. It is the excitatory effect of the cold. Heat has exactly the opposite effect. So here is a patient panting for breath, breathing very rapidly; put on a hot application, and that dyspnea is at once relieved to a remarkable degree, and the inflammation is relieved because the irritability of the nerves which are excited and which are reflexly inducing the irritability, is lessened through the inhibitory effect of heat.

irritability, is lessened through the inhibitory effect of heat. The pain is relieved in just the same way. It reflexly inhibits all these things.

Now let us have the other side of it. The tension upon the nerves and tissues of a boil is lessened, and the vessels of the boil are reduced because the size of the adjacent blood vessels is increased. There is no increased amount of blood flowing to the skin; so if we spread the blood out more there will be less in the boil. In the lung, it is shut up in a box. If we could increase the movement of the blood in the lungs by dilating the vessels, the air cells will be diminished in size, and the tension upon the nerves of the lungs would be increased. The tissues would be just like a boil swelling up and getting larger. There is almost an anesthetic effect.

There are always two antagonistic things happening in hydrotherapy. When you apply cold, there is a reflex effect, and a local effect. When you apply heat, there is a direct and an indirect effect, and they are opposites. There are untoward effects. It is just as important to understand the untoward effects, the objectionable effects of the applications as it is to understand the favorable effects; then to understand how to avoid those unfavorable effects. As we proceed this will all straighten out. If you apply cold to the chest, it will set the chest heaving, whether you need air or not. Excessive heat will set you to panting. Suppose we increase the amount of heat in this room until the heat is very high, until we produce panting, a panting respiration; but if you put a cold application on the chest it will excite the respiratory

centers. If you put a hot application on the chest it has the opposite effect. Suppose we go on and continue with the hot application for half an hour, or for a long time; very soon the very opposite effect will result. Why? The fomentations you put on relieve the sense of dyspnea. The fomentation you put on the chest relieves the sense of dyspnea, or want of air; it relieves it by inhibiting the respiratory center. If you continue that application for some little time, the effect will be the accumulation of CO_2 in the blood to such a degree that there will come a sense of suffocation; the patient will begin to suffer for want of oxygen, and the hot application would be damaging then because all this sense of dyspnea the patient has is a necessary, helpful thing that causes you to breathe deeply so as to make up by deeper inspirations for the small amount of respiratory area. In order to get his blood purified by the operation of oxygen upon the small area, he must breathe deeper, and breathe more frequently. That is right, isn't it? So the sense of dyspnea is beneficial; it is necessary. The patient's respiratory area is diminished; so he begins to breathe deeper. Sometimes the symptoms are aggravated, and the patient suffers greatly for want of breath; the fomentation is comfortable, and relieves the pain and the dyspnea. It relieves the sense of dyspnea for a moment. Apply cold, and it increases the respiration right away. Put on heat, and it lessens dyspnea, and the disposition to breathe deeper. The dyspnea that he has is beneficial to him; also the cough, unless it is excessive. The cough may be in excess of his requirements. Just as the patient vomits out everything he has got in his stomach, he keeps right on retching. It is a

good thing to stop that vomiting although the vomiting is beneficial; but it is in excess. So the dyspnea may be in excess. We do not know whether it is in excess or not; we can not tell for sure about it; but still if the patient has extreme distress, and is very distressed from the dyspnea, and his lips were red and not blue, and he was evidently getting air enough, we might know that was simply from excitability and excessive reflexes, excitability of the respiratory centers which are excited more than necessary. The fomentation is a good regulator. It will relieve that. Keep it on a longer time, and the veins of the blood would become over-saturated with CO_2, and the patient damaged by it. So leukocytosis is a good thing, but if we keep the fomentation on too long a time, the stasis will become so great that the white cells will have entered the tissues as far as they can, and the remedial process which can be carried on in the lung by the blood will come to an end; so it is important that there should be a new supply of blood, and the blood must move on so that the beneficial effects will not come to an end.

There is one more good effect. What is the effect of diminishing the respiratory area in the lung, what is the effect of that upon the heart? What is the effect of an exudate upon the heart? A portion of the respiratory area is cut off by the exudate, so the vessels are compressed in such a way that the blood can not circulate through them. What is the effect upon the heart? It increases the work of the heart. What part of the heart? It is the work of the right ventricle that is increased. What would be the natural effect of dilating the vessels of the lung? What would be the effect upon the heart?

It would make it easier for the right heart; it would diminish the work of the right heart anyhow. The left heart can take care of itself in pneumonia, but the right heart may have it harder.

To sum up the good effects and the ill effects of fomentations to the chest:

The good effects: Increases our leukocytosis; lessens the work of the right heart; diminishes pain, dyspnea, and coughing. There are five good effects, then, aren't there? It is a good thing for the patient to have a little rest if he is panting for breath and in great distress. The other day I was called to see a patient suffering from pneumonia, who was breathing 75 times a minute. He was awfully tired, and the fomentation give such great relief that the patient wanted the fomentation all the while.

To sum up the evil effects: Stasis; lessing the dyspnea; the effect on the respiratory center that is bad if it is too long continued; a fomentation continued for a long time would do harm instead of good.

There are several bad effects from stasis. The oxygen of the blood would become exhausted so that the tissues would become asphyxiated. The white cells thus would become asphyxiated; the toxins which are generated by the microbes will accumulate because the movement of the blood will not wash the tissues, and the natural tissue toxins will accumulate also. The bacterial toxins and the tissue toxins would accumulate, CO_2 would accumulate, and thus the resistance will be diminished. The fighting power will be lessened. All that comes from stasis. If the arteries are dilated so that the

blood passes quickly into the veins, more readily than before, there would be less pressure. The vessels are dilated reflexly. There is no obstruction. It is only slowed in the small ~~veins~~ vessels. It encourages the circulatio through the lungs, lessens the work in the right heart, and it is beneficial in that regard.

If there was just as much blood circulating through, there ought to be just as much toxins carried off. Remember this one thing, that there is a peripheral movement, or contraction of the vessels necessary for the movement of the blood ~~through~~ toward the peripheral vessels. If the vessels are dilated, we lose the peripheral contraction of the peripheral heart by which the blood is carried forward; and on the whole we know that these prolonged applications result in an accumulation of the blood in the heart. The CO_2 is greatly accumulated.

Can you see any other evil that comes from this prolonged fomentation on the chest? The most serious consequence that comes id the depressing effect upon the heart. These other things are minor; but the most serious thing is the depressing effect upon the heart.

The good effects: Increase of leukocytosis; relieves the right heart; lessens the pain; cough, and lessens dyspnea.

The evil effects: passive congestion; inhibitory effect upon the respiration (diminished respiratory action).

How can we get the good effects without the bad? When we apply a hot application, there is a good effect and a bad effect; and when we apply cold there is a good effect and a bad effect. We want to know how to get the good effect without the bad effect. Apply a fomentation for three minutes and the

patient feels better; but go on for ten, or even twenty minutes, and the patient is worse; so we make it a rule in pneumonia to apply fomentations very short and very hot, just as hot as the patient can bear; that causes [illegible] something of an exciting and a stimulating effect of cold, a certain amount of tonic effect; so apply very hot fomentation, just as hot as the patient can bear it. To avoid the bad effect put an ice bag over the heart, and put an fomentation over the chest while leaving the ice bag on the heart. Then five to ten minutes is as long as we ever ought to apply a fomentation to the chest for pneumonia. If we do that, we will get all the beneficial effects and none of the bad effects; and then follow this fomentation immediately by a cold application wrung out of water at 60°. That will give prompt relief. We must remember that when the right lung is affected, both lungs are sick, and the application should not be confined to the place where the pain is, but the application must be made to the whole chest, no matter whether it is the right or the left lung; it does not make any difference; the application should be made to the whole chest.

Another point: In order to get the best derivative effect upon the lung, itself, where would you make that application? I think it is better to say back than spine, for the reason that when you say application to the spine, the nurse is very apt to give a little narrow fomentation, to apply it right down the center of the back. But it is the large muscular masses on either side, and the large nerve trunks which are disturbed; so whenever you make an application to the spine you

do not get much from that. There are only just a few nerves in that narrow region, almost no muscles, and very little skin; so we want to spread it out and make a fomentation over the whole back. It should be a fomentation to the back in every case; I do not know any exception to it at all. When you make an application to the back with a spine bag, the heat spreads out on either side to a small extent. These applications must be made to the back so your fomentations must be made over the whole back, and followed by a heating compress, and in pneumonia, when a patient has a fomentation, put it clear around. Then when you take the fomentation off, put on a heating compress on the back; that is you put on a chest pack, but in two parts; one for the back and the other for the front. Then every twenty minutes open up the front and put on a new one; but now leave the one on the back undisturbed until the next fomentation That gives you a heating compress for the back which continues the effect of the fomentation, and a constantly renewed cold compress to the chest, which is allowed to warm up every time before you take it off. Why do you allow it to warm up every time before you change it? The same thing happens to the lung; it also renews the sensibility of the thermal nerves; but we depend upon the compress upon the back for the derivative effect of the fomentation. Take a patient at the very start with pneumonia, begin right off at the beginning by that means, and see what you are accomplishing. In the first place, we are doing all we can to relieve the patient's pain and discomfort so he does not have to have opium; in the next place we are doing all that can be done to relieve the congestion of the lung by the continuous derivative effect upon the back by the derivative effect from the fomentation

the derivative effect from the fomentation every two or three hours, and the cold compress to the chest which is constantly renewed, increases the heart tone, tones the heart up to the extra work that is going to be required of it. The cold to the heart is a physiologic stimulus. It always beats with more vigor in cold weather. It acts in a physiologic way; hence do not exhaust the heart. Suppose you keep on giving digitalis for six weeks, what would be the effect of that? The heart does not become more and more sensitive to digitalis. It rapidly acquires intolerance. That shows that it is pernicious. Make a cold application to the heart, and it increases the vigor of its contraction. Does the next application have less effect than the first one? What is the effect? It has an increased effect. The heart is gradually trained so that it responds more readily. Give a man a cold bath, and he does not react very well. Suppose you keep on giving him cold baths every day for a year. What would be the effect? At the end of the year he looks better. The skin reacts better, and better, and better, as it is trained. The heart reaction depends upon the skin. It is for the very same reason that the general reaction is improved by practice; and for that very same reason the heart action is improved by practice. That is a matter of tremendous importance, because it shows you the difference between the physiologic method and the pathologic method.

Suppose a man says to you, when his boy has a peculiar kind of eruption, and you tell him the boy has measles, he says to you, "How do you know that?" You say, I have seen it; I know it by observation; I have seen a boy have measles. You have observed that thing in a number of cases. So you have

to say the same thing withreference to cold. You can not prove it by any theoretical considerations, but you have to prove it by actual experience. That is the thing to be observed. The one thousandth time you put the cold applicatiom on, over the heart, the heart responds better than it does the first time. Another thing about it is that the response is instantaneous. Put on a cold application over the heart, and the heart responds right away, as quick as lightning. The response is immediate. Well, with digitalis you do not know when it is going to get around to produce its effect. It may not do it at all, and then all of a sudden, there will come a tremendous cumulative effect.

Is there anything else that will be good in pneumonia? The hip and leg pack, by producing a derivative effect, is a splendid thing. This is one of the most effectual applications I know of. We had a patient up in the ward last night who had a temperature of 102.8. The patient was operated on last Wednesday; perhaps you will recall it; it was a case of cervical perineal. The patient had a rise of temperature two days after the operation. I began to get worried, but from a careful examinatiom of the wound I could not see anything; nm that was going wrong there; but yesterday I became satisfied that the patient was having bronchial pneumonia. We had been giving her hot leg packs, but this morning the temperature was down to 99. The condition was being controlled, and the patient is going to get along all right. The temperature was 101 day before yesterday. That is the way catarrhal pneumonia comes on in these cases. It creeps up a little more each day until it becomes very serious; but I think she will be all

right after today. The effect of the hot hip and leg pack has been very marked in her case.

Another thing with reference to pneumonia. The hot hip and leg pack, of the heating compress to the back and chest, cold compress every twenty minutes to the front of the chest, and the fomentation every two or three hours--really these comprise the most important things to be done in pneumonia. Water drinking is very important; also a large enema twice a day to encourage the elimination of toxins. The use of fruit juice I think is very important to encourage the alkalinity of the blood; a fruit diet--starvation, a fruit diet amounts to a practical pleasant starvation. The quickest way to increase the alkalinity of the blood is absolute starvation. A fruit diet is the next thing to it; so that is a good plan. To what are the acid elements of the blood due which diminish the alkalinity of the blood? To what are they due? To the imperfect oxidation of nitrogenous waste matters. Does the imperfect oxidation of carbohydrates diminish the alkalinity of the blood? If we cut out the nitrogenous matters from the dietary, giving the patient practically nothing but carbohydrates, as when we give a fruit diet, we have done the best thing that can possibly be done to increase the alkalinity of the blood. These are really practical things that are useful to know. It is a most beautiful thing, and the deeper you go into physiology, physiologic chemistry, bacteriology, pathology--the deeper you go the more beautiful all this appears. We have been working on for forty years what Priessnitz began to work with one hundred years ago; and the more we work

on these principles, the more clearly they stand out, and the more beautiful they are, and we see how they guide us in the right way.

There is Dr. Senn who gave a prescription for pneumonia that is simply awful. One who would write such a prescription you might say, belonged to the middle ages. The only improvement I could see, was that he injected something instead of taking something out. He injected a salt solution instead of taking blood out of the manb limb.

There is another thing that is very valuable in these cases, and that is the wet sheet pack. Did you ever hear of bleeding in pneumonia? I was reading in a medical journal the other day of a doctor who prescribed bleeding as a very important thin g, as very necessary in pheumonia, and you find in nearly all the text books a report of bleeding as a great thing in pneumonia. Twenty years ago when they were endeavoring to turn me out of the county medical society, one of the charges the doctors brought in against me was the fact that I used cold in the treatment of pneumonia. At the same meeting a doctor said that a man who would not bleed a patient in pneumonia should be prosecuted for malpractice. I believe in bleeding in pneumonia, but I think it is better to bleed a patient into his own blood vessels. It is a great deal easier to bleed a patient into his veins than it is to bleed him into a pint cup. You do not have to cut anything, and you save the blood. Here is a man who has pneumonia. He has great difficulty in respiration, his lips are blue, there is great dyspnea, coughing, great distress, and pain. Draw off a pint of blood and the

patient is completely relieved at once, and we say, "Isn't that marvelous?" but in half an hour he is just as bad as he was before, and in a short time he would be likely to be worse. How long can you keep on bleeding him? It would at take very long to bleed him to death. That is what they did with George Washington, the "Father of his country." He was bled to death. He was killed. His resistance was lowered to such a degree that he had no leukocytosis left with which to fight the diphtheria germs he had in his throat. He had croup, diphtheria.

I had a very interesting case a number of years ago. I had a pneumonia patient; when I was called I found him in the very worst stage of the disease. The patient had heart disease and pneumonia, and was pregnant, and I tell you it was the worst kind of a case. Dr. Lindsay had the case about three o'clock in the morning. She was apparently dying,--just panting for breath; her limbs were swollen up, her hands were swollen, and her face was swollen, and she looked as though she would certainly die; her lips were as blue as indigo. I got a pair of forceps, and succeeded in placing the forceps on the head, and extracted the child as rapidly as possible. Quite a hemorrhage followed, and the patient was completely relieved. But in an hour we were working with might and main to save that woman's life. All the symptoms had returned, and we had an awfully hard time; but we succeeded in saving both mother and child, though without hydrotherapy we could not have done it. If a doctor had come a couple of hours afterwards and had not known anything about that case, and thought she needed bleeding, he might have taken away a couple of pints more of blood.

In this hot hip and leg pack we have a means of bleeding the patient into the skin. The skin will hold two-thirds of all the blood in the body. If a patient gets into a congested state so that he whole lung is involved, there is a place for a hot blanket pack followed by a wet sheet pack; in that way you draw the blood into the skin. You get the tonic effect of the cold, and have the inhibitory effect of heat for a couple of minutes--never longer than three to five minutes. By the wet sheet pack you have the derivative effect, drawing the blood into the skin. Keep the patient in that way until the patient perspires and you induce a crisis. The sweating pack should neverbe omitted on the fourth, fifth and sixth days in pneumonia. Begin on the second or third day. I think it is a good thing to give it every single day, because whatever good you can get from a pack to the lungs you can get from a pack to the whole body.

When you give a hot hip and leg pack, follow it up by heating compresses to each leg. It is also well to apply a heating compress to the abdomen. To relieve the congestion of the lung, you have a permanent compress on each lung, one to the abdomen, another to the back; and so you may use the arms also. In some desperate cases I have had heating compresses to the arms, legs, trunk, back, and a cold application on the chest. You say the patient wald be tired to be fussed over so much; but the patient gets such great relief and comfort that they will beg to have on the applications repeatedly. All these wet cloths must be covered with mackintosh and well covered with flannel afterwards, so that there will be no chilling by evaporation. There must not be ne single chilled spot.

I must tell you something of this patient in the ward who has pneumonia. When I called to see her the other day I noticed that the compress, the pack to the chest was loosend around the neck. I could look right down through and see that compress on the shoulder. I tucked my finger in and it was cold. That chest pack did not do a bit of good. It is necessary that it should be drawn tight around the neck so there will be no evaporation. The nurse neglected to put the mackintosh on, so that there should be no possible chilling of the skin. The chest pack does no good unless it warms up quickly. In pneumonia, we must always have a mackintosh over it, so that there will be no chilling by evaporation.

I think the best way to wrap the limbs is to have about three thicknesses of cheesecloth in the form of a roller bandage, wrung out of cold water quite dry, then wrap around the legs so it is tight, and then cover with mackintosh about an inch wider. Say have one four inches wide, and the other five. When youapply that, that makes it snug and tight; when youapply it otherwise than with a roller, it does not fit the leg very well. The flannel bandage is a good thing too, but there is so much space for air. Stockings generally are not long enough to come clear to the hip. You want to use every inch of skin you can cover to get the proper derivative effects. When you apply fomentations, or other hot applications it is very seldom that you do not want to follow the fomentation up with the heating compress. Almost always the heating compress follows it.

I found a case a couple of days ago where the patient

said, "The legs do not warm up, I can not bear the heating compress, I do not like it." So I instructed the nurse, instead of using the heating compress, to thoroughly rub the legs with a towel wrung out of cold water, and then put on a dry cheesecloth roller bandage such as I have described, and to follow that with a mackintosh roller, and that with flannel rollers; and yesterday when I called to see the patient she told me her limbs had kept perfectly warm, and that the effect was most excellent, and gave great relief. You see there is a little moisture on the skin already, and the skin will perspire all the more underneath the mackintosh, and the perspiration will soon moisten the bandage, and it will be kept moist, and warm up right away.

The fomentation should be put on very hot and kept very hot. If it is put on rightly, a dry flannel put on first, the heat will gradually penetrate through.

The compress after fever.

What are the germs of catarrhal pneumonia? Why do we use the chest pack, the heating compress after the operation? Staphylococcus and streptococcus are always present. Simply lowering the vital resistance will induce pneumonia. The effect of an anesthetic is always to lower the resistance. The patient is asphyxiated, and all the time the toxins of the body are accumulating, because the kidneys and liver are overwhelmed with the ether; all the tissues are poisoned; the tissue resistance is very low. After an operation, after ether has been administered, or any anesthetic, the patient is in a condition to contract pneumonia very readily, isn't he? To increase

the tendency to catarrhal pneumonia is the effect of local irritation. Ether is a powerful irritant, so there is direct local irritation, traumatism I might almost say. There is a particular lowering of the resistance from the irritation of the ether, so every patient who has anesthetic is extremely liable to catarrhal pneumonia. Now if you have a method of treatment which is capable of curing catarrhal pneumonia, or of assisting the patient to recovery when he patent has got the disease in full blast, is it not reasnable to suppose that if you apply that before he gets the catarrhal pneumonia it will be better than after the disease is in full blast? In the case of the fire department,--if they are told that there is going to be a big fire smewhere, they do not wait until the fire is in full blast before they commence to fight it. No., they get there just as quickly as they can, and if possible prevent the fire from getting a good start. Of course, you would not want to set the fire department at work on a house unless you were sure there was an incendiary going to set your house afire. If you know there is an incendiary, and he is going to set the house afire, you will be glad to set the fire department going and risk the damage to the furniture. In this case, however, the water improves the furniture, because this pack to the chest increases the depth of the patient's breathing. It increases the appetite, and the oxygenation of the blood. The patient will come to you coughing, with his lungs all congested, because he has been exposed, taken a severe cold for example; you would give him a chest pack, wouldn't you? He has got a worse thing the matter with him. What is the

proof of irritation of the lungs? Cough is one reason--the great quantity of mucus produced. Sometimes the patient's throat will become choked with mucus. I had one case in which the patient had fever, and there was so much irritation, that the mucus accumulated to such an extent that it filled up the bronchial tube, and the patient died from the suffocation. The post mortem showed the lungs completely filled solid with mucus. The patient simply died of suffocation. That, of course, amounted to acute congestion. That is just exactly what we find described in the books, the case of acute congestion of the lungs.

Now we consider every single case of anesthesia, a case in which the patient's lungs are congested and the resistance lowered, liable to come down with pneumonia; so we treat him for it before he gets it. It is preventive therapeutics. The principle of pathologic therapeutics, you might say, is an important phase of medicine that has been neglected. I am guilty of that myself. The last few years I have been seeing more and more how that thing can be set in operation. My patients in the surgical ward do not have peritonitis, because we treat every single patient that has a laparotomy, or has the abdominal cavity invaded or in whom there is the remotest danger of peritonitis, we treat every such case for peritonitis at once. You watch this in the ward, and you will be delighted with the results. You will see that there is unquestionably a good reason for it. The nurse [illegible] is there. The patient can not take vigorous treatment, or massage, or other treatment , and the nurse can attend to it just as well as not. There is not very much labor about it.

In general, apply the fomentation first, then the heating compress. If the patient is not cold, and is not suffering pain, the fomentation is not necessary; but instead of the fomentation you rub the surface with a cold cloth. That is a very important and practical point. Before applying the heating compress, apply the fomentation as a rule. It is not always convenient. Sometimes you want to treat the patient as quickly as possible. Perhaps you may have a feeble patient, who sweats under the slightest provocation. All these practical points will be of wonderful advantage to you when you get into practice. This is the difference between success and failure. I suppose scores of patients left the Sanitarium in the old days because they sweat so, and took cold. You have a patient that tires all over on the slightest provocation. The only way to deal with that patient safely is to undress him and give a good cold towel rub, so as to tone up the whole skin But that is too much trouble, and the general perspiration is exhausting to the patient, so you would not apply a fomentation to such a case as that. This is not talking about pneumonia. It is sufficient in such cases to take a cold towel, and rub the surface, and then the heating compress is applied until the skin is red. You can rub the surface with the hand or dry towel until it is red. Then apply the heating compress, and that will insure prompt reaction. The purpose of rubbing is to awaken the nerves and blood vessels to vigorous activity, so that the reaction will be prompt. You see there are thousands of little things, little details that you will gradually work into. If the patient does not react well, you must not put on the cold application. That is wrong. The poorer the reaction, the colder the application should be.

poorer the reaction the colder the application should be. So if the patient does not react well, you must use colder water, but less of it. That is the thing. Wring your towel or compress dry, as dry as you can get it; but have the water as cold as you can get it. You might use ice water some times. But water of 60° is cold enough for a compress. If you want to use a thin compress, in such a case, wring very dry, and rub the patient before you put the compress on, and cover up very warmly. If you have a patient that wont react even with that, rub the surface well with cold water, put on a dry application, put a mackintosh on over that, and plenty of flannel over that, and the patient will moisten the compress by the perspiration that will gradually accumulate.

We are having an interesting time with those patients in the ward.

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LECTURE TO SENIOR MEDICAL STUDENTS.

By J. H. Kellogg, M. D.,

April 6, 1904.

PNEUMONIA.

We were discussing yesterday the subject of pneumonia. This thing impressed me very much in the discussion we were having here, that in Chicago, in listening to those great men like Dr. Senn, and various others, there must be a great many things you receive on authority that you have to take strictly on authority. I do not want you to take anything on authority from me, for I do not profess to be authority on anything. Truth is the only authority you ever ought to bow your head to. Truth carries its own authority with it. Remember that. Truth carries its own authority with it. It does not make any difference how much prestige there may be behind any statement, if the hypothesis of it does not appeal to you as truth, you to not have to pay any respect to it; it does not make any difference on what authority the thing comes to you, if your own heart and soul tell you the thing is not truth, you do not have to act upon it. Sometimes you have to act on ~~thank~~ legal affairs, but that is simply mechanical. If a locomotive runs into you you can not help yourself; so if an officer of the law carries you away, it is the same as though a locomotive struck you. If anybody preached anything contrary to the truth, though it were an angel from heaven, as Paul says, it was not the truth, and I agree with Paul, and think that is the proper position for a man to take, when he has truth, and knows truth, and his soul tells him it is truth, he has got to

stand by it. When he has seen the sun, he knows he has seen it, and he can not help himself. In what Dr. Germ told you about pneumonia--there is nothing in it. When he said give thirty grains of quinine, and in a couple of hours, thirty grains more, of quinine, there is nothing in that to tell you it is truth. Eighty percent mortality is enough to tell you it is not truth. Seek for the truth, and the truth should have convincing power with it and in it.

When we were studying about fomentations the other day hydriatic treatment of pneumonia, it does not make any differen who tells you that, when you learn those facts you know it is truth; you know it is truth because the truth is in it.

Let us consider some other point. Are there any questions you would like to raise? I am perfectly willing to tell you that part of my mission just now is to seek to eradicate from your minds such errors as you inculcated in chicago. I do not want you to go off with any seeds of error in your souls that I can pick out. A number of times it has happened that the students who spent a year in Chicago and have gone out, the main things in their minds were the things they picked up in Chicago. Some things are splendid, and some are very wrong. We want to weed out the error and keep what is good. You get some things in Chicago that are better than you would get here; but we have some light here that you do not have in smoky Chicago. Ao we want to get all the good and eliminate all the evil.

In ~~making~~ giving the chest pack, it is pretty good to make it consisting of a moist compress, thin behind, and thicker in front, with mackintosh over that, and flannel outside of that

side of that; then that makes a good heating compress behind. A mackintosh going clear around will do no harm for this if present. You want that compress to warm up. You do not care to have it cool. You want it to have just the degree of coldness you have in it when you put it on. You want reaction. Why do you want that reaction? It is because of this contraction of the vessels; and then they dilate again, and that encourages the movement of the blood through the chest, doesn't it?--encourages blood change. It produces dilatation sufficient to encourage leukocytosis, while at the same time not sufficiently slow to do mischiefs, because of the accumulation of toxins.

There was one question with reference to encouraging leukocytosis. From which would you get the most benefit, a cold towel rub, cold mitten friction, or the wet sheet pack? The wet sheet pack will develop leukocytosis better because it makes universal contraction. This sudden contraction of all the vessels at once, of all the internal viscera, the vessels of the skin, the small vessels of the body, all contract from the cold. Why do not the blood vessels of the brain rupture and produce apoplexy? The brain vessels do not contract so much. There is not very much muscular contraction to these vessels. The blood goes into the portal system. Of course, when the small vessels contract, the blood is forced into the veins. The larger veins do not contract, so the blood is forced into the venous circulation and the portal circulation, which is always the great safety valve. Nothing serious would happen to the vein. There is not any very great danger, except of sudden injury from the application of cold to the skin; there i

is very little danger to the brain. The overflow goes into the portal circulation.

What protection does the brain have besides this against a rupture of the vessels from sudden afflux of the blood The lymph. The brain is a solid, resisting cake. But there is lymph in the ventricles of the brain, and all around the blood vessels, all through the brain; the brain is full of lymph, and that supports the vessels. The proper support of the blood vessels of the brain is the lymph. When more blood comes into the brain, the lymph passes out down into the spinal canal. There is a reservoir for it. Where is there the most room in the spine? There is more room in the cervical region than in any other part. When one bends the head over in front, it drives the blood into the veins. Does forcing the lymph up into the brain increase the amount of blood in the brain? The lymph increases. It takes a little time for that, so there is always a solid protection of the brain. This support of the brain by the lymph is one of the most perfect possible, and one of the most beautiful evidences of the intelligent care that is manifested over the body.

You never want to apply a wet sheet pack when the heart is seriously weak. How would you know when the heart is seriously weak? What evidence would you have? What would be the condition of the pulse? I do not remember ever meeting a case in which a person had a very weak heart and degeneration. I remember a case I had once of a man who had a slow pulse, a beat of only 24 a minute. You would not want to apply cold water to such a heart. A very slow pulse or a very rapid pulse is a contraindication for the application of cold water.

You feel the pulse and find you can compress it very easily. There are some other symptoms of a weak heart that are very marked, if a person has fever, pneumonia, or something of that kind, and one of them is, listening to the heart sounds. That is a better indication than the pulse. You would find weakened heart sounds. What is the evidence of that? Sometimes the patient has a very thick chest wall, and you can not distinguish the sounds so well. What other evidence would there be? These are very interesting, practical points that we are considering. There is a characteristic of the feet that will tell you right away independent of the intensity of the sounds, something pertaining to ordinary sounds. If you have a very thin wall, and a weak heart, the sounds are quite loud; and in a very thick wall the sounds of a strong heart might be weak, disproportionate. The first sound does not sound any louder than the second sound. The first and second sound seem quite equal. There is a loss of rythm--arythmic. It would be a continued beat sound, both beats the same length. Whenever you find a heart going that way, you can know you have a very weak heart. You can recognize that very quickly. I meant to have called attention to the fact that the first sound is loud and strong, and the second sound is light. That is the thing to think of rather than simply the intensity of the sounds as a whole, because that varies. There are some other indications by which you can know the heart is weak. You ought to know just as soon as you look at the patient. Cyanosis. If you have got a heart that is dangerously weak, there will be blue lips. There might be cold extremities, and there might not. That is

usually due to vaso-motor spasm. How do you know that is the cause of cold extremities? you look at the extremities, and you see they are ivory white. If it is due to the weakness of the heart, what would you see? They would be bluish. This is a condition which can warn you beforehand. you can find out when you are going to have heart failure. You ought to be able to know it twenty-four or thirty-six hours in advance, before the heart failure comes. Do you know what that is? Failure of compensation is an important thing to keep in mind; but there is another important point,--mottled cyanosis. What is that mottled cyanosis? What does it mean? You go out and get your hands cold, and you come in and your hands have a mottled appearance. What is the cause of that mottling? It is the spasm of the small vessels. What is the effect of that on the venous blood? It causes it to remain in the veins, it slows the movement of the blood in the small veins, and the blood remains there so long that all the oxygen is absorbed, and it becomes blue. This mottled appearance seems to be due to a peculiar arrangement of the blood vessels. If a patient has had a fomentation for a long time, he did not get a uniform brown color did he? What is the appearance? It is a mottled appearance. You get a mottling that is just like that. When a person has this mottled cyanosis it is just like the mottling you get from a prolonged fomentation--pigmentation. I suppose that is due to the blood vessels. You get an idea of how the anastomosis occurs. It is very interesting.

If you have spasm of the small vessels so great that it will produce this cyanotic appearance, the mottled cyanosis, what has that to do with heart failure? I mentioned that as an

indication of impending heart failure. Why is it an indication of heart failure? The spasm is due to the increased irritability of the vaso-constrictors, or the cardiac accelerators. The spasm of the small arteries increases the work of the heart; so if there is such frequent spasm as to produce mottled cyanosis, you know the work of the heart is enormously increased, and you are going to have heart failure twenty-four or thirty-six hours later, simply because the heart will get tired out. It is doing such hard work it is going to get tired. If you have got an engine going up a steep grade you can know the steam is likely to get low if it continues to go up the grade. The heart has not failed yet, but if this mottled cyanosis keeps on it is an indication that the heart has such hard work to do that unless it gets relief, in twenty-four or thirty-six hours it will fail. Having that notice of this, it is a pretty good thing to do something to obviate that condition; so you see if you are notified twentyefour hours before that you are going to have heart failure, you can do something to prevent that continually. Here is the thing to do. Dilate these vessels. Suppose you apply to the patient a hot blanket pack. It will dilate the surface vessels and all the small arteries in the body,--the hot blanket pack, and the short hot bath.

The question of heart tonics comes up now. Suppose we give strychnia or ergot, or digitalis. What would these drugs do? Strychnia, ergot, digitalis will all excite the heart; they will cause increased activity of the involuntary muscles, cause contraction of the involuntary muscles, and the

effect would be to increase the work of the [illegible] heart, to make the heart contract more vigorously; and at the same time they do the same thing to all the small arteries everywhere--they increase their contraction too; otherwise they increase the power of the heart, or rather they make the heart work harder, but at the same time they increase the work of the heart has to do. Ergot has a very slight stimulating effect upon the heart. The vaso-constrictors are the same sort of nerves as the cardiac accelerators. They belong to the same class. Are they medullated, or non-medullated?

The cardiac accelerators are supposed to excite the activity of the heart. The vaso-constrictors are the same sort as the cardiac accelerators. The pneumogastric is medullated, and the vaso-dilators are medullated. The cardiac accelerators are supposed to excite the activity of the heart; but the pneumogastric slows the heart. Under certain conditions it does the opposite. There seems to be some degree of uncertainty with reference to the function of those nerves, and I confess it does not seem very clear. There seems to be a balancing between the two--the accelerators and the pneumogastric, so that when one set is removed entirely, the heart is under the influence of only one single set of nerves, and the result seems to be to a certain degree eccentric. The best interpretation I have been able to get out of the experiments has been that the accelerators are the excitors of the heart, and they cause an increase of muscular contraction. That is what the vaso-constrictors do; they are the same kind of nerves, and it seems reasonable to think the heart is a part of the vascular system. The heart extends throughout the

whole body, and the accelerators are the vaso-constrictors of the heart. The vaso-constrictors really stimulate because of contraction of the vessels; and an increased activity of the peripheral heart as well as increased forced contraction. With the central heart, when these accelerators are stimulated, the effect seems to be to increase the exertion of the heart muscle. It contracts more quickly, and empties itself more quickly, makes a quick flowing of the arteries; causes the heart to dilate more quickly and contract more quickly, and that takes a longer time, so the heart movements are slowed. When the heart only partially empties itself, the beats are feeble and rapid. The failing of the blood vessels has the effect to make a back pressure upon the heart. A certain doctor in Philadelphia suggests that it is like putting sand on the rails for an engine. The sand put on the rails increases the work of the engine, makes friction, the wheels seize the rails , and then they go slower, but work is accomplished. When the heart is contracted, just sort of trembling, quivering, it does very little work, but when the heart is excited so its muscles contract with greater vigor, closes completely, the cavities of the heart are completely emptied, and the failing is more complete; so the heart action is slowed. The slowing seems to be in part mechanical, and is due to increased resistance. That is the best I have been able to figure the thing out. There are a whole lot of experiments, and theories that make it very difficult to understand the action of those two sets of nerves.

That agrees with what we see when our hydriatic application is made. Put on an ice bag over the heart; that

excites the vaso-constrictors; applied over the heart it excites the accelerators, and the vaso-constrictors of the heart, because the heart puts more blood through, but at the same time the movements are slow. The movement of the vessels themselves seems to be increased. They are not rythmical with the heart, and the case there is different. The small vessels are not working against pressure, are they? There is practically no movement in the veins, so there is no pressure against them ordinarily. It is so very slight any way, even in the most remote part the pressure is very slight, so the small vessels are not working against pressure, but the heart does work against pressure. The small vessels have only the capillary system to work against, but the capillary system is very short, isn't it? What is the diameter or sectional area of the capillary system, as compared with the sectional area of the other vessels? 300 or 400 times; so you can readily see that the small arteries have not very much pressure to work against when they have a sectional area three or four hundred times as great as the rest of the vascular system. If there was mechanical obstruction, there might be pressure, but ordinarily there is not. Friction comes from cohesion against the walls. There is very little work on that point unless the capillaries contract, and then the work is enormously increased.

So we have a quickening movement of the small vessels while we have a slowing movement of the heart under the same kind of stimulus. That is the point I want to get at. The movement of the heart is slow, but the movement of the peripheral heart is quickened by the application of cold. Suppose you should apply cold, and take all the pressure away.

Suppose you had here a heart that could pump the blood out without any pressure at all, and you should apply cold in such a way as to reflexly excite the heart, what would be the effect upon the heart? The movements would be certainly quickened. What proof have you of that? There is good, conclusive proof of it. When you were studying hydrotherapy, didn't you make the experiment of taking a man's pulse, then making a cold application to see what the effect on the pulse would be? What is the effect? It is quickened immediately.. The first effect of cold quickens the pulse. I have a table in Hydrotherapy that sums up the effects of cold and heat, gives a summary of the physiologic effects of cold and heat. You found that one of those effects is that cold first quickens the heart, then slows it; while heat slows it first, then quickens it--just the opposite. Why is it that cold when first applied quickens the pulse? It stimulates the heart before it does the arteries. It stimulates the cardiac accelerators, and the radiant heart movement is increased when cold is applied to the skin. Why is it slowed afterwards? Resistence is increased, the blood vessels become filled, the heart works rapidly until the blood vessels are filled and distended; then the heart begins to go slower and slower and slower until it comes down to the point where its movement becomes permanent down to the balance between the heart movement and the tension of the vessels.

When you apply cold the first effect is to contract the capillaries and to contract the small arteries--tonic contraction. It quickens the heart, and at the same time this contraction of the small arteries and capillaries greatly increases the work of the heart, so the heart movement is slow.

Shortly afterwards the reaction comes. With the reaction there is a dilatation of the capillaries, and an increased movement of the small arteries. Now while the cold is applied, there is a spasm of the small arteries, strong contraction; but when the reaction comes on, there is a quickened movement, with an increased excursion, the arteries dilate more and contract more completely, and the rate of the movement is increased; and the reason for that is that the friction is removed by the dilatation of the capillaries and all the small vessels, so they really have very little to work against; but the heart is still working against increased pressure, because the heart is distended to such a degree as to raise the blood pressure.

A cold application over the heart itself affects the heart in just the same way that it affects the small arteries; only the heart is working under different conditions. The heart fills the blood vessels with blood and raised the pressure, and that slows its movement. I am glad you are thinking of these things, and I see you are thinking down deep into the principles. It bothered me a long time. It thought it must be due somehow to the action of cold upon the pneumogastric, but now I think the whole thing is due to the action of the cardiac accelerators, and that they act in harmony with the vaso-constrictors.

In pneumonia all these questions are of great importance. You can not treat it successfully without knowing all these points. They will come in for consideration in deciding what treatment should be followed. Anybody can prescribe for pneumonia if he goes entirely by following a formula. If he sees a patient treated, and tries to treat this

patient as he saw another treated before, he is never at a loss for a prescription, but the prescription may do a great deal more harm than good. It makes all the difference in the world whether you make just the right prescription, or a prescription that is haphazard. Suppose you have a very weak heart. Hmm Would you make a local application even when you did not make a general application? No. If your patient 's heart is so weak that you are afraid to make a general application, it is still more dangerous to make a local application. Do not ever forget that in the world. The heart in can never be so weak that it wont do to make a general application if you make it right; but the heart may be so weak that it is not safe to make a local application over the heart. Attention was called to this point several years ago, and I was glad to see it, because I saw that it was a point of very great value and importance. In clinical application particularly, very frequently I have been saved from making a bad mistake in diagnosis by just remembering that thing. Now why? Here is a horse going up hill. He has got a heavy load to pull, and besides the heavy load, the horse is very weak, and feeble, and it has an awfully heavy load. If you wanted to make sure you would get that horse over the top of the hill, with the load, would put more weight on him, or would you put the whip on him? No; you would take off some of the load. You let a horse in that condition pull the wagon up hill, you stop him, and he will get stuck in the mud, and never get started again; so you have got to keep him going. The thing to do first is to throw off some of the load. After you have thrown off as much of the load as you can, then you may put on the whip a little, carefully. But suppose you

put on the whip first; the horse will exhaust himself and never get over the hill. So with the heart the first thing to do is to lessen the work of the heart. When you excite the heart, you simply compell the heart to exhaust itself still further, and work under a disadvantage. If the heart is feeble, there are two causes for that feebleness.

There are two great causes of a feeble heart. What are those two causes? It may be angina pectoris, the circulation is disturbed; but there are two great general things which cause heart weakness,--increased work, and weakening from the depressing effect of toxin. Those are the two great causes. You always have that in every infectious fever. You always have to deal with those two things. The depressing effect of toxins, and increased work. Now then we are all the time trying to get rid of those toxins by diluting the patient's blood, by giving enemas twice a day, by long neutral baths, by water drinking, by giving a diet that will so far as possible aid the eliminations of the toxins; but after that we want to do something by way of treatment to improve the circulation. What the doctors are aiming at all the time is to make the heart work harder; that is the great thing--to give something to stimulate the heart. We say we want give anything to stimulate the heart; but the important thing to do is to lessen the work of the heart. Then we may go further than that and apply physiologic stimulants to the heart. We wont apply toxin.

Here is a heart laboring under the toxin of pneumonia, and is depressed by it. Suppose we apply another toxin that has an exciting effect upon the heart, what do we do? It would be just the same as though a man was trying to go in one direction and somebody got hold of him and tried to pull him

direction and somebody got hold of him and tried to pull him in another direction, and another man got hold of an arm and pulled in an opposite direction, and the two men hawing hold of his two arms would pull so hard that they would pull the arms off. That is exactly what we are doing. Here is one toxin pulling the heart down, and if we give another toxin, the heart has to bear the sudden pressure between the two. Here is a heart exhausted by the excessive work imposed upon it. The most sensible thing to do is to lessen the work, and remove the toxin. We remove the toxin. We are doing that all the while by elimination, by increasing oxidation, etc; but here is something we can do immediately. When we undertake to remove the toxin we have to make the patient able to do it, and we have to wait for the kidneys to eliminate it; but when it comes to a matter of decreasing the work of the heart, we have means by which we can do that at once, and we can do it to a remarkable degree. How can we do it? Suppose it is a case of pneumonia. We were talking about mottled cyanosis. That means we are going to have heart failure in a day or two, because we have got the heart under such great strain and resistance. What do we do to relieve that? Give a hot blanket pack, or a short hot bath followed by cold mitten friction. That is just the thing exactly. Why do you apply cold mitten friction? The hot application dilates the vessels, and that removes the work of the heart. When we talk about lowering vessel tone, what do we mean? The average doctor does not get much out of that. When we say lowered tone, it is something vague, some scientific talk that does not mean much of anything. What does it mean? Heat maintains a certain

ry rythmical movement, it maintains a certain calliber, , but at the same time it is working, and tone means a certain power, a certain rate of beating, the rate at which it pumps the blood. That is tone. Heat has the effect to stop that, to lower the tone. What effect does it have upon the heart? It has just the same effect upon the heart. So if you apply a hot blanket pack in such a case as that, it ought to be short. Suppose you should put a patient into a hot blanket pack and leave him there half an hour. He might be worse off than he was before. Why do you give cold mitten friction after that? To increase the tone; that is to set these small arteries pumping, and with wider excursion. They were in a state of spasm. We apply cold to set them going again. Now you have done the most beautiful thing that can be done. You have found the artery in a state of spasm, shut up so that it will not work, but you have set it to work again by cold application. You set the small veins working in the skin, pump the blood on and get it away from the front of the heart; so you set the heart going at the same time. Now how can you stimulate the heart more after you have done that? What can you do to increase the energy of the heart? Put a cold application over the heart. The hot blanket pack first, cold mitten friction next, then cold over the heart. Suppose we began the other way. You can readily see that there might be evil results from that.

If your patient is warm, has a rather feeble heart, and the skin is warm, and you do not have this mottled appearance, it is perfectly proper to begin with cold mitten friction instead of the hot application. If you can not give a hot

blanket pack because the patient is so feeble, what else can you do? Give hot mitten friction to the skin. A hot sponge will answer just as well. You can break this spasm by hot sponging with real hot water; just as well as with cold water; so you can do one arm at a time, then the chest, then th back, and then one leg at a time; sponge with very hot water, and then youmight follow with cold rub with hand or towel. In that way you can break the spasm, and in a very few moments get rid of the mottled cyanotic appearance. Whenever you see a patient with the mottled cyanotic appearamce you want to get cleared right away. Do not wait six hours, or do not wait until morning, but get to work right away.

Suppose the patient is feeble and very cold, and you do not think the nurse is skilled enough to make a hot blanket pack, or cold mitten friction; some people think water weakens the patient and exhausts him, and do not dare to use water for any reason,--in a case of this sort what else could you do. You could rub the patient with warm flannels couldn't you? I knows of a case in which a man's life was saved by being rubbed with mustard. That was chemical irritation. You can have chemical or purely mechanical irritation, or thermic irritation,--thermal irritation, chemical irritation, or mechanical irritation. Mechanical irritation can be helped by rubbing with a cloth or with the hand. In a case of this sort percussion would act very slowly, and the reaction following the percussion would be very slow. There is something better to do. If you were going to apply friction, say, how would you do it? Where are the blood vessels in this arm. Notice all the veins here in

the forearm. Make the application; start at the palm of the hand grasping the whole arm, and follow it up clear into the body.

With the leg do just the same thing; follow the hand along to the knee, roll it around the knee, and follow right along up to the body, so as to carry the blood right into the body. This is what empties the veins, and reddens the skin. We get the idea that the skin is reddened in the same way that you warm a stick. You rub a stick until it gets warm; but the skin is reddened by the fact that you have dilated the vessels and brought more blood into them. You can do that by percussion. But the thing that is going to help the heart most is by emptying the veins you take away all the pressure from in front of the heart. As you take your hand off after making this pressure the skin will fill. Pretty soon the skin will get red because the arterial blood is coming into it; then the skin gets reddened. Alternate the long sweeps and the percussions. A cold towel rub is one of the very best things possible in these cases. Apply the cold towel, make a little percussion on the outside, then you get thermic stimulation and mechanical stimulation both.

The best and most powerful thing of all is a hot application. There you get stimulation, heat through the hot cloths; then follow that with cold friction and you get thermic stimulation in the cold nerves; then you come along with percussion, and with the percussion you stimulate the nerves, and get a reaction through them. Then by long sweeps you get purely mechanical benefit, by which the blood is moved

along the large vessels and carried off into the interior of the body.

We have heat nerves, cold nerves, vital nerves, pain nerves; then we have the purely mechanical effect of cold carrying the blood along in the veins. There are five forces we can set in operation, all of them to help the heart. Then we are prepared to make a cold application over the heart itself. In extreme cases these applications will affect the heart in the same way. A short cold application will excite the heart; the more prolonged the cold application, the longer the heart is excited. Then we can have percussion of the heart. We apply the heat, and the cold, and then the percussion If you have a patient faint away, you put a few drops of water on the face; but there is something better to do. Put your hand in cold water, and just slap the patient. Percussion of the face is the thing. The real smart percussion will do the patient as much good as the cold, because you excite the pain sense and the vital sense, you see. Slap the chest; if you have a patient under anesthetic that has succumbed, and the heart is failing, put your hands in cold water, and then slap the chest a real smart slap. Now when we understand this principle, it is worth more than all the drugs in the whole materia medica. You can see it yourself right away. This increased movement of the blood that we secure by relieving the heart work so that the heart can work efficiently, then energising the heart by a cold application, this increased movement of the blood is the best thing in the world to aid in the removal of toxins isn't it?

The effervescent bath is a very excellent thing in weak heart. Why is it good? It is not better than the other, but what are the virtues of the effervescent bath? When you come to use it you will see that there is more in the sound than is the thing. The effervescence is only the breaking of bubbles at the top of the water. There is no foaming or perturbation in the water itself. It is not like a glass of soda water effervescing, but just a little effervescing at the surface of the water,--very slight. It is the chemical effect of the CO_2, that is all. Chloride of calcium has more effect than CO_2. There are two points. There is the chemical irritation of the skin. Chloride of calcium is the most powerful irritant. The [redacted] CO_2 is irritating to the skin too. Sea water, cold water, water of a high specific gravity can be administered at a lower temperature because of the chemical irritation ; so you have a more powerful thermic stimulation and chemical stimulation combined together. You can use the bath at four degrees lower. The difference in temperature is only three or four degrees. In the neutral bath in chronic cases, you endeavor to avoid the perturbation of very cold baths, for it produces retrostasis, and overtaxes the heart. The idea is to get the lower temperature without the retrostasis.

When it comes to a fever, we do not hesitate to use water at a temperature of 80° or 75°. The effervescent bath is given at 88°. I took the effervescent baths to see how they did it. They did not seem any colder at 88 than at 92. I do not think there would be any particular advantage. The fact is, if you use that bath several times a day, the skin would get irritated . This bath is not used more than three

times a week. I think we can get all the effects from friction, towel rubs, and we cangraduate the thing much more perfectly. There really is nothing at all in the effervescent bath that you can not get by other means. It is a good thing sometimes for variety for a patient, but there are no specific good effects from it that you can not get just as well by other means.

Always make this a rule whenever you have a very weak heart make a general application first before you make a local application to the heart. The general application can be dry rubbing until the skin is red; cold rubbing; hot sponge followed by cold rubbing--any of those things. For acute weakness of the heart the best thing is to sponge the hands, face, and chest with cold water. I have seen men faint away in the gymnasium by violent muscular exertion, which drew such a large amount of blood away from the heart that the patient suddenly fell right on the floor, pale as death. In such a case as that, I think that the application of cold may be made directly to the chestof a person who has suddenly fainted from any other cause. That will set the heart to going, and keep it going until the circulation can be re-established.

In general it is better to make the application to the chest first. Why? Because it increases the heart movement, and so promotes reaction. That is the reason. It is only in cases of extreme weakness of the heart that it is best to take this precaution. In ordinary cases, it is better to increase the heart action at the start. These patients suffer from lack of power to react, but when you get the heart action going well, the difficulty is lessened. The blood vessels and

muscles are so suddenly distended that the blood is drawn from the circulation into the muscles. The muscles are capable of holding half of all the blood in the body. Suppose you take out of the circulation half of the blood in the body into the muscles, the effect upon the heart is somewhat similar to bleeding a man, drawing half his blood out. The only thing is to excite the heart to keep it going until the blood can get restored.

V-B-4-4--8.

LECTURE TO SENIOR MEDICAL STUDENTS.

By J. H. Kellogg, M. D.,

April 6, 1904.

PHYSIOLOGIC MEDICINE. BURNS.

I had a letter from Dr. Paulson this morning. I will tell you what he said. I think you can all be trusted to not make any bad use of it. We must do more to get our students thoroughly grounded in the faith of physiologic medicine. Dr. Paulson wrote me that they had an excellent lecture the other day from Dr. Walls on rickets, and he first gave them a careful account of diet and of the hydriatic treatment, etc., gave a very excellent account of what ought to be done for rickets; then he mentioned a few drugs. As soon as he began to talk about drugs they all began to take notes. Up to that time, none of them had taken any notes. When the class was over they had some cases of rickets, and they all went back into the pharmacy, and put up some drugs for those rickety children. That is the love of darkness rather than light. How easy it is to slide into the wrong way, to choose evil rather than good. I have seen the thing repeatedly, have seen several graduates of this school who have gone out and gone to practicing with drugs. I wish that the students of this class could finish up their work and receive their diplomas in the same state of mind as regards drugs as men who have been in [illegible] the profession for fifty years have reached. You will hardly find an intelligent man who has been in the practice of medicine for fifty years who has any faith in drugs to amount to anything.

Dr. Frank Billings, in Chicago, President of the American Medical Association, although as nearly as I can learn

from persons who were present he was at the time himself somewhat under the influence of a drug; but he declared before the American Medical Association that there were only two drugs in the whole materia medica that are of any value at all. He said that drugs do not cure disease, excepting that mercury cures syphilis, and quinin cures malaria; but he was certainly mistaken about that. The drugs may be useful in certain cases, but they do not cure the disease. There must be something more. When we have this thing right before us, and see men who have not had the experience we have had, coming to the conclusion that drugs as a class are really valueless, we ought to have more enthusiasm for these physiologic principles, that we have such an opportunity to acquire knowledge about. We ought to be the last people in the world to resort to drugs. I think there ought not to be a single drug in [illegible] of any kind in the Halsted Street Dispensary. I think every single drug of every single kind ought to be cast out of it. We have no business to have any drugs there. I should like to see every drug cast out of that place. The purpose of that Dispensary is to demonstrate what can be done without drugs.

When I was in Berlin I visited some clinics where no drugs were used. They had there a number of clinics where they did not use drugs. One doctor has a clinic there to demonstrate what can be done with massage. He is a professor of massage in Berlin University, the Medical Department, and he has a clinic in which he does nothing for sick people but give them massage. Not another thing does he do. You could not induce him to give medicine. He would consider that he was disgracing himself to do it. He is holding up massage. He

does not say that medicines can not be useful sometimes, but he wants to demonstrate to the world what massage can do. Prof. Pflüger, one of the greatest physiologists in the world, the discoverer of ptomains; he is working on toxins, and when I was there he showed me two new toxins he had recently discovered in typhoid fever. Pflüger has a hydriatic clinic at which he employs water for everything ~~that~~ that can be treated with water. He did not employ anything but water. He did not have any drugs there, he did not have any medicated water or anything of that sort. He has nothing but water--thermotherapy--did not employ electricity even. He was puting in an electric light, but it was a hydriatic clinic. Now this Professor in studying hydrotherapy did not go to the universities. There was not much chance to learn much at the universities. Where do you suppose he went when he wanted to study hydrotherapy? He went to study at Knieppe's institution. Think of it! There was that man, a Catholic priest, who did not know a thing about medicine; he went up there and studied weeks, and weeks, and weeks. An intimate friend of his told me all about it. He told me that he had been up there and spent weeks at a time at the baths of Knieppe. He did not learn anything from Kneippe. He could not give him any dissertation on hydrotherapy. But he watched what water did with people; he watched the effect. He saw what was done for various maladies, and watched the results. So that was a great clinical field for him. His observation was great. That was the place where he got his knowledge of Hydrotherapy. He fitted up a splendid large place; but it would not do for this country. It was just

one great big rock with a big shower bath in the middle, vapor baths, sitz baths, all sorts of baths around the outside wall. There you would see fifteen or twenty people taking their baths, and the bath women were men. They had men to give the baths. One day would be women's day, and the next day men's day; but they have men give the baths all the time. When women were taking treatment, there were a couple of women nurses there toassist about it. I presume the women nurses assist all the time; I do not know. There was a reasonable degree of modesty, but it would not be considered very decorous in this country. The professor, as I have said, gave no drugs at all. I asked him if he used lavage, how he would treat stomach disorders. "No," he said, "the tube specialists use lavage." He looked upon Ewald, Boas, and those men as tube specialists, and he laughed very heartily at the idea of using a tube and washing the stomach out. He is of course something of an extremist, but I want to tell you it commanded my admiration and respect to see those men standing up so sturdily, each man for his principle that he was holding up to the world. It is necessary that men should be in this country. If you are going to call the attention of the world to what you have got, you must specialize; you must champion something. A man can champion almost anything, even an absurdity, if he talks loud enough and perseveringly enough he will get a following. There are people who believe the world is flat, and they preach it so earnestly and enthusiastically that they get quite a large following. I think there are quite a large number of people in England who believe the world is flat. There are some in

this country too. There has been at times really quite an interest created in that theory by a simply loud and earnest talker.

If you have got a good thing to talk for, if you have got a substantial thing, and have got the truth to talk for, and you do not have to be ashamed, and you are not afraid things are going to pieces; you know your feet are on the solid rock, and the thing is going to grow. I certainly feel that of all people we ought to be the most enthusiastic. We do not really appreciate the great truth we have got, and we cheapen it and in our Dispensary in Chicago, when we allow people to take drugs, ~~which they get~~ they will go there to that dispensary, and go away with a bottle, and feel as though we had put a blot upon our banner every time we do it. We have not any right to do that thing. Suppose a person has malarial fever, would you give them quinin? Will you give them a prescription for quinin and let them go to a drugstore and get it filled? If they want some quinin, I would make an earnest effort to cure them without quinin. We have quite a large bill for drugs there at that Dispensary every month. I know that Dr. Walls is quite in sympathy with that plan. I talked with him last summer about the idea of making our Dispensary an exclusive hydriatic dispensary. He thought that was just the thing to do. I think he is starting out this year with aneffort to give more prominence to physiologic measures. I thought he was really trying to hold the students' minds to that idea. When the principal man who pays more than anybody else to keep that Dispensary up, a man who has been raised in the drug system, and is not really a champion of truth as we are, when

he is in sympathy with it, it does seem to me that we of all people oughtto be the least slow about it. I found that electric light bath down there that I made our men work nights to get ready and sent it down there, and it has not been connected up yet. I found that the sinusoidal machine needs just a little fixing, and they are not using it at all. You have got your hands, and massage, and electricity. We have got facilities enough there for a whole sanitarium. We have got at Halsted Street now more and better facilities than Brother Hanson has got at his sanitarium in Nashville. From the time he started at Nashville until now, he has never had such good physicians as we have got at Halsted Street Dispensary; and we have a number of branches that have not got as many physicians as we have there. It is so easy to drop into the old wicked bottle.

The symptoms may be temporarily dissipated under the use of drugs. The symptoms disappear, but the man is not cured he is the same man he was before. If he has a pain you give himm something to stop the pain, but the paincomes back again in a few days. At the Sanitarium yesterday, I saw a lady who was a good illustration of that. Three years ago she was very sick, had gastralgia. The doctor gave her morphia. The doctor gave her morphia, and she got better of it in a short time. A short time ago she had a severe attack of something--the same thing, vomiting, gastralgia; she sent for her doctor, and he came and gave her a hypodermic injection of morphia, and it did not do her any good. He first gave her an eighth of a grain, then a quarter of a grain, but it did not do her any good at all. He found this woman had got into the habit of

taking morphia, had been taking it for years by means of suppositories. The doctor had given it to her once in that way, and she had been taking the suppositories, and of course an ordinary dose of morphia did not do her any good at all. When the doctor took the morphia away from her, she just nearly became insane. And now we have a great time with her. There was a terrible pain in the limbs, in the bowels, and the stomach, vomiting, retching, and we had quite a severe time for a few days to get her over that. That is the consequence of following a wrong principle. That is just exactly as wrong as when a man comes and says, "I feel weak, I can not keep up my strength," and takes quinin or strychnia, or strychnia pills, and then says he feels better right away. The appetite increases, irritability of the gastric nerves is increased, and more gastric juice is formed, and he thinks he is better. You have not given him any strength at all. We can illustrate this thing by a tank. We have here a tank. Here is a pipe that comes out here about the middle of the tank, a little pipe, and there is a stream which comes out and falls to the ground from this pipe. This stream is supposed to run a wheel somewhere in its course, that depends upon the pressure in the tank. If the water is at the top, you have a full force stream, a full head. As the water comes down, the stream will come out with less force, and the wheel will run more slowly. The water will get lower and lower, until there will be but a few drops trickling down. That is the neurasthenic. His pond is running dry, his reservoir is getting empty. When it gets down even with the pipe, you see he can do nothing at

all That is complete collapse. What does strychnia do? It simply taps the tank a little lower down so you can getout a little of the reserve. That is all that any stimulant or tonic candc. It takes out of a man's constitution a little of what nature has intended to be held back as reserve, you see. Suppose we were so constructed that we could get all the energy out of our nerve centers, empty our tanks altogether. What would be the effect? The first time a man got tired it would be the end of him. It would kill a man tog et tired, because he would have nothing with which to recuperate; but nature has so adjusted the outlet that there is always held in reserve more than what we have expended. We have always more energy in reserve than we have used. We have only a little narrow margin. The young man has a great reservoir of reserve energy. The old man has comparatively little. That is the reason why the old man suffers from second fatigue. The young man does not. He gets tired, but does not get the second fatigue. Bgt after while he finds out that his general vital processes show the injury he suffers. His vital process suffers; his digestion suffers; his assimilation suffers; and the liver action and kidney action suffers. A day or two later he begins to show the bad effects of it. There is diminished oxydation and elimination, and accumulation of waste. He has what is called second fatigue, but the young man has a large reserve, so although he becomes very tired, still he has got such large reserves, he has vitality enough to repair the damage done, and do it quickly, over night, so he is all right the next day. Strychnia simply taps the reservoir lower down. That is what all tonics do. First quinin taps the tank a little ways down;

then next strychnia taps it a little lower still; next perhaps arsenic, and after the effects of these drugs wear off you go down a little lower, and then lower, and you go on with that plan thinking the man can be cured, and every time you give him a new remedy, it cures him for that time, but every time he gets sick, he is a little worse thanhe was before. BY and by he getst to be a confirmed neurasthenic, and he comes to the sanitarium here, and the doctor takes him in hand. He used to go to his doctor to get something to help him up. The doctor did not do him any good, but said he did not respond to his treatment. The reason why he does not respond at first here is that his capital of energy has gone down so low that it can not get any lower down. He has got down to where nature refuses to heal, and the resources of the body can not be exhausted any further because they are already exhausted. So he will not respond to the stimulus. This is a very plain illustration. It is only when we get things in the very simplest way that we really absolutely grasp and comprehend them. When a thing is vague, and has to be presented in a grandiloquent way, in grandiloquent terms and phrases we do not understand it. A child can understand this. That is the way I talk to my patients, and I can see that they grasp it and understand it.

You see the people at Halsted Street do not expect to be there again, though I hope some of you will be there perhaps, and put that on a right basis. You say they wont go there if we don't give them drugs. I tell you it will be just as reasonable it seems to me to start a mission meeting and have some theatricals to call a crowd in, or to have some sort of amusement of some kind, to get the people in,--have a

lottery or something of that sort so as to get people in. A good many so-called ministers of the gospel cease to preach the gospel, but they give lectures, or read from Dickens. Down here at the Congregational Church they read Dickens, or somebody else almost every Sunday.

If we wanted those people to come in there as specimens to examine them, just as we would examine specimens for diamonds in a jewelry shop, or as we would pick over pebbles on the seashore, if we simply want to look at them for pathological specimens, of course that might be a good way to bait our hook; but if we are going to carry on a missionary, Christian gospel dispensary, we have got to have it in accord with Christian principles right straight through. Then we have got to depend on the power and authority of truth to make the thing a success. It might look as though it would be a total failure to hold up the truth, and let the truth be the practical thing in the dispensary; but my experience has been that truth is the most interesting and practical thing in time and the most attractive thing in the world, and in the universe. It is only necessary for truth to have the right presentation. We often hide the truth by our bungling efforts; but at Halsted Street we ought to make it shine so that it will attract people more than anything else we can do.

The idea that people have got to have drugs is entirely mistaken. Kneippe was a Catholic; yet he did not use any kind of drugs. He did use a few roots and herbs, a little tea of some kind of bark or some sort of leaves, but not to any very great extent. He depended on water. I want you to help to make that dispensary a thoroughgoing reformatory, to set a model for the people of Chicago, to let them see what

can be done by the thorough-going application of hydriatic and physiologic measures. I hope you will do all you can in the way of supporting that principle. Dr. Walls is ready to do it, and we ought to do it. We can not do it by simply taking a patient in in a desultory way and giving him some sort of bath. It has got to be done by the real earnest application of right measures.

I am glad to hear from Dr. Paulson that the classes are taking up missionary work in good shape. There is a dispensary at the Workingmen's Home. Brother Winchell has charge of the missionary meeting every night at the Workingmen's Home. The students take charge of the Sunday Evening meetings at the Lifeboat Mission, and Dr. Paulson says he is holding two real, missionary dispensary clinics over at Halsted Street every week. I think they are all taking hold in good earnest, and trying to hold up as well as they can the interest that has existed while you have been down there and which you have started. I believe the work this year has been far better than what has been done any year before. I hope there is a better future before us.

We have got to build up this College, not on the old foundations, but on new foundations, and our work must be be built on new and better foundations than have been followed before. If we do that people will come to our school to get something which we can give them here that they can not get anywhere else. If we do not give them something better, they will go some other place. There are other places where they can get anatomy and physiology just as well as we can give it to them here; but we have a great truth, and a better chance to show that to them, and to show the working out of this truth

here at the Sanitarium and in connection with our work. We have a better chance to show them thanmyone else. I feel anxious that this class shall be better prepared to represent these glorious principles the world needs so much than any class that has ever gone out before. The profession are waking up, and getting hold of a good many principles. I was reading last night in the Dietetic and Hygienic Gazette, of New York, which is just brimful of physiologic medicine from one cover to the other, brimful of hydrotherapy and massage, and a doctor in Canada had a full page article on hydrotherapy which is excellent. It was somewhat crude, but he had hold of right principles right straight through. He was talking about the treatment of pneumonia with and without drugs, and the treatment of typhoid fever. He gave for instance, one quotation from a book describing an epidemic of typhoid fever in which several hundred cases were reported in which the patients were treated expectantly. Nothing at allwas done for them, but they simply had good care. The mortality was 27%. Then some 800 cases were reported which were treated with baths, and the mortality was a little less than 3%, 2.9%. That shows right away--several hundred cases who had nothing done for them with the result that there was a mortality of a little more than 27%; and with the application of water in 800 cases, the mortality was only about 3%. Only think of the many people sick with typhoid fever the whole country over! See what a multitude of people die of typhoid fever every year. We can readily see what a terrible waste of life there is. If we can only get hydrotherapy into operation so that people generally will understand the method and utilize it, what a wonderful saving of life

there will be. There are more people sacrificed to drugs and wrong methods every year than are sacrificed in war and famine. We think it is a terrible thing to have a famine in India, and have some hundreds of thousands of people die; it is a terrible thing, yet right in our own country there are just as many thousands dying from sheer malpractice, from ignorance, error, from wrong things done for them. People treated with drugs--they can just as well die with drugs as to die without them, as to take nothing at all.

You do not seem to be impressed with the weight of these things as I suppose you will be after while. I hope the burden will roll upon your souls so that you will feel more keenly than it is possible for you to feel them now. In the atmosphere that we are living in, this thing does not appeal to us so forcibly as it will when we actually get into the work. I do not doubt that when you get into the work itself, you will see this thing more plainly than it is possible to see it now. I want to get it before you as much as I can now to start with.

The slowing of the heart is due to the filling of the blood vessels, and the increased resistance ahead of the heart. You have always to think that when cold is first applied, the peripheral vessels are contracted, and the blood can not as readily pass out as it could before, out of the small arteries into the veins, so that when the heart, being excited just as the vessels are, the heart being excited from increased activity soon fills up the blood vessels, and then the heart action is slowed. I tried to make it quite clear that the action of the accelerator nerves is to quicken the heart and to

increase its activity. It does the same thing to all the vessels of the body, the small vessels, the big vessels and the heart all act in the same way. The vaso-constrictors are the vessel accelerators. When you apply cold, it excites these. If you apply cold directly to the heart it will lessen it, actually slow it. When applied reflexly it quickens it, and that quickening is shortly afterwards changed to slowing. And why? Because the blood vessels become distended, the resistance of the heart is increased, and that slows the action of the heart. Strychnia slows the heart in the same way. Cold however, has the advantage over strychnia that while it excites the heart and increases its power, it slows its movements, because of the combined influences; at the same time it increases the peripheral heart, so that the whole blood movement is increased.

I called special attention to the fact that the effect of cold is to excite the heart, increase the activity of the heart, increase its rate of movement. The pneumogastric is excited in the same way that the accelerator is. We get a quicker beat, but the slowing of the heart is induced by the increased resistance to it. That is mechanical. It is not due to excitement of the accelerator nerves, only in an incidental way. Then how much influence the cold has on the pneumogastric, I don't know. The thing is complicated, and I do not think it has ever been thoroughly figured out just exactly how the mechanism of the application of cold,--just what it does to the heart. As I stated to you the other day, I have not been able to see the thing absolutely clearly. There

seems to be such confusion in the experiments in relation to the accelerator and inhibitory nerves upon the heart. Contradictory results are obtained.

The sympathetic nerves are temperature nerves, and connected with the vaso-motor centers, and the vaso-motors centers are connected with the heart in various ways; the sympathetic nerves, the accelerator nerves, the pneumogastric nerves,--all the nerves are brought under the influences of the cold application. The summing up, the total result of the application is the slowing of the heart, and increasing its force. As I said, I do not believe anybody has yet fully fathomed the absolute mechanism of the thing. I can see this very clearly, that if the accelerator nerves and vaso-constrictors belong to the same system, what happens to one happens to the other. One is operating with increased energy at first, and the other with diminished. This is a very interesting thing, and in this way it is very easy to explain.

Another illustration comes to mind that does help the situation out a little bit. A man takes exercise: the force of the heart is increased, the rate is increased, and the pressure is diminished. When a man takes moderate exercise, say a moderately active walk, the effect is to increase the rate of the heart beat, and the force of the heart beat, and at the same time to diminish the pressure. How would you account for that? You can test that, and try it. Very violent exercise will raise the pressure, but moderate exercise lowers the pressure. When I first began to experiment upon hydrotherapy fifteen years ago, I was very much surprised to

find it is so difficult to get a rise of pressure through a bath. Take a warm bath, and the heart is very much excited. Take a hot bath, and you would naturally think you would get a rise of pressure, but you do not. It is very difficult to get a rise of pressure with ~~with~~ a cold bath unless you take the pressure while the patient is in the bath.

In exercise the arteries of the muscles are opened up so widely, such a large amount of blood is passing through the muscles, that the blood pressure is lowered. The muscles are capable of holding half of all the blood in the body, and the consequence is the general blood pressure is lowered, because so large a proportion of the blood is taken into the muscles. When so much blood goes into the muscles there is actual lowering of the blod pressure, unless the exercise is so very violent that the heart is excited to such a degree that the blood pressure in the arteries is kept up notwithstanding the very large amount of blood taken into the muscles. When you apply cold first you get a very rapid movement of the heart, and it is not increased in vigor; it is a rapid movement of the heart, but nevertheless the blood vessels are quickly filled, and when the blood vessels are quickly filled, the beats come slower, so the heart has a chance to fill more completely, and as the vessels become more completely filled the increase of the volume of the blood in the ventricles ~~and~~ excites the heart to increased contraction. Here is a feeble person with a pulse of 160. Inject salt water into the tissues, increase the volume of the blood, and the pulse is steadily slowed. The increased volume increases the power of the heart, and slows the heart. The heart

needs to be filled, its walls need to be distended to produce the reflex contraction which makes a strong beat.

We had a case of a nervous woman. The doctor prescribed a hot and cold spray to follow hot fomentations. She had fomentations to the abdomen, and a hot footbath at the same time, then a hot and cold spray to fill out. She thought she would like to take the spray in order to learn to take cold water. She got in the spray and they could not make it very hot. I should think the water was 105 perhaps. When they gave her the cold, she said she had a cramp in her heart. We had a terrible time with her. She did not faint, but she acted queer the whole afternoon, and every time she would sit up she would have the same nervous feeling, her heart pounding like everything. The skin would get very red. The extremeties were a little cold. She should have had the hot spray to the legs to get them good and warm, and then she could have a very short cold spray, but she had an awful time. She had not yet been quite trained up to the shower; it was too vigorous for her. This is a very good illustrationof the evil of too strong an application.

There are a great many people who can not stand a cold application at all. There are some patients who can not stand it to be put down into a tub. The moment they are lowered into the water, they begin to have that same feeling about the heart. It is partly psychic, I think. Perhaps you have noticed it at baptism; as soon as some people came to be baptised they began to suffer very much from nervous disturbance. It is purely psychic. This case may have been both. It pro-

bably was, because she did not mind it so much until the water struck her.

You never should give cold water to anybody when they are afraid of it, or chilly; when they are sweating and exhausted, when they feel as though the cold water was going to make them shiver, and they tremble at the thought of it; that is a contra-indication. The fear of water is an instinctive notification that they are not prepared to use the cold water. That to me is a principle of very great value, to see that that instinct within the man, an automatic instinct we call it, a divine instinct, that ought to tell youthat cold water is not good for him applied in that form. It does not mean that he should not have cold water, but it means that he should have a minor application. If taken in that way he would not suffer any injury at all. Most patients suffer from headache, palpitation of the heart, severe headache, exhaustion, chilliness, and cold hands and feet. Those are all indications of the untoward effects of cold water.

This case was one in which a cold spray was contraindicated. Towel rubs ought to be given to such a case, and not a cold spray. It greatly lessens your hold over a patient when you make a prescription and the patient feels worse. He has lost all faith in your judgment. It is hard work to restore confidence again. So it is a good thing to recognize contraindications in advance. A patient who says he suffers a great deal from palpitation of the heart, can not use a cold spray. That is the reason why we have our graduated scale of treatments. We have carefully worked that up and have introduced some special new procedures. We find no trouble

with some of the [redacted] new methods that I have not dared to describe in any book, that I have found necessary from experience to introduce in order to complete the scale of graduation.

In graduating treatment for a person the first thing I would be a dry rub with the body exposed to the cold air. The next would be a cold wet hand rub. This thing seems easy, but every week I meet in consultation patients that have been damaged by the cold water in improperly graduated treatment. There is not a week but I run across cases of constipation here in the house that have been damaged, and I have seen hundreds of patients actually driven home by the fact that their treatment was not properly prescribed for them. I got a letter from a woman the other day who told me several people went home because their treatment was not properly graduated, and they got discouraged, got untoward effects from their treatment.

We are not doing things in the Sanitarium today as well as we ought to do them. We are improving all the while. Some of our doctors have studied hydrotherapy and know what they are doing, and do it just right. Some of them do not. Some of our doctors are safe to follow; some of them are not. Some of them, the Lord only knows how their patients get along. I can hardly say that of doctors that we have at the present time, because I think we have got the best lot of doctors at the Sanitarium at the present time that we have ever had in this world. We never had so good and qualified faculty as our doctors are now. They are bringing the work up to a higher level all the while. Go back a few years, and I tell you it was a desperate struggle to keep people from going home before

they had somehow gotten better. There is a general healthful tide in the institution that helps people even if there are a good many prescriptions that are not absolutely wise. It is worth while to study this question of graduation.

The dry hand rub, the wet hand rub, cold mitten friction, cold towel rub--cold mitten friction might be changed for salt glow, and in place of the wet hand rub you may have water flavored with a little witchhazel, or a little vinegar, or something else. I have sometimes tolerated that much concession, because it is an external application. There is a very little possible advantage in it.

The dry hand rub, the wet hand rub, the wet towel rub--what next? The wet sheet rub, then the dripping wet sheet, or wet sheet with pour. Then comes the cold shallow bath, the shower bath, then the horizontal jet, then the shower and jet combined, which is a very vigorous treatment; then the plunge.

Most doctors will not learn in any other way than by their own experience. I expect you will be just as foolish as the rest of them. When doctors get their diplomas they are independent and are going to do what they think best. However, my colleagues are all very sensible folks, and I have no quarrels with any of them. As I said before, we have got the most intelligent and scientific corps of physicians in this institution we ever had, and they are doing excellent work. Now and then we find a slip, and when there is a slip it is generally that thing,--the patient had a little too strong treatment; but I must tell you more; often I find it the other way; that the patient has been taking cold mitten friction for three months

I found a patient the other day who has been getting cold mitten friction since she came, and she has been here three months and is still taking cold mitten frictions. That is just like putting a boy to studying his A B Cs, and keeping him there; or studdying addition in arithmetic when he ought to have been promoted to long division.

When I deal with patients I do this thing: I take the patient, take his arm, give him mittenfriction, and see how quickly he responds. If a man says he has been used to swimming in cold water, that man can take vigorous treatment right off. No feeble person who has been cuddled in a warm corner should have this kind of treatment. Patients who have cardiac disease must be very carefully treated. People who have brights disease, diabetes, and people who have very sensitive nervous systems, must all be very carefully studied before making a prescription. Priessnitz always saw his patient take his first bath. He never omitted to see his patient take his first bath. He was always there to see him come out of his pack. He looked at the skin to see whether the skin was red or not, and went with him to his plunge to see what happened to him. If he found bad effects, he did not do that again. He could not predict beforehand what a man ought to have. When he found a dose was too strong, he tried it again. It was like the Irish woman; a lady told her to be careful of the temperature of the bath for her baby, and asked her how she knew whether the bath was right. She said, "Why, if the boy turns red, it is too hot, and if he turns blue, it is too cold." That was the way Priessnitz tried his baths. If he found the plunge was too strong, he gave them something else.

I will give you my theory of these chronic ulcers.

There is a boy over here who has asore on the ankle. When I first saw the boy, the bottom of the sore instead of the granulations filling the wound, there were just a few very unhealthy feeble granulations in the bottom. In ordinary granulated sores, when there is vitality, the granulations will reach up above the skin. In this case, there was a hollow and a few granulations at the bottom. The dead skin was round, smooth, and blue. Wat does that indicate? It indicates very little circulation. I said we will see what we can do with this by improving the circulation by the use of water--the hot and cold spray. The idea was to see if we could wake up enough vitality in that part so that a healthy healing process could set up. It has been going on a week or two, and not making much progress. The trouble with this waund is that there is a little area that has got so low vitality that it can not set up the healing process; and underneath the bottom of the sore there are tissues which are of such a low grade of vitality that they can not set up a healing process. The best thing to do is to cut the thing all out and make a healthy sore that will heal up right away. Ordinarily that is not necessary. Generally, hot and cold applications and massage of the limb is sufficient. A few days ago I ordered put on a heating compress, moist cloth covered with mackintosh and flannel. My idea was that by accumulating the blood in the part it was possible we might get up a little life; so we shall see it today and see how it looks. If it has not improved any, we will scrape the whole thing out.

I am not sure whether the alcohol and boracic acid is not good. I am not sure there is any particular advantage in antiseptic

in the antiseptic. I have seen the most wonderful healing take place in water. Dr. Frank Hamilton was professor of surgery in Bellevlew Hospital when I was there. He used to take men who had had limbs crushed on the street, all smashed up, and bring them into the hospital, put that leg into a trough, and keep water at about 105% running over it; and all the surgeons in the Hospital said the leg had to be amputated, but he would keep that leg there six weeks, and it would get well. I show in Hydrotherapy some pictures of the water trough. Did you notice them? There are also there pictures of the water dressing used in Vienna or Berlin, used by German surgeons away back forty years ago, before Lister discovered antisepsis. It was only the discovery of antisepsis that led to the disuse of water dressings. There is nothing better than water dressig especially the antiseptic dressing of Lister. I do not have much faith in a good many antiseptics. Certainly, corrosive sublimate is not a good antiseptic to use, because it is poison, and general lowered resistance is the cause of this sore. He ought to have tonic treatment at the same time.

BURNS.

There are two kinds of burns. First, burns to which the injury is confined to the skin, the superficial layer of the skin, in which the deeper layers of the skin are not destroyed. When you have a burn in which the skin is left intact, a superficial burn, the proper thing to do is to apply picric acid. Apply picric acid; then apply bandages to protect the parts. Apply a saturated solution. Paint it over the parts;

when it dries, paint it over again. Keep doing this until you have a thick dark layer of varnish. What is the characteristic of picric acid? We use it sometimes as a test for albumin. It congulates the albumin. It makes a hard coagulant like white of egg. It serves as a protectant to the skin. It remains there and allows new skin to form underneath. By and by when the new skin is entirely formed, the old skin will peel off. The next best thing is the application of soda; plaster the parts all over with soda. Mix a little water with it, plaster the parts all over, and then put bandages outside. Put mackintosh on instead of linen. Put mackintosh outside of the soda, then cloth outside of that. The effect of that would be the same. The soda by the process of osmosis will take the water out through the thin skin, and so cause the skin to hug the flesh. If you have a blister put on soda, cover with mackintosh, and the next morning the blister will have disappeared, and instead you will see the skin flat upon the surface, and in the course of a few days there will be a hard skin like varnish or collodion paint. It really accomplishes the same thing, leaves a protective covering.

If you put it on in the form of paste you can spread it on, even spreading it over the whole surface so as to protect it from the air. You can not spread it on very well dry. It will only be a little while before you get the soothing effect from it. There is nothing better than soda. You can use salsoda, or baking soda, or carbonate of soda, or bicarbonate of soda; but do not use baking powder.

Suppose the skin is off, and it is a very deep burn

so the skin is gone. There you have got an open wound, and the best thing you can put on is iodoform dressing. There is going to be a slough in spite of everything. The tissues will be damaged and slough off, and you want to prevent putrefaction of those dead parts. Simply apply iodoform gauze, a couple of thicknesses. Lay it all over the part, and put the water dressing outside of that. First of all put yellow vaseline all over the surface. Then put on iodoform dressing; then put on cool water dressing. That relieves the pain. Gutta percha tissue outside of the water is good, and evaporation is good at the beginning because the parts are hot and feverish. I am

I shall never forget an experience I had down in Mexico some years ago. The train ran off the track and rolled down the bank, and the sleeper I was in,--we had a couple of porters, and these porters were in the buffet. The boiler was full of water, and the gas was lit. When the car turned over they saw they were going to be upset, and they ran for the door. They were both trying to get through the door at the same time, and as a consequence they did not get through, and the water tank tipped right over, and the whole of the hot water came right upon their bodies about the middle. Of course they had on heavy woollen clothing, and the clothing was saturated, and they were just thoroughly blistered from their waist down to their heels, and the poor fellows made a loud outcry. I happened to be the second one off, and hurried up to see what I could do to help folks. The baggage car and express car had upset, and they had a car full of red pepper in sacks, and the sacks were all pi

sheets were all piled up on top of the baggage cars. We had to pour water down from above to resuscitate him while digging him out. I found these poor porters lying on the ground under a bush. Someone had helped them to get their clothes off, and they were suffering dreadfully, just groaning. The Pullman conductor was applying whiskey to make them drunk. It only made them grow the louder as they lost their self-control. I got some sheets and went to the water tank for water. I found the water was all running out of the tank through a hole, but I got some sticks and plugged up the hole so as to save the water to saturate these sheets, and I wrapped the sheets around their legs and their bodies, and it was not three minutes before they were completely relieved. I had someone carrying water and pouring it this cold water over the sheets. We wrapped them up in blankets, and they slept comfortably all night. When we got on board the train next day and got the folks up, they were the most grateful fellows you ever saw. Sometimes tepid water is better than cold. Cold water will produce too much reaction. I am inclined to think in mexico the water is always tepid, so I think this was not very cold water.

This man who was burned at the Haskell Home the other day is over at the Ward now. They treated him on this plan; they have been cooling his face and hands with tepid water. They had tried cold water, but it gave him so much pain they resorted to tepid water, water at 92°. You can see why that would be better. If it is a bad case and there is going to be a great deal of slough, it must be immersed in water. If you cannot immerse it in water, the next best thing is to have

it wrapped up with cloths, oiled muslin, and wrapped up with absorbent cotton or cheesecloth, and have irrigation.

When the wound suppurates the best thing is to wash it out thoroughly with ordinary soap and water, then apply the iodoform gauze; and if the suppuration is very profuse, there should be irrigation for a few days. If it is not very profuse, if the granulations are already well formed, dry dressing is just as good. It has got beyond the painful stage by that time, you see, and the dressing of iodoform gauze is sufficient. If you see the edges of the wound are blue after a burn or any other kind of wound, that indicates lack of vitality, and such a case should always have alternate applications. A very good way is to soak it in hot water for half a minute, then take it out and with a pail, or dipper, or hose, pour cold water over it, put it back for another half minute; take it out, pour a dipperful of cold water over it, and then back again. It is not necessary that the hot water should be poured. You pour on the cold water to encourage reaction, but with the hot water you get dilatation of the vessels; so simple immersion in the hot water is quite sufficient.

V-5-6-4--3.

THE NEW DIETARY.

Sanitarium Parlor, Battle Creek, Mich., May 5, 1904,

Lecture by J. H. Kellogg, M. D.,

Pawlow has given us a new basis for the classification of foods. According to Pawlow every food contains certain subtle substances which are capable of causing the digestive organs to secrete and to pour out the fluids which are necessary for the digestion of those foods. For example, those foods which require a large amount of saliva cause the salivary glands to pour out saliva. Dryness is the quality of foods which most appeals to the salivary glands. Sweetness and other characteristics of food does not call forth an abundant flow of saliva as does dryness. For instance, a bit of dry Granose requires for its insalivation twice its weight of saliva. An ounce of Granose chewed in the mouth, mouthful by mouthful, morsel by morsel, causes the pouring out of two ounces of saliva; so that this dry, flaky Granose has a remarkable power of stimulating the action of the salivary glands.

Pawlow showed this in a very curious way. He took a dog and performed an operation upon it by which the esophagus was brought out through the skin and attached to the skin, so that whenever the dog swallowdd anything, it fell out upon the floor and did not go into the stomach at all; so the dog kept right on eating, when he was hungry he would eat for seven or eight hours at a time. He had the pleasure of tasting a great deal of food while his appetite got stronger all the while, because he had no food. The longer he went without food the hungrier he was, and the more earnestly and eagerly he

ate. He found that when he gave thi s dog pebbles, the pebbles only produced a very little saliva. They only required a small amount of saliva, enough to lubricate them. He would toss the pebble at the dog, and the dog would catch the pebble in his mouth and swallow it. He would keep throwing pebbles, and the dog would continue to swallow them, so that there was a regular hail storm of pebbles. If he took those pebbles and crushed them into fine sand, and put them into the dog's mouth in the form of dust, the salivary glands poured out a very great quantity of saliva.

Another very interesting observation he made was this, that if he stood off and threatened to throw the pebbles at the dog, simply made a fe nt to throwgh the pebbles at the dog, the dog snapped his mouth and began to secrete saliva just the same as though the pebbles actually entered his mouth; but only a very little. Just a few drops of saliva would pass down the esophagus; but when he threatened to throw the sand at the dog, there came pouring out a great deluge of saliva so that the mere sight of the sand caused the dog's salivary glands to make saliva. We have heard about the mouth watering when we smell or see something appetising, or something that is very pleasant, very savory, very agreeable, you say, "It makes my mouth water; the very sight of it, or the smell of it just makes my mouth water." So it was with the dog, the sight of the sand made his mouth water. I dare say that very few of us would have that experience at the sight of sand; but the dog had that experience. When he saw the sand he knew just what it felt like, and knew it took a large amount of saliva to get the sand out of his mouth; so the very sight of the sand caused

the saliva to flow into his mouth very abundantly.

This shows the relation between our brains and our stomachs. A French physician a good many years ago wrote a book entitled "The Brain and the Stomach." In this book he called special attention to the marvelous relation that exists between the brain conditions and stomach conditions. For example, a man with a brain that was very much exhausted by trouble, or worriment, would have trouble with his stomach; it would not digest. On the other hand, when the stomach was in a state of indigestion, the brain would be disturbed so as to produce moroseness, and produce apprehension and confusion, and sometimes produce symptoms exactly like those of apoplexy. He cited the case of a woman who frequently would be seized upon with sudden attacks of blindness, and would fall headlong on the floor unconscious for a few moments. He also cited the cases of several men who had this same experience. I remember very well the case of a lady who came here soon after I read this book, and I recognized the case at once as a similar example. It was a lady from Chicago who came to us to be treated for very curious spells that she had. Every little while she would have a curious experience; everything would appear to be red. The landscape was red, the grass was all red, the trees would look red, and the leaves would appear to be red; everything she saw was red; the people, all the men, and all the women she saw looked red, everything was red. Sometimes everything looked blue, or perhaps black, and occasionally everything would be green. It was a very curious experience, and sometimes she would become absolutely unconscious. I presume some of you have seen things blue sometimes; but fortunately

this lady did not have that experience; she only saw things red, green, and black. I found on investigating this case there was nothing the matter with this lady's brain, although she would sometimes fall unconscious from a sudden sound. A little jar, the rattling of a street car, the blowing of steam, the ringing of a bell, or any sudden noise or explosion would cause her to fall down unconscious. I found that she had nothing the matter at all but a bad stomach, and under treatment she made a good recovery. She had a prolapsed stomach, and the food taken into the stomach would lie there and ferment, and decompose, and produce poisonous substances, and these poisons were absorbed into the blood and had the effect of so intoxicating her brain that she would fall unconscious, just as the same effect as though she had taken morphia, or alcohol, or some other subtle poison. She made, as I said, a perfectly good recovery, simply by putting on an abdominal bandage to hold the stomach in place, and by strengthening the abdominal muscles so that they would be able to hold the stomach in place. Besides this, of course, she changed her diet, and had to give her stomach the food which it could deal with. With a little help the crippled stomach was able to digest good, wholesome food; and this woman has enjoyed good health ever since. Her home has again become a happy home, and for the last ten years she has been able to do her duty by her children, to care for them, to rear them and superintend her home instead of being a confirmed invalid and a burden to everybody about her. Her difficulty all came from her stomach. Her friends thought her brain was affected, had something the matter with it but the trouble was all with her stomach.

A number of years ago a ~~fine~~ clergyman came here, and he said to me, "Doctor, what shall I do? Had I better come here to the Sanitarium, or had I better go to Europe; get a good vacation of a year, and go to Europe? The doctor tells me I am threatened with softening of the brain." I examined this man and found that he did not have any trouble with his brain at all. It was hardening of the liver; that is the only thing that threatened him. Sometimes it affects people in one way, and sometimes in another. This man simply had indigestion. The food taken into his stomach would not digest; it would remain there, and decay, and ferment, and produce poisons, and interfere with his liver; these poisons affected the brain, and he had all the symptoms of a man who had softening of the brain. It wassimply a crippled brain, and not an organically diseased brain.

I remember a similar case of a lady who came in, sat down in the office, and looked very melancholy indeed; had a very downcast countenance. She told me about a friend of hers that had died, and who, she said, had a "very long favored countenance." Well she did have a very long favored countenance She said, "Doctor, I do not know what is the matter with me. Doctor, I am cross. Doctor, I scold my husband, I scold my children, I scold my neighbors; I am cross all the time. Doctor, do tell me, am I sinning? Am I wicked?" This lady you see thought she had hardening of the heart, or softening of the brain; but she had nothing of the kind. I looked at her tongue, and it was covered over with a thick coat of germs producing poisons; and all along her stomach was in the same condition; the whole alimentary canal was in that state, covered

with poison-producing germs. I was glad to tell her that her case was not ~~xxxxxx~~ a case of total depravity, but a case of total indigestion. Thousands of cases are like this.

Prof. Vincent was here some years ago, and he told our patients of some people who thought they had been converted and experienced religion when they had only had a bilious attack. That is, they got to feeling kind of bilious, felt kind of solemn like, sort of melancholic, and thought they were converted, and had really experienced religion. I suppose these folks thought that was the way Christian people felt all the time; but that is quite a mistake, according to my way of thinking, at any rate.

We have been learning a whole lot the last fifteen or sixteen years about autointoxication, and how different conditions which can come, affect the body. We are learning more all the while. We have had a terrible disease to contend with these later years, which has been multiplying very fast, known as pernicious anemia, in which a man begins to lose his blood, and his blood count just goes right down from 5,000,000 corpuscles in a little drop of blood, the very smallest drop that you can measure with the millimeter, one-twenty fifth of an inch in diameter--a cube of blood of that size contains five million red blood cells in a healthy man. But women do not have quite so many blood cells as men do. A man will be examined and found to have only two million, and in a few days, a few days later, he will have only one million, and in a week or two perhaps it will be found that that man has not more than half a million blood cells where he ought

to have five million.

Some years ago we had a man whose blood got down to four hundred thousand, only about one-thirteenth of what he ought to have. That man was so nearly dead that we had to keep him in a horizontal position all the time; in fact we had to tip his head down a little so the blood would run out of his heels down to his head to keep him going. If we raised his head three inches, he would faint away. We had all we could do to keep him alive; but we had already discovered what was the matter in these cases, that it is simply autointoxication, poisoning taking place in the alimentary canal. The decomposition, and growth of germs in the stomach, in the bowels, in the colon, is so great that the whole body was flooded with poisons generated in the body. This bad taste in the mouth is not simply in the mouth; but it extends all through the alimentary canal. This poisoning is taking place along a tract of thirty feet, and it would be thirty feet long, and presenting a surface of many square feet, a good many square feet. The intestinal surface is much larger than the skin surface. The skin suface is 17 square feet; and there is a much greater intestinal surface because of the great number of convolutions, foldings, and the progections of the papillae. We had to give this man the simplest kind of food. The first thing we gave him was fruit. You will say that fruit is not very nourishing, not a very nourishing diet; so it is not; but this man needed first of all a disinfecting. He needed to stop this flood of poisons going into his blood. These poisons dissolved his blood. Take a drop of blood and add to it

certain substances and they wil l dissolve the blood cells. This man's poisons were being dissolved into the blood, and they dissolved the blood faster than the blood cells could be made. The way to stop that was to kill the germs that were making the poisons. So we gave this man fruit juices in large abundance. He took large quantities of fruit juices, all we could get him to swallow. Every little while he would take a glass of apple juice, or orange juice, or lemon juice, any acid fruit juice, because these fruit juices have been proven to be capable of destroying all kinds of disease producing germs. There is not one disease producing germ that will survive an attack of fruit juice. It is worth while to know that. In cholera districts, when you are somewhere where you can not get any water to drink, that has been boiled, if you will put the juice of a lemon or a sour apple into the water, you can disinfect it completely. The juice of one-half a lemon will disinfect one glass full of water. One lemon will disinfect a quart of water, and make it perfectly safe. It wants to stand fifteen or twenty minutes, so as to give the acid time to act. Every known disease producing germ is killed by fruit juice. Nearly all fruits contain more or less acid. Even the sweetest orange you ever saw has got nearly as much acid as sugar in it; not quite so much, perhaps, but quite a little amount. The orange has about 10% sugar, and 2 1/2% acid. The lemon has 7 1/2% of acid, and 8 1/2% of sugar,--more sugar than acid you see, but the acid is stronger than the sugar, so it tastes very sour.

Now these facts are of immense value, for that fruit juice is capable of disinfecting the alimentary canal.

That is the secret of the success of the grape cure, and the peach cure, and the cherry cure; that is the real secret of their success. These acid fruits taken into the stomach, and passing down into the intestines, disinfect the alimentary canal, and destroy the germs. They do something more. Pawlow showed that these acids of fruits when brought down into the stomach and passing into the intestine, cause the intestine to make a disinfecting juice. The bile pours out more abundantly; the pancreatic juice pours out more abundantly, the intestinal juice is more abundant; so the intestinal digestion is performed with greater efficiency when there is a liberal amount of acid brought down from the stomach into the intestine.

This is a very interesting process. The saliva is alkaline. It stimulates the stomach to make acid juice. The gastric juice is acid, and this acid juice passing down into the intestine stimulates the intestine to make alkaline juice; so each one makes xx xpp the opposite of the other you see. It is very necessary that this should be so, because when the saliva takes the alkalis out of the blood it is necessary that the balance should be restored. So the next digestive organ that operates upon the blood takes out acid instead of alkali, you see, and that balances up and keeps the blood in its normal state; and after the stomach has taken out a large amount of acid, the food passes on into the intestine, and the intestine reverses the order and takes out a large amount of alkali, and in that way the balance of the blood is continually maintained, and the proper degree of alkalinity is maintained, which is

very necessary to maintain the integrity of the corpuscles. Pawlow pointed out the wonderful fact that all foods contain substances capable of generating the digestive fluids, which digest these foodstuffs. Each one generates its own digestive fluid. Starch, for example, requires saliva to digest it; so the dry bread causes the salivary glands to pour out a large amount of saliva. The taking of this starch into the mouth, causing the saliva to pour out abundantly, is not all of it. Something more happens.

Down in the intestine, below the stomach, is the pancreas, or the abdominal sweetbread, as it is sometimes called, which makes pancreatic juice. This digests starch also. So if dry bread is taken into the mouth, not only the salivary glands are stimulated into activity, but also the pancreas, away down below the stomach; and also the stomach is stimulated at the same time to pour out gastric juice. The pancreas is getting ready to pour out abundantly the pancreatic juice.

There is another very interesting thing. Suppose one eats bread and butter. The butter is fat, and the saliva does not digest fat. The gastric juice does not digest fat, but fat is digested in the duodenum, and throughout the whole length of the small intestine. So when the fat is taken into the mouth, the effect of this presence of fat in the mouth is to notify the pancreas that fat is coming along, and it must get ready to digest fat, and it begins to prepare the pancreatic juice, and to pour it out into the intesting and have it ready when the fat comes along. This is one of the wonderful things that Pawlow has demonstrated. He has shown it to be a

fact by his experiments upon dogs. The experiments have proven beyond all possibility of doubt that these things actually happen as I have explained to you. He has a great many dogs, and he has xxxx performed operations on a number of them, and made windows into the dogs' stomachs, so he can see absolutely and exactly what happens. These experiments have enabled us to make a new classification of foods.

We find in patients coming to us for treatment different conditions. For instance, here is a man who makes too much acid in his stomach. I met a man today who said, "Doctor, I suffer so much from acidity, and from sour stomach; my stomach gets so sour and so acid." When does your stomach get sour? I asked. He says, "O, every time I eat; within half an hour after I eat my stomach is sour." Well, I told him that his stomach was not sour, then in the sense in which he thought it was. The stomach does not ferment. What it does is this: It simply makes too much acid, and it does not make enough pepsin, because the stomach makes both pepsin and acid, and when the pepsin and acid are made in the proper proportions, the acid combines with the food by the pepsin. It acts in a catalytic way. The mere presence of pepsin causes the acid to combine with the food so this action taking place in the stomach, the acid never accumulates. Whenthere is not enough pepsin, the acid accumulates, and in consequence of this accumulation of acid, there is an irritation xx xxx set up; the mucous membrane is extremely irritated.

Here is a man who has too much acid and too little pepsin. That man wants something that will stop the forma-

tion of this excessive quantity of acid, and something which will increase the formation of pepsin. Doctors have been puzzling their heads for years to know how to get along with this sort of cases. They have thought that the only way to do would be to give patients things that would make them sick. Atropin was one thing, but it stopped other things besides the acid, and so made trouble. Ipecac has been used in other cases to stimulate the liver, but it stimulated the stomach too much, and in that way made the man sick at his stomach. So various mischiefs have been happening from these various drugs that have been used to regulate digestion, and they have all been abandoned. The most eminent physiologists in the world, for example, Prof. Ewald of Berlin, Boas of Berlin these men of world-wide reputation have come to the point where they brand all these things as being absolutely useless; and Prof. Kuttner, the associate of Prof. Ewald, said to me a couple of years ago when I was visiting Prof. Ewald's laboratory, "We use nothing but foods for the treatment of gastric disorders; everything is food." I said, "What drugs do you use? "None at all--only foods, nothing but foods; we do everything with foods." The assistant of Prof. Boas told me the same thing. He said, "Medicines accomplish nothing; they give a little temporary aid, but they are found to be worse than useless, because they leave the stomach in the end in a worse condition than it was in the first place." Everything must be done with foods. Why? Because foods are the natural stimulus of the stomach. They furnish the natural stimuli by which the digestive apparatus is enabled to perform its work.

So the patient now makes too much acid, we will say. What he wants is something that will emble him to make pepsin. We do not want something to stop the formation of acid so much as to find something that will encourage the formation of pepsin. The pepsin then will cause the acid to combine with the foodstuffs, and in that way there will be no excess or accumulation of acid. Pawlow has discovered that there are things that will encourage the stomach to make less acid and to make more pepsin; and curiously enough, the very best thing for this purpose is one of the most simple, every-day articles of food, that venerable, old, staff of life--ordinary bread. Ordinary bread; when bread is chewed in the mouth a long time, some portion of it is converted into dextrin and other subtle substances are produced along with the dextrin which we do not exactly understand as yet; but certain aromatic substances are produced along with the dextrin, as the saliva acts upon the bread; and these peculiar, subtle substances , even a very small quantity, have wonderful activity in their potency. These substances act upon the stomach glands, influence them to pour out a great amount of pepsin, and this pepsin causes the acid to combine with the gluten in the bread, and so the acid is neutralized.

Further observation has shown that if this bread is subjected to a high temperature so it is made brown, in other words if it is converted into zweiback, thenthis peptogenic property is still further increased, enormously increased, because there is a much larger amount of dextrin formed. The high temperature converts the starch into dextrin; so that is the same thing the saliva does, but does it more completely,

and much more extensively than the saliva has appeared to do it, while the food remains in the mouth so short a time, as is usually the case. But we see from this the importance of chewing. The longer the food is chewed, the more pepsin will be developed in the stomach; so chewing is of great advantage, not only to aid the digestion of starch, but also to cause the stomach to develop the amount of pepsin and other digestive substances, and to notify the pancreas to develop its fluid so as to be prepared for the work of completely digesting the food as it comes along.

Pawlow showed another interesting thing also; that is that when bread is chewed in the mouth, and no other food is taken, that the amount of acid formed in the stomach is small. Less acid is formed and more pepsin. That is exactly what we want in these cases. So zweiback is proved to be one of the very best foods for these cases. We know that long ago from experience; for twenty-five years we have known this. So for the last twenty-five years we have been preparing peptogenic substances without knowing why they were peptogenic. In Carlsbad zweiback was shown to be one of the greatest and most advantageous factors in the treatment of dyspepsia. Pawlow has not discovered anything new, but he has discovered an explanation for an old fact, and this explanation is thoroughly satisfactory, and puts the use of zweiback upon a thoroughly scientific basis.

He also discovered another thing, and that was that fats lessen the formation of acid; that when fats are taken along with the food the presence of fat in the mouth, while

it encourages the pancreas to pour out pancreatic juice, and encourages the liver to make bile, it at the same time discourages the formation of acid in the stomach. When the fat enters the stomach somehow it inhibits the action of the gastric juice and lessens its development. We can readily see why it is that some people are bilious when they eat fats. These fats prefent the formation of gastric juice which is necessary to disinfect the food. So the food remains in the stomach and decays. Everybody who has a slow stomach must avoid fried foods and all kinds of greasy foodstuffs. Pastry, very short piecrust, griddle cakes, doughnuts, and every thing of that kind must be carefully avoided for the reason that fat prevents the formation of gastric juice, and the formation of acid. Acid is very necessary to preserve the food, to disinfect it in the stomach. It kills germs, and prevents the food from undergoing putrefaction. When a person has a dilated stomach, and the food remains in it a long time, he generally has too little gastric juice already, and if he takes fats, fried foods, buttered toast, pastry and things of that kind, the consequence is the stomach will make still less gastric juice, the food will remain in the stomach still longer, and the food will undergo decomposition, decay, and putrefaction will take place and there will be a sick time, and when this day comes he will vomit offensive, decomposing matter. This is a thing that occurs not infrequently. Thousands of people suffer in this way simply because their gastric juice is interfered with; and most often, as I have said, it is a result of taking fat, especially buttered toast. Ladies who take tea and

toast for breakfast, for example, are particularly liable to this trouble,because the tea prevents the digestion of the starch. The tea absolutely prevents the digestion of the starch stops it entirely, and the fat, butter, taken along with the toast, it prevents the digestion of the gluten; because the gluten needs gastric juice, and the fat prevents the formation of the gastric juice; so tea and toast makes the very worst possible combination anybody could concoct. You could not possibly get any worse; it is a combination that absolutely can not digest.

We might dwell at considerable length upon some of these points, but I do not want to tax you too long; I just want to give you a little idea of how to classify foods.

Here is a man who wants less acid and more pepsin. Now the important thing is to give that man something that will inhibit the formation of acid. What will do that? One thing will be all kinds of fat-containing foods, that are wholesome. Nuts, for example. There is nothing better than nuts. But suppose he can not digest nuts. Well then we will give him malted nuts. This is of special advantage because it contains a good deal more fat than ordinary cream does; then in addition to that it contains peptogenic substances which cause the pouring out of pepsin, the production of pepsin; so the malted nuts is a preparation which has been made especially to meet those cases; for it prevents the formation of acid, and increases the formation of pepsin.

Now you can get the same effect without eating malted nuts. You can get the same effect quite simply. You may take zweiback, for example, or bread and rich cream, if

you can digest cream. There you have a splendid combination; simply bread and milk, or bread and buttermilk makes a very good combination; or the toasted wheat flakes; any of this sort of toasted flakes--there are a good many kinds of them now-a-days. There are all much alike, but some of them are adulterated with various things. Toasted Wheat Flakes, Granose Flakes, or Toasted Corn Flakes,--these all contain a large amount of pepsin forming elements, peptogens, which are the result of the dextrin produced in the digestion of these foods. It produces dextrin, which Pawlow has shown capable of making pepsin in the stomach. Ripe olives are very excellent also because of the large amount of oil which they contain. Olive oil may be taken if you like it. If you have not a dilated stomach, you can eat salad, with olive oil on the salad. A little olive oil taken before breakfast is an excellent for such patients--a tablespoonful or two is very excellent in cases of this sort. If you use cream or milk, it must be a jersey milk or cream diet, because in this there is a good deal of fat, and you want the fat to prevent the formation of these acids. Zwieback, Granuto, and all these malted foods--they are all satisfactory for this purpose; and we have a special food, Panpeptogen in which these elements are concentrated, so that persons who require extra help of this kind, can find it in Panpeptogen.

Here is a person who does not make enough acid; he will wants more acid, perhaps more pepsin too. A man never can get too much pepsin, but you often have too little acid. There is generally pepsin enough, so that we do not have to bother so much about that. If we take care of the acid, the pepsin will take care of itself, usually. We must have more acid. What

will be useful for that? All kinds of foods that are tasty are good provided there is nothing in them that is detrimental. Pawlow showed there were two stages of gastric juice production; first, while the food is in the mouth. Within five minuted after taking the food into the mouth the gastric juice will pour out, that is if it is a food you like. But if it is a fod that you do not like, the gastric juice does not flow. It is very necessary that the food should be tasty, and the juice that is produced in this way is what Pawlow called appetite juice. He found his dogs were so sensitive when they were hungry, that if they saw the assistant coming into the room who was accustomed to feed them, when he even came into the feeding room, when the dog saw this assistant coming in at the door, his appetite juice would immediately begin to flow, in less than five minutes; so he had to be very careful about making his experiments.

After he had fooled his dogs several times, the appetite juice would not flow when they came into the room; then he would bring in some meat, offer it to the dog; not let him have it; the first time the appetite juice would flow, but the next time it would not.

So the appetite juice, although it is purely a reflex phenomena, after the dog has been disappointed a few times, the appetite juice would not flow. After he had disappointed the dog two or three times, he would have to take a great deal of pains in making the experiments to cause the juice to flow. He would have to bring in the meat, and the dish he fed the dog in, and show it to the dog, let the dog smell it; then take the meat and pick

meat and pick off a little piece, scrape it out, and put a little piece on the dish he fed the dog in, and show it to him and let him smell it, then pick off other pieces and drop them in the dish, then another little bit of a piece, and so proceed with the entire piece to sharpen the dog's appetite, and by and by the dog's confidence would be restored that he was going to feed it to him. If the greatest care was not used in the experiments, the dog would cease to respond to the experiments, and the appetite juice would not flow.

But here is a man who has not got enough gastric juice does not make enough hydrochloric acid. First, he must have foods that he likes. This has come to be a scientific principle in cookery. Food must be prepared so it must be tasty. Every one knew that by his own experience. He knew he could not digest food very well unless he relished it. Doctors always say, You must have something you like. So it is almost a universal custom, when a person has been sick for a long time, for the neighbors to bring in something, some new indigestible things for the patient to try, and the patient is certain to be upset more or less. One of the greatest trials doctors have now-a-days to keep the neighbors away. You remember the story told by one of the Beechers, how that one time when he was already suffering for having eaten a large mince pie, and ~~one of the neighbors~~ his aunt said to him, "Thomas, you don't look well." "Just go into the pantry and help yourself to a piece of cake." She had just prepared some extra nice rich cake, and although his stomach was upset by the mince pie, his good aunt told him to eat some cake because he looked sick. A good friend of

mine who was very fond of cake and pie, and always wanted some before going to bed at night, came home one evening, and found his wife had gone to bed. He shouted up the chamber stairs, "Maria, Maria, where is the cake? His wife shouted back, "O, I am so sorry, John, but there is not any cake tonight." He then went to the pantry and hunted for pie. He could not find any pie, and he shouted up stairs again, "Maria, Maria, where is the pie?" And she shouted back, "O, John, I am sosorry, but there isn't any pie tonight." And he shouted back, "Why, Maria! What would you do if somebody should be sick in the night?" You see that is the old idea that if a person is sick he must have something to eat. But back of that is something more; he must have something he likes; for a really sick man will digest pie as indigestible as it is, if he likes it, better than ~~x th~~ he can digest a thing he does not like. If the appetite rebells, he absolutely can not digest it. I had one patient that I recommended to try all kinds of things that I thought would be good for her, and she finally got down to gluten gruel, and she refused to digest that. Finally I said; Eat everything you want, and ordered the whole bill of fare, and she digested it without the slightest difficulty, and had no ~~difficulty~~ trouble at all. She had been vomiting and retching everything for six weeks; but when she had the whole bill of fare, and had everything she liked, she had no trouble at all. I would not recommend a hotel bill of fare in that way, but the sanitarium bill of fare will do very well.

Pawlow has shown this, that we must have appetite juice if we want to digest. In order to get the benefit of the food we relish, we must keep it in the mouth long enough to

get all the taste out of it.

This swallowing of the food as fast as you get it into the mouth puts you at a great disadvantage, because you swallow a whole lot of food and you only get very little taste. Every bit of taste in that food is necessary for its good digestion. In order for you to digest the food well, you must get out of it all the flavor there is in it, and this flavor in the food, as it is developed in the mouth through the central nervous system, through the nerve centers, causes the stomach to pour out appetite juice; but if you do not get the flavor you do not get the juice; so the more flavor you get the more juice you get; and the longer the food is retained in the mouth the more appetite juice you get; and if you keep the food in the mouth and extract from it all the flavor there is in it, you get all the good there is in the food. The appetite juice is there already to digest it. It is appetite juice that is produced while you are chewing, while the process of mastication is going on, and this is the best, the most active juice, and the most important digestive fluid portion of the digestive fluid; so if there is no juice he will produce in his stomach by the very act of chewing enough gastric juice to digest the meal. So here is a man whose stomach has got so slow that it is not capable of digesting food in actual contact with it; but this man who can not develop gastric juice, still by the chemical action of the food upon the stomach, through the psychic influence of the food while it is still in the mouth, is able to digest it. After the food has been swallowed into the stomach, the contact with of it with the mucous membrane

of the stomach causes it to make gastric juice which is called chemical juice; but the most important thing of all is the ~~xxxx xxx juxxxx~~ appetite juice.

When food is swallowed down into the stomach, this mucous membrane is stimulated by the food stuff itself, and there are certain substances in the food which influence the development of acid in the stomach. For instance, in milk there are fats/ Fat lessens the amount of acid which is produced, so that milk produces the weakest kind of gastric juice, the very weakest sort of gastric juice; while bread produces the strongest kind of gastric juice. Meat produces the most highly acid gastric juice, but not the strongest gastric juice. The relative digestive powers of these different fluids are, for milk 11, for meat 16, for bread 44. Bread produces this amount of digestive activity, meat 16, and milk 11; so if we want to discourage the activity of the stomach, if we have a stomach that is too active, we will give the patient milk. On the other hand, if the stomach is slow, bread will be the better thing. Meat is not much better than milk. Pawlow showed that skimmed milk is just as good as beef steak, and produces just the same flow of gastrick juice as meat does, ~~xx~~ for it contains the same amount of solid substance; but if the milk was rich, and contained the fat, then it lessens the amount of gastric juice produced to some degree. So people who have slow stomachs ought to avoid the use of milk. Persons who do not produce acid enough, should not eat milk, because milk will still further lessen the activity of the stomach, and will decay in the stomach and produce coating of the tongue, headache, biliousness, nervous headaches, inactive bowels, and

a variety of other troubles that grow out of a deficiency of gastric juice.

But what can such persons take? Sweet fruits, saccharide substances encourage the flow of juice. Even cane sugar will stimulate the flow of juice, but cane sugar is not good because at the same time it causes a flow of juice, it causes an enormous flow of mucus, and the mucus interferes with the action of the juice after it has been produced, and produces by and by, gastric catarrh. So cane sugar must be avoided. Honey is better than cane sugar. Maple sugar and syrups, all these things are of course akin to cane sugar; but we have other sugars. Sugars are produced naturally in the process of digestion. If we chew the starch for some time, that starch will be converted into sugar. This sugar will cause the stomach to make gastric juice, and that is the natural order in which the food stands, you see. The action of the saliva upon the starch converts it into sugar, and the sugar in the stomach causes the gastric juice to be poured out, which digests the gluten in the bread. Then as the food passes down into the intestine it causes the pouring out of pancreatic juice, which causes digestion of the food.

All kinds of malted foods stimulate the digestive fluids in the stomach, and the juices of fruits also have this effect. Peas and beans are powerfully peptogenic. Bean broth, peas broth, vegetable broth, purees of peas and beans have the same effect. Practically all kinds of meat juices are very peptogenic, stimulating the flow of gastric juice; but meat j juices are objectionable for other reasons.

There is very much more to be said on this question. It may be a little tedious for some of you to go into all these details if you are not all suffering from gastric disorders, but a few words further may be interesting with reference to foods required by special forms of disease.

Here is a person with a dilated stomach. What must he eat? What happens to that patient? We say here is another case of a man ~~who~~ whose pylorus is obstructed so that food does not pass quickly out of his stomach. The man's stomach is feebly weak so that food does not pass quickly out of his stomach, and can not empty itself quickly; so he feels a depression, a weight in his stomach. What would be good for such a person? In the first place, such a person must take care to eat foods which will not decompose and decay, and ferment in the stomach very readily. So such a person ought to avoid cheese. Why? Because cheese is already fermented and decomposing. It is already full of germs, and able to set up a ferment and putrefaction in the stomach. He should also avoid meats, because he has little gastric juice, and gastric juice is necessary to prevent meat from putrefying. That is the only thing that will prevent putrefaction of the meat in the alimentary canal. He must avoid fats because they prevent the formation of gastric juice, and he needs more instead of less. So he must take all those foods that are useful for such persons who have slow stomachs to begin with. He must avoid all kinds of foods which readily undergo decomposition. He must avoid coarse foods, cabbage, celery, lettuce, salads, and things of this sort he must avoid entirely--carrots, beets, parsnips, vegetable oysters--everything of that sort. He must avoid all kinds of

foodstuffs which contain skins and hulls, like peas, beans etc., from which hulls have not been removed. He must avoid the skins of cherries. If he is eating grapes, he must be very careful to reject both skins and seeds. In eating raspberries, and blackberries, he must reject the seeds. In eating peaches, he must reject not only the skins, but he must look out for the woody pulp of which the peach contains a large amount. He must chew up the fruit, extract the fluid pulp, and reject all the rest. He will continually be removing from his mouth the woody residue which is absolutely indigestible.

There is nothing so indigestible as the old-fashioned "biled dinner" with its cabbage, turnips, and other vegetable dishes, with sometimes more or less fat, which taken into the stomach will sometimes remain there several days. I have known people to vomit, three or four days after a "biled dinner" to vomit a large proportion of what they had eaten. The only way for such a person to do is to take the food into the mouth and chew, chew, and chew it until every particle of it that can be reduced to pulp has been reduced to pulp, extract the other portions, swallow the pulp, and reject the balance. Not a particle must be swallowed unless it has already become liquid. Horace Fletcher has emphasized this point. He is perfectly right about it,--that it is necessary that food for the best digestion should be made fluid in the mouth before it passes down into the stomach. This requires a great deal of time in eating. The mouth is the mill. The stomach can not grind. It can not act upon the foodstuffs in such an way as to reduce them mechanically; it can only act chemically upon

the foodstuffs, and it can not act vitally or chemically on them unless they have first been reduced to a purely fluid condition.

Here is a person who is too fat. What ought he to eat?

I ought perhaps to say a word further for this class of patients I have been speaking of. Disinfection of the stomach once or twice a day is a very good thing. The stomach must be washed out once a day, but all cases are not so bad. But in cases where some of the food is liable to remain, it must be disinfected with fruit juices, by taking a glass of applejuice at night or in the morning half an hour before breakfast--take a glass of applejuice. Or a half a lemon in a glass of water without sugar at night is an excellent means of disinfecting the stomach, cleansing it, so it will be clean and ready for work the next morning; and the next morning, it is a good plan to take an orange before breakfast. The great value of oranges is in this disinfecting power upon the alimentary canal. If there is a great amount of decomposition there, there will be foul stools, eructations of foul gases, and it is well to take several times a day a glass or so of quite acid lemonade without sugar, or of orange juice. Lemonade is perhaps better. Applejuice is one of the very best things that can possibly be used in those cases, because it is nourishing as well as disinfecting.

Here is a patient who is too fat. What must he eat? He must of course avoid fats, because they form fat. Sugar forms fat. He must eat starch in only moderate quantity.

Above all things he must aboid beefsteaks, because they contain a large amount of uric acid, and the too-fat person already has an excess of uric acid. He is just as likely to be rheumatic a little bit later as he is to be still more obese. Rheumatism is a disease of the same sort, belongs to the same class, and is associated with obesity. A man who is eating beefsteak, is simply laying up rheumatism for himself by and by. These cases must have blood making elements of some sort. What shall he eat? He may eat nuts in moderate quantity; he may eat peas and beans in moderation; but he will find in bread, in ordinary bread, all the proteids he requires. All the blood forming elements that are necessary will be found in ordinary bread. About one-eighth or one-seventh of its solid substance is made up of gluten. Bread is from one-third to 40% water; the rest of it contains one-eighth gluten, which is blood-making and tissue forming food. This substance is directly convertible into muscle structure, brain structure, and blood. So if one eats bread he will get all the carbohydrates he needs, and all the proteids he needs; also if this patient wants to lose flesh very rapidly he can put himself upon a fruit diet, and take all the fruit he wants; he may satisfy himself completely four or five times a day if he wants to; but he must also take pains to masticate his food thoroughly, eating with some deliberation. He ought perhaps to take a little bread once or twice a day in order to furnish the strength he needs for his work.

The obese patient must work above all things,-- swim, work out of doors, sweat. At the same time he can starve

on a light diet of fruit, starve a little, without any injury. Or rather he might put himself upon a moderate diet of breads, ~~dilute~~ fruits, and a very little fat, if he needs it, in the form of butter, or nuts, a ration whichw ould amount perhaps to about eight or ten ounces a day of dried substances, until he gets a considerable reduction of fat, and finally he will bring himself down to the proportions he desires, and he can then put himself upon a ten or twelve ounces a day diet of water free food. He must eat nor more than twelve ounces a day, ~~of this~~ and that is ample. The average man eats twice as much, and the working man three times as much as that; but the excessive amount of food they take is a detriment. They get no good out of it.

Here is a diabetic. What shall he eat? The supposition is that diabetics should not eat starch. It is a great mistake. When carbohydrates are removed entirely the body processes seize upon the muscles, and the brain, the nerves of the body and consume these in order to convert the sugar, and the consequence is the patient is likely to die of diabetic coma, a dreadful disease, and one which carries the patient off sometimes within a very few hours; and when a patient is seized with diabetic coma, it is generally impossible to save his life. Sometimes when it comes on the patient produces but a small amount of sugar. This subtle condition will appear, and the patient says he feels a little drowsy; he falls to sleep by and by, ~~and~~ and he goes into a dead sleep from which he never awakens, and in 48 or 72 hours at most, patients will be dead in spite of everything that can be done.

It is a very important thing to know that in these cases the best thing possible to give the patient is sugar or starch in some form. It is the only thing really that will save such a patient's life, because by giving the sugar or starch the body will cease to consume the proteids which develop these deadly poisons, and will produce more carbonic acid gas which can easily be eliminated, and the patient will temporarily be relieved. One of the best foods for diabetics is potatoes. For one hundred years at least, the medical profession have been prescribing potatoes but within the last ten years, French physicians have called attention to the necessity of introducing carbohydrates in these cases, and expeciallypotatoes. At the present time the usual prescription of the scientific French physician for a case of diabetes is two pounds of potatoes a day, with the balance of the diet to be made up of milk, fats, corn, and vegetables. At first I did not take any stock in this suggestion, but when I investigated it, I found there was a foundation for it. It is not all kinds of starch that the body refuses to assimilate. It is only certain starches. Cereal starches are difficult to digest, but vegetable starches are very easily digestible. The Jerusalem artichoke contains starch which is converted into levulose. It has long been known that levulose is the kind of sugar the body can assimilate in diabetes; so starches which are acted upon by the saliva and converted into levulose are perfectly harmless; and the starch found in the Jerusalem artichoke, and which is found in the dandelion and some other roots of that kind, and also the starch found in the potatoe are found to be easily

assimilated by diabetics when they can assimilate any other of the cereal starches. It is worth a great deal to know that, and I have saved several diabetics' lives by feeding them potatoes. Patients come here in a state of chronic poisoning; their skins dry, sallow, and in a miserable condition, getting weaker, and losing flesh every day. I note with very great satisfaction a bright woman here at the Sanitarium who came here some time ago; and I see her now walking nine or ten miles a day, gaining in flesh and strength, and taking a couple of pounds of potatoes every single day, and getting better all the time, without any withdrawal of eggs, water, or any necessary article whatever. These patients lose their thirst, they cease to lose flesh; they regain their strength, and generally begin to gain flesh on this diet of potatoes.

In addition to the potatoes, we can add such wholesome food as glutens; our 40% gluten biscuit, perhaps, is as good as anything that can be used for this purpose. It is the only gluten bread you can get of that sort in which you know just what you are eating. So-called gluten flours are humbugs, all of them. There is not a single exception, with the single exception of that which we make here, ourselves. That is not a very modest thing to say perhaps, but I found they were all humbugs, and that is the reason we had to make it ourselves. The Scientific American made an analysis of all the different gluten flours, and showed that they were all humbugs; there is very little gluten in them. They are simply flours made out of coarse middlings. A miller who makes gluten flour--he has sold out now--told me himself that there is nothing in these gluten flours but ordinary coarse middlings.

He sells it at the price of ordinary flour to the party who advertises it as gluten flour and sells it as gluten flour for $12.00 a barrel.

The only way in the world to make gluten flour is to take the ordinary flour and wash all the starch out of it, get the pure gluten out of it, take this gluten dry it, and grind it up into flour. When you make flour in that way you could not do anything at all with it. There is almost no taste to it, and it is a very disagreeable sort of thing, and it is an impractical thing to use. So the only way it can be prepared to use is to take the gluten flour prepared in that way, and add it to ordinary flour. That is the kind of flour our folks here prepare. I took pains to prepare the formula for them, and they prepare our gluten flour in that way. It makes a heavy bread which is likely to be sour, and I can not recommend it very much. It is better to use this ordinary gluten biscuit. They are made in this way. The flour is made into dough; the dough is allowed to soak for several hours. The starch is all washed out of it and the pure gluten is obtained. Enough flour is added to that pure gluten so that it is brought up to the percentage desired,-- 20%, or 40%, or 60%, or whatever percent is desired. It is then made into rolls or biscuit with water, put in the oven and baked; and they are fresh all the time and nice because they contain a large amount of gluten. I want you to know the truth of this matter. The Battle Creek Sanitarium Food Co., is purely philanthropic, a purely philanthropic enterprise for the good of the world. It all goes to help pay for this building. All its earnings go into this philanthropic enterprise; no one gets a cent out of it.

I have told you the only way that this gluten flour can be made. These flours made by the milling processes are all alike. None of them contain any more than the ordinary amount of gluten which is found in first-class patent flour. In the first place, the flour contains as much gluten as it is possible to get into flour except by the manner I have described This is a very good food for diabetics; but it is better that diabetics should have potatoes, for the reason that in diabetes there is a general lowering of the alkalinity of the blood. The alkalinity of the blood has a tendency to get less and less and less. It never becomes absolutely acid, but the alkalinity gets very much less. But by the use of potatoes the alkalinity of the blood is maintained because of the large amount of alkalies, potash that is found in the potato; and the potato in this way helps to build up the blood of the diabetic.

The diabetic is very likely to suffer from boils and skin diseases. By the use of potatoes this difficulty is entirely relieved. The alkalinity of the blood is maintained, so the resistance of the body is kept up and it is able to destroy the germs which are responsible for boils and other forms of skin disease.

Next time I will tell you what a person should eat who wants to get fat, who is too thin; and what a person should eat to build up brains, and nerves, and what a person should eat who wants to build up the blood, and to build up the muscles by diet.

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SANITARIUM METHODS.

A Stereoptican Lecture by J. H. Kellogg, M. D., at the Sanitarium Gymnasium, Battle Creek, Mich., June 30, 1904, 9:30 P. M.

I am going to tell you something tonight of the interesting story of how sanitariums began. Away over in Austrian Silesia close to the border of Russia, there is a little mountain village called Grafenberg. In this village something more than a century ago--about one hundred and fourteen years ago--there was born a little boy, of German parents, by the name of Priessnitz. This child was born in great poverty. His father owned a piece of wood and pasturelend up in the mountains behind the village, and there was a famous well there, or spring, known as the Priessnitz Well, which had been discovered by his ancestors two hundred or three hundred years before; and this little boy, when he was about nine or ten years of age, was set to tend the sheep and cattle up in the mountains. He did not have an opportunity to go to school, so he did not learn to read until he was nearly grown, and he only learned to write his name. He was forty years of age before he was able to do anything more than simply to write his name. Even then, he wrote with very great difficulty.

Here is his picture. This man, although ignorant, was a man of rare intelligence, and he seems to me to have been inspired; for without teachers other than nature, and the God of nature, without attending school, while without knowing a thing of medical science, he became the greatest healer of his age--of the century.

of the century; and he made more discoveries, more original discoveries in the healing art than any other man who ever lived. This man, Priessnitz, or this boy, Priessnitz, rather, evidently had a clear head, a remarkable brain, a remarkable ability to observe, and to interpret his observations.

Here is a picture of the little village where he lived. This is Gräfenberg, and this is the little village, Freiwaldau, which is down at the foot of the mountain. Gräfenberg is on this little mountain here, and here is the little house where Priessnitz was born. Now in these rural surroundings, in this wild country place, among these hills and woods this boy grew up, and built up a system of medicine which has since come to be known as Silesian hydrotherapy. In those days, it was known as hydropathy, as it is still sometimes called. Now, starting in that little cottage, a picture of which you see here, this man's work grew, little by little, in the way I will tell you, until now in place of the little cottage there can be seen this fine village, and these huge buildings, all of which are occupied by patients, and most of them were built by him. They are large, stone buildings, capable of accommodating fifteen hundred or more patients. And here for many years while Priessnitz lived--he died about 1850, or soon after, 1850, I think he died--this great multitude flocked to his care.

This next picture which I show you here, will give you a little idea of how Priessnitz began his observations, and the first lessons he took. In 1830, this is the first building he erected. This is a picture of the style of dress which was worn in those days. This was the first building he erected.

Here was the first lesson Priessnitz took in the use of water. When he was a boy about thirteen or fourteen years of age, out in the woods tending the sheep, looking after the cattle for his father, he saw--you see he a boy hid behind the bushes there--he saw a deer come down to the spring--there were many springs in that region--the deer had been wounded by a hunter, in his legs,--he saw this deer come down to the spring, and put its leg into the water. Crouching upon the side of the bank, he put his wounded leg into the water for an hour or two twice a day. Twice a day for several weeks, this deer came regularly and held his leg in the cold water of this spring, until the wound was healed. Now this was the instructor of Priessnitz; here was the professor, if you please, that taught him the use of water. Here is the university, among those noble trees where he studied. I had the privilege of visiting this very spring a couple of years ago--two years ago just about now I was in Grafenberg, and spent a day going around visiting these very springs through those very woods. It was a very interesting day, indeed.

Now some little time afterwards, Priessnitz met with an accident. It was in thewinter time; he was carrying down the mountain, driving down the mountain side with a load of logs, when the horse ran away, and the load of logs tipped over and a great log rolled upon him, and crushed a limb, crushed his ribs, so badly that the doctor said he never could recover, that he would die; but he lived, and the doctor said if he lived he never would amount to anything; he would be a cripple all his life; but Priessnitz had observed what this deer had done

then it was rumored; so when the doctor gave him up he began to think what he could do for himself. He applied cloths--he could not go out and rest in the spring as the deer did; so he wrung cloths out of cold water, put them upon the side, upon his ribs and his leg, continued this day by day, and in the course of a few weeks he made a splendid recovery, and became as well as ever, much to the astonishment of the doctors. The sore of his eye went out. Soon afterwards, he had a wound in his arm. He treated that in the same way, immersing it in water; and the fame of his recovery went out all about throughout the neighborhood.

Presently he had a friend who was a veterinary surgeon, and he used to assist this veterinary friend in caring for the cattle and horses, and sheep, and pigs that were sick; and he found that the water was good for the deer, it was good for himself, and he persuaded his friend to allow himtto use water for these animals, and there is a picture somewhere of his applying the wet sheet pack to a pig. And the pig made an excellent recovery. People soon began to come, and then he was fourteen years old, this peasant boy was treating scores of people every day. The yard of his father's house was, during the day, filled with people waiting for him to tell them what to do, and to make applications of coldwater. The usual thing which he did for sore limbs, broken limbs, and chronic ailments of various sorts, was rubbing with water. That was about the first thing he did; first rubbing with water; then rubbing with wet bandages, and rubbing it two or three times a day, and every night his father's barn and cow sheds were filled with

people who had come from the neighboring towns to be treated by this boy. They got it into their heads that the boy somehow was possessed of magic healing power. They did not think it was the water that healed; but they thought Priscilla had somehow acquired a knowledge of the magic art, and they thought he put something into the water, or said some magic words over the water that in some way restored the water and the hotsprings especially powerful to heal; so they came, although he was only a boy; they came from scores of miles away, until when he was sixteen or seventeen years of age, the people thronged to be treated, hundreds and hundreds of people were there, and houses were built; and before he was twenty it was necessary to erect a building in which to accommodate the people who came to be treated by this peasant boy; and before he was thirty, people were traveling from England, France, and all over the world to get there to be treated.

Here is a picture of the water cure as it was in 1897. This was just after he died. You see the style of dress that was in use at that time, and the people here are drinking from the spring, drinking from the hollow horns of oxen which were used for drinking cups. Each one carried his own horn, and did travel through the mountains drinking at each spring; I think there were about forty of these springs. Here is another picture of people drinking from their horns. At every spring they had to stop to drink. The walk to all these springs in the morning, these springs up in the mountains, is about twelve miles, and they were required to travel from one place to another, and so on, drinking at each one. He asked people to

to drink twenty or thirty glasses a day. It was not an uncommon thing for people to drink twenty or thirty glasses in the course of an hour's walk around through the mountains, before breakfast—ten or twelve glasses before breakfast was a very common performance. That was in 1849.

I am going to show you some of the various kinds of treatment that Priessnitz invented. One was this wet walking shoe. Here is a wet jacket, wet pantaloons, covered over from the ankles with thick, dry flannel ones, and mits on your hands so you will be warm, and a cap. In this way they had to go out and walk through the mountains until they became warm, or until the wet clothing became dry. This was one of his devices. I will show you at another time a larger number. Now you see the methods he then employed, and the methods you find employed in the bathrooms here,—the wet sheet, the wet girdle, the sitz bath, the rubbing wet sheet pack, and in fact, nearly all of our fundamental hydriatic procedures were invented by Priessnitz.

Here is the Bohemian well. This was erected by some wealthy Bohemian people who came there and were cured. Many of the springs in the mountains are decorated in this way, or ornamented. Here is another one. This is the Priessnitz well. This is the spring house of Vincenze Priessnitz. This is Priessnitz himself, a picture of him at his spring; a glass of water is being offered to him.

Now Priessnitz began in this very small way; but before he was forty years of age--here they are out walking in the wet grass. This has been introduced in more modern times by Kneippe

of Holland, and is being introduced at the present time to some degree in this country. Underwood people are often to be found in the early morning walking through the wet grass in Central Park, New York, City. This is a method of improving the circulation of the feet. They come to be very red by the stimulation of the cold water and the grass. In the winter time, they walk in the snow. This was the custom in Old time of Friesenhe. Here is Grafenberg in the winter of 1891. People are just going out for a walk up through the mountains. You can see a large building in the rear. This building is a very interesting old place. The custom in that country is to build the house and barn together under one roof; and so it was with Priessnitz,--the barn with its cow stable joined the dining-room; so you could hear the cows lowing while eating your dinner. Here is Priessnitz out for his morning ride, to visit his patients located in the different places, and in the surrounding villages. Every morning he mounted his horse, rode out around among the villages. One of the exercises which they employed at Grafenberg, was sawing wood. Everybody was required to saw wood. The patients had the logs boils carried into their rooms. This lady has arisen from her bed, put on her clothes, and with the saw back which has been brought in, she is sawing wood. She would not be seen sawing wood outdoors; so she has the sawhorse brought indoors.

Here is an invalid, a famous count who had the gout, and of course Priessnitz discovered that the reason he had the gout was because he did not sweat enough; so he had a sweat brought close to the bed. His toes were all swollen up with the gout so he sat on the bed and operated the saw.

Rubbing with cold water; rubbing the ankles sometimes for four or five hours at a time was the treatment for gout. Fortunately attendants were very cheap in that time. A very good attendant could be hired for a couple of dollars a week. I had an acquaintance with an attendant who was there with Priessnitz, so I had him give me a bath in one of the big tubs out out of cement, a great big tub almost big enough to swim in, and the temperature of the water was just as it came down from the mountain in the open troughs, in cold winter weather,--about 40°. Here you see patients out for a walk. This man is chopping wood. This is one of the exercises they required. They fortunately had great forests and abundant opportunity for chopping. Here is a poor, feeble man, unable to walk alone, and has an attendant to help him along. They go along these mountain paths for hours and hours every day. The usual routine was to get up in the morning, take a wet sheet pack, remain in the wet sheet pack until they began to sweat--sometimes they were kept there sweating until they sweat so hard the perspiration ran through the mattress and actually dripped through the floor into the room below. One of the very favorite prescriptions of Priessnitz, was the air bath. The patient was drenched with water, then the attendant threw a sheet around the patient, the attendant took the sheet behind the man, and shook it so as to keep up a lively breeze about the patient. Sometimes the patient made the breeze himself by taking the sheet in his hands, and running around in the woods as fast as he could go. That was the outdoor treatment. These were well isolated places where it was not necessary to build walls around the outdoor gymnasium as we do

in this country. Here are ladies out doors walking in the grass, you see, for the purpose of warming their feet.

Here is the spigot; here is the nose douche--drawing water up; here are some eye cups that were made. There are more recently invented nose cups; I noticed it advertised in a recent journal, exactly like those made by Priessnitz almost one hundred years ago. Here are some eye cups, you see, and people taking eye baths. As I said, Priessnitz invented almost every method of using water that has ever been employed since that time. Here are some men and women out walking in the grass, wading through the grass, for the purpose of producing a strong reaction through the feet. Priessnitz unquestionably, as I said before, made greater advances in the treatment of disease, greater discoveries than any other man who has ever lived.

This picture shows the treatment of a small boy who suffered from whooping cough. This boy had attacks of whooping cough, and the method of treating it was to pour cold water over the patient. The purpose of that was to increase the resistance. This boy did not like the cold douche, so he had a little hobby horse, and while he is very busy with the hobby horse, the doctor steps up behind and douses him with cold water. That is the only way the child could be made to take it, I suppose.

This is a curious picture, but it illustrates one of the peculiar features of the method of treatment. The house where the patients were kept was down on the mountainside, but the spring was far up on the mountain, and they had not yet acquired means for bringing the water down from the mountain;

so the patients had to go up to where the water was. They did not have wrought pipes, iron pipes, or even logs yet, so the patients were hauled up, sometimes with ox teams, sometimes with horses, were hauled up the mountain side, four or five miles to the spring. There was a place there where the water poured out of the rocks at a height of twelve or fourteen feet, and the patients were made to stand under these streams of water, and the water poured down upon them, and this was the Russian Douche.

So much for the discoveries of Priessnitz/ Priessnitz discovered the uses of water. Science has made many improvements since the time of Priessnitz, but at the present time the world is not acquainted with any other remedy that has anything like the power thatwater has in controlling diseased conditions, and in the cure of disease. By means of water it is possible to control the circulation of the blood in every portion of the body. It is possible to control the activity of every single organ of the body by proper applications of water. I shall show that up a little farther on.

Now I want to tell you a few things about foods. I am not going to keep you very long tonight, but our slides up here are to give you a whole lot of information in a few minutes. Here is a table which gives the time required for the digestion of various articles of food. I would like to impress some of these photographs on your mind. These figures were made by Beaumont. Beaumont nearly one hundred years ago had under his care Alexis St. Martin who had a gunshot wound, an injury to his stomach, so that when he recovered there was an opening into his stomach, through which he could look into the

stomach, so it was possible to take the temperature of the stomach, and to watch how long the food remained there. As regards these experiments, Beaumont found [illegible] the time required for gastric or stomach digestion of foods. This table shows the results he obtained. (Table found on page 927 of "Home Hand-Book of Domestic Hygiene and Rational Medicine" By J. H. Kellogg, M. D., Edition of 1896.) You notice salt pork requires four hours and fifteen minutes for digestion. You see now why it is that the lumberman is very fond of roast salt pork--it sticks by the ribs the lumberman says; it actually stays up under the ribs, does not digest for four hours and fifteen minutes, and before four hours is up, indigestion has commenced. I did not make these figures; they were made by Beaumont almost one hundred years ago. These facts have been before the medical profession all this time, and before the world all this time. You will notice here that rice has three and one-half times the nutritive value of salmon, and digests in less than one-fourth the time. Salmon required, you see, four hours and fifteen minutes to digest it, while rice requires one hour only. Rice has three and one-half times the nutritive value, and digests in one-fourthhe time. The popular idea about food is that hearty food is food which is very nourishing, very sustaining; but the real truth about it is that the so-called hearty food is simply hard to digest, hard of digestion. We might spend considerable time more, but I will just briefly state that the purpose in selecting a Sanitarium bill of fare is to select these articles,prepared them in such a way as to make these articles very easily digested so that they will tax the body as little as possible; to get as much nutriment into

the body as possible with as little tax to the body as possible, so that the energies of the body may be used in combatting disease. Thousands of people use up nearly all of their energy in digesting big dinners, indigestible suppers; they spend all their energy and strength in that way, and have no strength left with which to resist disease, and disease comes along and carries them off easily.

Here are specimens of the different kinds of starch. Every kind of vegetable, every farinaceous vegetable has its own peculiar kind of starch. By examining the starch you can tell what vegetable it came from. For instance, corn cockle has a very peculiar kind of starch. Here is the canna root starch. Here is wheat starch. Here is the oat starch; here are some potato starch cells shown with the starch inside. That is the way they look. Here is the starch of spurge--dum bells, you see; some of them look like bones. Here is bean starch, the starch of corn, and potato starch magnified. Here is the starch of millet; here are some rice starch cells, showing the starch granules inside. Here are various kinds of plant crystals. I want to show you some of this starch that has been cooked. For instance, some potato cells,--just a little thin slice of potato cooked--this shows what you see through a microscope when you look at a very thin slice of potato; you see the starch granules inside,some large, some small. This is the woody part of the little wood cells with little rooms, each room packed full of these little starch granules. The next cell shows how these little starch cells look after they have been baked. This is a potato that has

been baked, and the granules are all pressed, or rather all combined together, they have absorbed the water. Now when these cells are broken in the process of mastication, this undigested yeasty looking mass, when these cells are chewed in the mouth, the saliva acts upon the starch cells and dissolves them; but these cells have been broken up by the rough cooking.

Now we must give attention to this matter of cooking. You see the importance of it. The more thoroughly starch food is cooked, the more readily digestible it becomes. Without a good cook, a sanitarium can do nothing. Without a properly arranged dietary a sanitarium is a very lame affair. There are some institutions in the country in which they undertake to cure people with baths. You can not cure the chronic dyspeptic with baths alone. First of all you must correct his dietary, because it was his wrong diet that made him sick. You see advertisements in the paper sometimes,--notices about this sort: "Dyspepsia cured without attention to diet." There are some institutions that undertake to do the same thing,--cure dyspepsia without attention to diet, while still continuing the same hotel bill of fare that made the patient sick in the first place.

Another important factor in the Sanitarium treatment of disease is the building up of the body. The body that is prepared with strong muscles and nerves, strong vital resistance, that body is prepared to fight disease. You never saw a man coming down with cancer that had a great, strong, vigorous body; for a man has first to destroy his body, to break down his vital resistance by wrong habits of life; before disease can gain a foothold. That is an important thing to know. Exercise is

one of the ways in which vital resistance can be built up. Diet is an important matter. By proper diet, the alkalinity of the blood is maintained. With blood of high alkalinity, one is able to destroy germs as fast as they come into his body. When the alkalinity of the blood is reduced, the saliva loses its power to destroy germs, the tongue gets coated, the gastric juice loses its power to destroy germs, tape worms slip on through into the intestine and get a foot-hold there. Germs of other sorts get in,--typhoid fever germs, consumption germs, germs of tuberculosis get into the body because they are not killed in the stomach by a strong, active gastric juice these germs find their way into the body.

Now I operated upon a man today, just before I came down here, for the removal of a rib, and I found this rib was all eaten up with tuberculosis, tubercular disease. I had to remove nearly the whole of his tenth rib, and why? Why do those germs get in? He had no germs in his lungs, but those germs had gotten into his body through his stomach, and he had a sick stomach, a feeble stomach, unable to destroy the germs, and this allowed the germs to get in, to slip into the blood, and from the blood they gradually found their way to this rib, and there they set up this mischievous work of destruction, and a large abscess had been formed. When the stomach is able to destroy germs, then it protects the whole body. By proper diet the blood is kept pure, and maintains this ability to destroy germs. A sedentary life, without exercise, and an improper diet allows [illegible] poisons to accumulate in the blood, which destroy this germ-destroying power. A butcher is always the worst kind of a fellow for the surgeon, because his

wounds will not heal. Although the man looks well, has a shiny cheek, still his body is full of food for germs. It is almost like a morgue because it is full of dead things he has swallowed, and the remnants of dead things are scattered throughout his body, all the residue that is left behind, the poisons remain in the body. Although the flesh is digested, when it is digested, along with this flesh that is digested are the poisons that are in the dead animal, poisons resulting from decay of the flesh before it is eaten. Decay begins within twenty-four hours after the animal dies, and when the flesh is kept in the butcher shop until it gets tender, it is far advanced in decomposition. These poisons taken into the body destroy its germ-destroying power. Then the body itself decays.

This represents to you the difference between a well developed man and a poorly developed man,--a man whose physique is undeveloped, and a man whose muscles are well developed. This splendid chest and arms, this splendid muscular development is an indication of a strong resisting body. Now a person with that sort of body does not have to be afraid of anything. He need not be worried lest he take consumption; he can not get it. He need not be afraid lest he take typhoid fever; typhoid fever and cholera have no terrors for such a man. He might get malaria by being bitten by mosquitoes; but he would not take that either because his body would take up the germs and destroy them.

Proper position in sitting is another thing we must give attention to in the Sanitarium life. The Sanitarium method of treatment is a system in which the whole life of the

patient is taken into consideration. Here you see a lady sitting at a desk, doubled over so she can not breathe. The stomach, the liver, the kidneys, and the bowels are all crowded down in the lower abdomen, and the consequences are, inactivity of the bowels, indigestion, imperfect breathing, imperfect oxidation of the blood, and lack of general health. Here is a person sitting up straight. It is not so easy to sit in that position, but when one trains the muscles to hold the body erect, it becomes a second-nature. Here is a man writing a piano in the same cramped position. Here is a man using his piano in the proper way. That is the reason we have our Delsarte sloyd; any one who wants to learn sloyd can have a chance to be instructed, to learn to maintain the proposition while at work. Here is a man sitting in a chair in the right way, and here is one sitting in the wrong way. This man is lying down, and relaxes so his whole body is out of shape. This man is sitting up straight with his shoulders rubbed against the back of the chair and he can breathe well and all the bodily functions are properly performed. Here is a woman who is sitting in the ordinary way,--fallen down, you see, the chin carried forward, and the chest prolapsed, and a crook in her back. Here is this same woman sitting back in a Sanitarium chair, a physiologic chair which supports her so she can rest in the chair, and the body is maintained in a correct position. In the ordinary chair as she was relaxed there, she would very quickly get out of shape. This shows the proper and the improper position. Here is a man standing in the proper position. Here is a case of anterior curvature of the spine. Here

the hippo are carried too far forward. This shows a well developed and a poorly developed figure. This shows the strong convex line that is natural; this shows the concave line that is ordinary. There are very few women who do not show this concave line who have worn the ordinary dress. This is the proper figure, the proper outline. I have seen many cases in which women with this figure had developed this figure by a few months' exercise --swimming, gymnasium exercise, with loose garments; such exercise will form this kind of a figure into this proper kind. This figure means health, strength, vigor; while the other one inevitably means disease in every single case. This shows how this curve about the waist is produced. One wonders how this poor woman can breathe, how she can live, how she can digest; there is no room for these important vital organs which naturally belong right about the waist--no room for them.

Here is a very interesting story in these pictures here. I see it is just nine o'clock, and I have not time to tell you about all of these things; but next time, in my lecture in the Gymnasium, I will tell you about these spots, and explain to you what they mean. I think you will find them very interesting indeed.

V-8-1-4--3.

HOW NOT TO MIND THE WEATHER.

A lecture by J. H. Kellogg, M. D. in the Sanitarium Parlor, Thursday Evening, September 15, 1904, at 8. P. M.

"How not to mind the weather" is my subject tonight. We are often told not to mind the weather, but how to do it--that is the question. In the first place, what is the weather? It is not very easy to define what the weather is; the atmospheric conditions which surround us are very fluctuating. They consist of temperature, moisture, pressure, electrical conditions, and possibly other conditions with which we are not very well acquainted. The conditions of dryness and moisture perhaps have more to do with our health than the mere corditions of temperature; for a given temperature, when the air is cold and moist, is much colder than when it is dry; and very much warmer when it is moist than when it is dry. Dry air can be tolerated at a much higher temperature and at a much lower temperature than can moist air. The air is capable of containing a large amount of moisture, much more than one would think; and the amount of moisture depends very much upon the temperature. For example, a cubic food of air at zero is capable of holding about two drops of water. That is, two drops of water can be dissolved in the air so it will be entirely invisible. You know you have sometimes watched steam rising from the spout of the teakettle, or possibly a coffee-pot--though I hope you will never see that any more--and you have noticed as the steam rises, when it first issues

from the spout of the teakettle, it is invisible for a short distance; then it becomes visible, rises in a cloud, and then gradually disappears. Now the point where it is invisible, as it just leaves the spout of the teakettle, that is simply water in the form of gas. As it rises a little higher, and becomes dispersed through the air and cooled a little, it forms in minute drops which float away in the air; and these floating drops constitute what is called vapor. It is fog, the same thing as the clouds. When it by and by disappears in the air, it has been dissolved in the air and has become a part of the air. Now the air, when it is at zero temperature, thirty-two degrees below freezing, is capable of dissolving in this way two drops of water to the cubic foot; that is all; but for every degree the air rises in temperature, every degree of temperature it rises, it becomes capable of holding --if the air is at 25° it is capable of holding twice as much as water as it does at zero. At zero it holds two drops to the cubic foot; at 25° it holds four drops; air at 50° holds eight drops; at 75° sixteen drops; and air at one hundred degrees carries thirty-two drops. So air at 100° is capable of holding sixteen times as much water as air at zero. That is very interesting. While the temperature rises in arithmetical ratio the capacity of the air for holding moisture increases in geometrical ration; it doubles at every 25°, approximately so. Now the consequence of this is that we are exposed to peculiar conditions. When the air changes its temperature, if it happens to be saturated with moisture, we are exposed to conditions which are likely to make mischief,

and we are liable to take cold and suffer damage. When moisture is brought in contact with the skin, the evaporation of that moisture by the heat of the body chills us. When you arise from a warm bath, in a moment you feel chilled. Evaporation of water from the surface of the body produces chill. Now, if, on the other hand, one goes out into the air, and this air coming in contact with the body produces deepseated effects on account of the moisture floating in the air, these little drops upon the skin cause evaporation, and the evaporation of this moisture produces chill in just the same way as though water had been thrown upon you. It is precisely the same thing when one exercises until he perspires; the skin becomes wet by the perspiration, and the evaporation of this perspiration will produce a chill and xxxxx because the heat of the body is carried away by evaporation.

The process of evaporation is one which absorbs a tremendous amount of heat. A pound of water absorbs in evaporating, one thousanddegrees of heat, a thousand degrees of heat, nearly. It takes five times as much--it takes about six times as much heat,--a little more than six times as much heat to raise a pound of water at ordinary temperature to the evaporating point, to evaporate a pound of water at the ordinary temperature as it does to raise it to the boiling point. When you get it up to the boiling point, then to evaporate it takes six times as much heat as it did to boil it. That is why steam is such a useful means of heating. When steam comes up into the room in a coil, the heat of a pound of water in steam gives out one thousand heat units, whereas if it is only boiling water, it could give out only 150 heat units--a little less

than 160; but in the form of steam it will give out 1000,--more than that, perhaps. A pound of water evaporating from the surface of the body does the same thing,--carries off 1000 heat units; and whether it is produced by perspiration or whether applied to the body in the form of a bath, the moisture which is produced deposited moisture on the skin from the damp air, and evaporation taking place at the surface of the body has the effect to chill the body. The clothing becomes moistened in a damp atmosphere, and the evaporation of this dampness in the clothing by the heat of the body chills the body. That is the reason why we do not like a damp atmosphere, that is why we feel chilly in a damp atmosphere, and the hands are cold, the feet are cold and damp,--that is because of this robbing the body of heat by the evaporation from the surface.

Now, let us see what happens sometimes when the air is full of moisture. For instance, on a hot summer day, a real hot summer day, there is suddenly a change of wind, and the wind comes blowing down from the North, and brings down cold air from the North. This cold air meets the warm air which is saturated with moisture, and let us see what happens. Now let us see what happens. Suppose here is air at 100°; here comes a wind that has a lower temperature, a temperature at 50°. There is a certain volume of air, we will say 500 cubic feet of air if you please; and here is another 500 cubic feet of air at 100°; this is fifty, and this is one hundred. Now this has got eight drops of water in it, and this has got thirty-two drops of water in it. When these two come together, here will be 1000 cubic feet of air at 75°. At 75° that is the

average temperature you see. Now a cubic foot of air at 75° contains sixteen drops of water, but there is another sixteen drops of water, and the two together would make thirty-two; but these two cubic feet of air before they combined each had forty drops of water. One had thirty-two and the other had eight. Add thirty-two to eight, and you have forty. After the temperature had been lowered to seventy-five degrees, the two cubic feet of air will hold only thirty-two drops of water. What becomes of this other eight drops of water? It drops out, and if there is enough of it, it breaks out in the form of rain. If there is not enough to make rain, it becomes a fog, or the whole sky will be covered over with clouds, and the sun will be obscured, and we will become chilly and cold, and the whole air will be saturated with this moisture which is precipitated. As the higher the temperature of the air the more water it contains, the lower the temperature, the less it contains. When a high temperature and a low temperature combine, the average temperature which results from the combining of these two is not capable of holding as much water as was held before, and the surplus drops out. In our example, you see there was forty drops, and there was thirty-two drops, and the difference was eight drops, which drops out in the form of rain, or it becomes fog, or cloud. So, when we have a damp day it is because the air is saturated with moisture. If the air were not saturated with moisture, then it would not be damp. You go out of doors and your clothes feel damp; that is because the air is completely saturated with moisture, and such a day is a hard day on an invalid; and the reason why

it is hard is because his skin can not get rid of his moisture--that is one reason. When the skin is perspiring freely, or producing what is called insensible perspiration, the dry air picks it up and carries it off so fast the skin remains dry. But if our skins are exhibiting pouring out an ounce and a half of moisture every hour. Every hour, every person here, whether he knows it or not, whether he is conscious of it at all or not, is pouring out an ounce and a half of water every hour. A cornstalk sweats half as much as a man does. If we had a big cornstalk growing here, five or six feet high, that cornstalk sweats he much as a man does when it is a big one; that is why it takes so much rain to keep that corn growing,--because it is throwing off so much water all the while. Insensible perspiration, that is. So all the trees are throwing off moisture all the while--that is insensible perspiration as well as the water that we are throwing off from our bodies. But, now, if the air is damp and is full of water, if the air contains all the water it can hold, then we can not carry off the perspiration, you see; it does not take any off from the skin; so the perspiration is being produced an ounce and a half every hour, remains upon the skin, and the skin becomes damp, and the feet will sweat, the palms of the hands will feel clammy, and the whole body will feel uncomfortable. As this moisture is not able to evaporate, it remains in contact with the skin, and the activity of the skin is lessened. But there must be some compensation. That compensation is found in part in the increased activity of the kidneys. If you will observe about that, you will find that on cloudy days the kidneys are more active. On bright, clear, warm days

the secretion of the kidneys is scanty, and is dark colored; whereas on days that are cloudy, when the skin is less active, there is a larger amount of kidney work, and the secretion of the kidneys is lighted colored; so that explains the phenomena that many people are sometimes frightened about--this variation in the renal secretion, its color, appearance, and quantity; but it depends entirely upon the weather; it depends upon the weather more than upon any other one thing. It has to be to compensate the action of the skin. These two organs work together. The kidneys are a kind of skin. If the skin were all rolled up into a little mass, and all the different little vessels were made to empty inside and communicate with a single little pocket, we should have a kidney. The skin and the kidneys are practically the same kind of organs--almost exactly alike--there are little coils, tubes in the skin, and little coils or tubes in the kidney--very similar forms; but in the kidney, the kidney is the skin turned inside and crumpled up. The skin is a kidney turned inside out and spread out. So these two organs do very much the same kind of work. The skin carries off water, salt urea, uric acid a little, and the kidneys do the same. The kidneys are a better secreting organ than the skin. The skin carries off mostly water with a little chloride of sodium in it, and acids. So we see how the weather affects the body in one way.

One way in which the weather affects the body: It is by its influence upon the skin, upon the activity of the skin, and that depends very much upon the amount of moisture in the skin. This explains the reason why we feel better on days when the smoke rises. We see sometimes the smoke comes

down around the ground, and we see the air seems very heavy. The air is not many heavy at all on these days; we say it is a very heavy sort of day. It is not because the air is heavy that the smoke comes down around the ground; it is because of this condition; it is because the air is light that the smoke comes down around the ground, because smoke is naturally lighter than the air. If the air is heavy, the smoke goes up. The heavier the air, the straighter the smoke will go up; and the lighter the air, the more the smoke will hover around the ground. So when we see the smoke hovering around the ground, it is because the air is light, and this is due to the fact that the air does vary in specific gravity.

There are tides in the air as there are in the ocean. Many of you have been at the seashore, I am sure, and seen the great tidal waves rolling in, great rollers coming in, four, five, six feet high; sometimes more; and you have seen the tide gradually rising. There are just such tides in the air. The same influence which creates the tide in the ocean of water creates the tide in the ocean of air; for the air is simply an aerial ocean about fifty miles deep, at the bottom of which we live. We are like the oysters that live along the ocean bottom, and pick up the crumbs from the bottom. Now, when there happens to be a great tidal wave rolling over us, the air is deeper, and it weighs more; it is heavier; there is more air pressure, and we feel better because we take in more air at each breath. But when we are in the trough of the sea, so to speak; when we are the ebb tide, the tide is out, then the air is lighter, and we have the tides every twenty-four hours in the air, just as we have in the ocean; the barometer

rises higher at certain hours, and sinks lower at certain hours, just exactly as the tide rises higher and falls lower--the same thing is true of the air. There is one low tide along about midnight. The tides follow the sun just as we have the sun tide and the moon tide, you know. The moon tide is bigger than the sun tide; so we do not take much account of the sun tide in the ocean tides; the moon tide is considered most. Sometimes they both come together; then you have the highest tide, you see. When the sun tide and the moon tide are in antagonism, then we have the most lowest tide. It is exactly so with the air; so we may know of these sun tides in the air. Along about midnight the tide is low. That is probably one reasonwhy the majority of people die somewhere about midnight; then the vitality, the body tide is low; and it is probably lowest then because the barometer is low about that time. So these conditions which affect the air, to make it lighter or to make it heavier, affect our feelings and affect our bodies. We feel better when the smoke goes straight up. Our spirits rise with the smoke, apparently, and we feel worse when the smoke hovers around the ground, not because we inhale the smoke, but because the same thing that brings the smoke down, brings us down also. On such a day, when the smoke hovers around the ground all the time, we get out of breath if we take a long walk; invalids do especially. Perhaps you have noticed that horses easily get out of breath on that sort of a day: Sometimes in driving a horse, you know, they sweat very easily, and at other times they do not sweat easily at all. Farmers and horsemen always know that--that horses sweat on

certain days. The days that horses sweat easily are hard days for the invalid. That is the day when the air is light, generally.

Electrical changes in the air we have also. We are wonderfully susceptible to these changes. I remember many years ago I was sitting in my office--it was when the telephone first came around, and I had a telephone put into my office--I often wish I never had had one put in--but I had a telephone, and one night I was sitting in my office late at night writing away along about one or two o'clock, and I heard a noise at the telephone. I went to the 'phone and put the receiver to my ear, but heard nothing at all. I went back to my work, and pretty soon I heard another noise. The bell did not ring, but there was a noise, a crackling sound at the telephone; but I was quite surprised to hear it,--did not know what it meant; so I went back again and took it up, and while I was holding it to my ear there came a tremendous cracking. Just then I observed a light away off on the horizon. There was a thunder storm coming, and the telephone reported it before the storm got here. I saw the flashes and waited to hear the thunder, and then I first began to hear the first peals of thunder, the first peals that I was able to make out, the thunder storm was fourteen or fifteen miles away, and the telephone knew all about it. The storm came along gradually, and the telephone snapped, and cracked--we did not have lightning arresters in those days, and the telephones made very interesting pyrotechnics in those days, and by and by the storm passed over. I watched the storm recede until it went away

off out of hearing, the telephone still reporting it. I could see the flashes of light away off so far away that the sound did not reach me, but the telephone reported every single discharge, every one. So I found this telephone was a wonderfully susceptible to electrical changes in the air. I thought to myself, Here is this telephone, now, nothing but a piece of iron with copper wire wound around it--simply copper and iron wire. If the telephone is so susceptible as that to these electrical changes, how much more susceptible must be these delicate nerve filaments of mine, these delicate protoplasmic masses in my brain and in my spinal cord, these telephonic wires all through my body, one one-thousandth of an inch in diameter, so delicate and sensitive to the faintest touch, and the slightest glimmer of light will stimulate them; they catch the faintest breath of the sun. They must be equally susceptible as those electrical wires.

I recall a man in Philadelphia who had neuralgia in his toe, in his right foot, and he used to observe that he had twinges of pain in his toe whenever there was a storm anywhere. He watched the weather bureau reports, and the reports of storms, and he found that whenever there was a storm center formed anywhere in the united states, he could feel it, even though it was as far down as the coast of Mexico. If a storm center formed down there, this man felt it in his toe, and he reported it even before the telegraphic dispatches got in. I did not believe that when I read of it the first time, though I found it in a medical journal which was supposed to be a scientific authority; but after I observed the telephone, and

began to think about it, I made up my mind that was perfectly authentic and right; that there was no reason why it should not be; but ordinary well people do not feel these disturbances. They do not mind the weather at all. The thoroughly sound, healthy, well man does not mind the weather; it does not make any difference to him what the weather is; he feels well all the while/ he does not mind the weather; it does not disturb him any. But here is this poor man; the storm comes up and his joints begin to crack, pain begins to run up and down his limbs, and he has painful and disturbing symptoms of all sorts, and says, "O, I wish this weather would change." There comes up a damp day, the electrical conditions of the air are changed, and the moisture is perhaps increased, and the hydroscopic power of the air is changed, and that man is in agony and distress; his skin is not active enough to carry off the lactic acid which is irritating his joints. That is one of the causes of rheumatism. He can not get rid of his lactic acid through his skin, and he has to suffer the consequence; the skin has no room for the surplus of lactic acid that he has, and he has no chance to store up any. Here

Here is another man who says, "I am all right," on a warm day; but justa as soon as a cold day comes, he says, "O, I have got so much pain, and neuralgia all through my back, my back aches, and in my legs, my legs ache, my fingers ache, my sciatica has come back in full force, and I have so much pain I can not endure it." Another man says, "I am all right on a cold day, but on a hot day I feel depressed; if we could only have cold weather all the time, I would feel

so well." What is going to be done to help out all these crippled people? for they are all cripples. These folks are all cripples. That is the reason why they are suffering in this way. Suppose you saw a man walking along the sidewalk and he came to a little bit of obstruction six inches high, and he can not step over that obstruction, but begs some of the passers by to help him over. He can not get over that six inch log that lies across his pathway. What would you say of such a man? Why, you would say he must be paralyzed; he must be a cripple. A man who can not step over a six inch stick must be a cripple, for a well man can stride right over and go on. This man stops there and looks dismayed at a six inch log in his way. What seems to be the matter with that man? He is a cripple; he has lost his power to lift his limbs. A man that has health and vigor in his legs can step over an obstruction two feet high perhaps, may be spring over an obstruction several feet high if he is good at leaping; but here this man can not raise his feet enough to get over an obstruction six inches high. I have seen people so crippled in their limbs they actually would trip up on a wrinkle in the carpet. I have seen such people--people who could not raise their toes, would simply raise their heels and drag themselves along. I remember very well seeing one such man who came to a little wrinkle in the carpet, and he was wiggling his toes trying to get them over. He had to sort of work them over by manoeuvering in order to get over that little wrinkle in the carpet. Just spread a rope in that man's path, and he could not get over it. An inch rope was enough to obstruct that man; that man could not walk over an inch rope, because he could not raise his toes.

The only way he could get over an inch rope would be to lie down and roll over. That is exactly what some invalids have to do when a little change comes in the weather. They have lost their capacity for getting over obstructions, for meeting emergencies.

The man who has power to regulate his skin activity, his kidney activity is sufficient to compensate for his skin--that man will have no trouble. Here is a man we will say, who has Bright's disease of the kidneys. There comes a damp day, his skin has lost its activity; that requires more work of his kidneys; but he has got Bright's disease, hence his kidneys are good for nothing, one of his kidneys is good for nothing, and the one kidney which he has left has got to do all the work that the two kidneys ought to do. It is all right on a bright day when the skin is doing a large part of the work, but now comes a damp day, and his kidney is not equal to the emergency. What is going to be done for that man? that is, when he is in trouble? Here is a man suffering from rheumatism; he has had rheumatism a long time. When a man has got rheumatism, it is because he has just about got to the end of his rope. A man is not just beginning to get sick when he has an attack of rheumatism; he has been sick a long time; uric acid has been accumulating until he has gotten to the point where his blood is saturated with uric acid; then it has to unload itself into the tissues, and the tissues become saturated with uric acid; then his tissues by and by become painful, inflamed, and swollen, and he has rheumatism. This man's storage capacity for uric acid is all used up; it is used up. Now, suppose you are keeping house in a flat away upstairs somewhere in Chicago.

You have a garbage box somewhere in which you put away all the refuse, and you keep on piling away the refuse in that garbage box and you don't have any trouble. Everything is all sweet, and nice and clean; everything goes off all right because you have a place that hides the refuse away; a nice cover covers it up; but by and by the garbage box is full; you can not get the cover to fit on tight, and a little garbage begins to come out, to run over--a little bit. You can not keep things in, as I said, [illegible] you can not keep things as nice looking as you did. Pretty soon the garbage runs over, spills on the floor, fills up a corner where the garbage can stands, and things look very untidy. By and by the corner is filled, and the garbage runs through the floor and down into the next house below you; and it spreads to other rooms, and runs through the rest of the house, so that garbage is scattered all over the house.

That is a description of the man that has got rheumatism. That is the man that has got autointoxication; that is the man who has got any kind of uric acid disease,--he is in just that condition. The refuse material of his body is lying loose all through the vital domain. The house he lives in is defiled, needs housecleaning, needs to send for a chimney sweep to come and clean out the chimneys; needs to send for the scavengers to come and clean out the cellars; needs to send for the sanitary officer to fumigate and disinfect the upper rooms; needs to have a man come around with a machine for cleaning the carpets, the rugs, etc., needs to have a general housecleaning corps set to work in his whole establishment. That is why he has to come to the Sanitarium. That is what

these folks are doing in the Bath-room, in the manual Swedish movement room, in the mechanical Swedish movement room, in the phototherapy department, and in the gymnasium. All these places are established for that purpose--to get rid of this mischievous rubbish that has been stored up in the tissues of a person's body. This man has got rheumatism; his house is all full of this rubbish I have been telling you about, and all the rooms of the house are full of uric acid and rubbish. Now here comes a damp day. In ordinary weather, in bright weather, this man is able to pass the garbage out as fast as it comes in; he is able to keep up very well; but now comes a damp day; his skin will not work; his kidneys are already crippled, as they always are in chronic rheumatism and gout--always, so when the skin fails to do its work, the kidneys alone are not able to do the work. The kidneys are able to work just as well on a bright day as on a cloudy day, but on a damp day the skin can not work so well, so more work is required of the kidneys because the skin does not do its work properly, can not under those circumstances; but the kidneys are already doing all they can, don't you see? so there is no place left, no chance left, no reserve capacity; so, as I said before, we have an additional accumulation, and this additional accumulation within the body clogs up some corner somewhere, and that is what stirs up anew the rheumatic pain--congested nerves, or irritated nerves, irritated joints. That is why the rheumatic suffers pain; that is why the gouty patient suffers extra twinges on damp days; that is why in every chronic disease there are exaggerated symptoms on a damp, cloudy day. I find

invalids very much more interested in doing those things necessary for their welfare if they knew the reasons why; so it has been my custom all my life to try to make my patients as intelligent as possible with reference to the advice I give them, so they will see it is rational, and they will be willing to accept it; and I believe that is one reason why these Sanitarium principles have acquired so large a following in the United States and other countries too--is because we have always tried to teach the reason and show the reason for it; and sensible people are willing to do sensible things.

Now, here is another man who has lost his ability to regulate temperature. ~~Where is~~ What is the trouble with him? The temperature regulation is carried on by means of the control of the thermogenic tissues in the muscles. The muscles are the furnaces of the body. It is in the muscles that the fuel which keeps the body warm is burned--in the muscles. It is not in the brain; it is to some degree in the liver; to a slight degree in the blood; but it is especially in the muscles. Liebig supposed the lungs are the furnace of the body; but the lungs are not the furnace of the body. The lungs are the drafts--simply take the air in,--but the burning is in the tissues, particularly in the muscles. Four-fifths of all the food we eat is simply burned in the muscles. It is slow burning, you see; the same as you see these Japanese bed warmers, hand warmers, and foot warmers. It is a curious little thing in which you light a little bit of fuse, put it in there, and it goes right on burning in a quiet way for hours, without any smoke arising from it; but heat is being generated; it goes

on burning,--no flame at all, but it is heated inside all the time by a tube. There is not any danger of setting anything afire, but it burns just low enough to keep the thing warm. I am sure many of you have seen those curious little things.

There is a similar fire going on in the body all the while. Heat production is taking place at the expense of the tissues stored up in the muscles. If a person has a large amount of stored up tissue of this kind, then he has very little difficulty in keeping warm; but if he does not have very much of this stored up tissue, he has trouble to keep warm. A man who is very thin is likely to suffer from cold. The fleshy man suffers from excessive heat, but not from cold; that is, it takes an extraordinary condition to make him cold. Once in a great while, the fleshy man suffers from cold, but generally it is the thin man that suffers from cold. He says, "I feel as though the wind is blowing right through me." It does not actually get through, but it penetrates his skin, carries off his heat, and he notices the least little loss of heat, and he says right away he is suffering a serious loss that he must in some way compensate for. The poor dyspeptic generally suffers in this way because he has not got ability to take in fuel enough to keep his fires going. He is like the locomotive that when it passes into a town does not stop long enough, or for some other reason, can not get coal enough to keep heat going until it gets to the next town; so the coal gets less and less in the tender; by and by the steam gets low because there is not coal enough to keep the fires up. That is the dyspeptic, because the stomach is the avenue, the

door is which fuel comes in, and the man who has a poor stomach, poor digestion is going to suffer a great deal because of the vicissitudes of the weather, because of the changes in the temperature.

Now, perhaps I have explained far enough with reference to how these conditions affect invalids, why the weather does affect invalids. I might go on at considerable length, explaining more further in this line, especially in relation to the nervous system; but the question is how to rise above this, how to rise above it. Of course, we must readily see that a man suffers from rheumatic pains because his system is full of rheumatism, and he must eliminate the uric acid, he must get rid of the uric acid; then he will cease to mind the weather. He is a regular weather barometer, because of this over-accumulation of uric acid. His blood is saturated with this great amount of uric acid, and as a consequence, there is gout, there is superstitions, and he suffers in consequence of this thing. Now, I have not any doubt at all that the great majority of chronic invalids, probably every person in this room, and the people who have gone out as well,--I have no doubt they are all suffering more or less from uric acid. I do not mean uric acid in the sense in which we ordinarily talk about it either, but rather the poisons to which class the uric acid belongs--it belongs to the same class.

There are other poisons generated in the body besides uric acid. There is xanthin, hypoxanthin, guanin,--these poisons are much more toxic than uric acid; uric acid is comparatively harmless, but hypoxanthin is a deadly poison; and these

substances appear in lesser quantities than uric acid, so they are of greater importance because of their greater toxicity, because of the greater mischiefs which result. All chronic invalids suffer from the accumulation of these tissue wastes. If you should heat your room with soft coal without any chimney, think what a condition your house would be in in a little while,--soot on the ceilings, and ashes about the floor. The house would be in a very untidy condition in a short time. A man who does not take much exercise, a person who eats excessive quantities of meat, or the person who eats excessive quantities of any kind of food, eats too large quantities, the person who does not sleep enough--all such persons are really like a stove that is burning without a chimney, or with a very poor draught, a smoking stove, and the whole house becomes polluted; and these poisons that pollute the house, this effluvia that pollutes the house, corresponds exactly to the poisons which are generated in the body. Some of those poisons are absolutely identical,--some of the same kind of poisons that are produced in smoke, some of them are more poisonous--creosote, for example,--are produced in the body itself. These poisons accumulated in the body produce the symptoms that most chronic invalids have,--headaches, nerve aches, swimming in the head, pain in the back of the neck, pain in the top of the head, a bad taste in the mouth, pain through the eyes, pain in the forehead, and various tingles, and crawling and creeping sensations--all these symptoms, nearly all of them, arise from these poisons accumulating in the body. When we have changes in the weather we ought to be able to adjust ourselves. Our bodies were made to, in normal conditions, adjust themselves

accurately and instantly to all these atmospheric changes, and to adjust themselves to all these electrical changes, and to all the temperature changes, and to all the hydroscopic changes,--to any of these changes, no matter what they are, the body adapts itself to them. If the pressure falls, so that the air has not so much oxygen as usual, all we do is to breathe a little deeper, and this is done automatically. The same thing will happen if we are sound asleep; if the air is diluted a little bit by a fall of the pressure, the body adjusts itself at once, and deeper respiration supplies the same amount of air as before. If there is a change in the amount of moisture, or, for instance, if there is in the summertime a change of temperature in the night so that it becomes too warm, here is a child asleep, or anadult asleep--it is just the same thing--and the temperature rises, perspiration takes place; when we are sound asleep, the body will suddenly begin to sweat. To some of you that does not seem to be anything at all remarkable--that we should sweat when we are asleep; but it is a wonderful thing, it is a wonderful thing that we should sweat when we are asleep; and that sweating by producing evaporation of moisture from the skin, cools the body off, and so protects it from over-heating. On the other hand, suppose you are sleeping on a warm night, and the temperature changes, the sweat stops, you get cooled off, the skin vessels close up, the temperature of the skin falls, so that the body adjusts itself in the opposite direction. The healthy body makes all these adjustments automatically; there is an intelligence within the body that is not under the control of our wills,

a divine intelligence, an intelligence that is wiser than we are, and this intelligence it is that makes all these changes, it is this intelligence within the body that causes the body to automatically adjust itself to all these varying conditions that surround us. One does not know when he ought to sweat. Suppose you should say, for instance, "I think the air is too warm; I will try sweating for a while." Try it. The only way you can get into a sweat is to exercise. By making you think hard, you can be made to sweat sometimes. I hear people talking sometimes about getting a man and putting him in the sweat box. I suppose that kind of sweat box, and putting a man into such a sweatbox means to make him perspire by mental effort. Suppose you say, "Well, the temperature is falling now; I guess I would better stop this sweating, close up my pores, contract my blood-vessels, and keep all my heat in." You can not do such a thing; there is no possibility of any such control of the bodily functions. They are controlled by an intelligence that is wiser than we are. The great Intelligence, my friends, that made every man and every woman is looking after every man and every woman. It is just as utterly impossible for us to take care of ourselves as it is for us to make ourselves. ~~The psalmist~~ David said, "It is he that hath made us and not we ourselves." We are not able to make ourselves, we are not able to create ourselves; we can not add one atom tom our lives; we can not even take care of ourselves; there is an intelligence caring for us. "He careth for you", one inspired writer said. That is a great thought, a wonderfully comforting thought; but we do not need to be worried if we are doing the best we can ourselves, we can just depend that this wiser intelligence will do the rest in caring for

us; and as far as the body is concerned, that, too, has been created; it is able to adjust itself within reasonable limits, to all the different changes in temperature, in moisture, in the electrical conditions, to adjust itself to the pressure of the air; the body has the power to adjust itself to all these changes within reasonable limits. By means of houses, and clothing, or both, we are able to go beyond the ordinary natural limits, and to adapt ourselves to climates to which we are not naturally adapted, so that we can, if we want to, endure weathers that we are not naturally adapted to endure, and atmospheric changes; but now, the invalid,--what shall he do?

The invalid is shorn of his strength. The great capacity for adjustment which he had, has been narrowed down. The large margin which he once had, within which he could adjust himself to changes, has greatly dwindled down, little by little, little by little, until he has got down to a very little, narrow margin; and the man who is disturbed by the weather has no margin at all. The man who can not stand a little weather, who can not stand a cloudy or a damp day, but suffers irritation,--that man's margin is used up. The only way in the world that man can ever get able again to endure a change in the weather is by getting a greater margin. What do you mean by that? Well, we will illustrate it. Take breathing: When one takes a deep breath, gets in all the air he can and then breathes out all the air he possibly can, he can force out of his lungs a gallon of air. We will say, 230 cubic inches of air. Ordinarily we use only about twenty

cubic inches of air, two-thirds of a pint. When one takes an ordinary breath, two-thirds of a pint go out in one breath when one is breathing in the ordinary way; but if one breathes out all he possibly can, he can breathe out [illegible] hundred cubic inches more, and if he breathes in all he possibly can after an ordinary breath, he can bring in an extra one hundred cubic inches of air, making about two-thirds of a gallon one can breathe out--just about a gallon; but there is left in the lungs ordinarily one hundred cubic inches more that you do not use at all. Here, then, ~~there~~ are two hundred and twenty cubic inches of air that it is possible for one to breathe. Why do we have that extra one hundred cubic inches? When we breathe in an extra hundred, we can breathe out two hundred or more cubic inches with an ordinary breath. Why is it? Here is the 220 cubic inches we ordinarily breathe out and in. After we force out all we can, there are still 100 cubic inches that we can not force out. So there is a margin of one hundred cubic inches, isn't there? What is that for? The purpose of that is to help a man when he has to run sometimes to catch a train. If he runs to catch a train, he has got to have more air to keep his legs going; so he has got to have more capacity, and he will have to breathe much deeper. It may be that sometime that man will get pneumonia; if he gets pneumonia it will fill up one of his lungs entirely, cut off half of all the lung capacity he has got; so he has got to be able to use more of the other lung, don't you see? On that account, nature has supplied us with an extra capacity for breathing more than we ordinarily do.

The same thing is true of the kidneys. A man came to me some years ago, as much as sixteen years ago. He said, "Doctor, My boy I think, must have some trouble with his kidneys, for I notice that the kidneys are extremely active. I am sure he has some disease, diabetes or something of that sort." I told him to send up a specimen and I would examine it. I asked him to take a fruit jar specimen, and I would have an examination made. A couple of days afterwards, I was looking out of my office window, and I saw a dray coming up with a great big bushel basked filled full of fruit cans; and they were brought into the office. I said to the man, "What is this?" He said, "That is the specimen you called for." I was thunder-struck. I said, "I only wanted a twenty-four hour specimen." He said, "That is exactly what this is." Twenty-eight pints! I made an examination and found this boy was suffering from a disease known as diabetes insipidus. It was not diabetes proper,--there was no sugar at all,--but simply diabetes insi-pidus--a large quantity of water carried off. I said to this boy, "Are you thirsty?". He said, "I am always thirsty. I drink a pailful of water every night. I wake up three or four times in the night and drink a whole big pitcher full of water, and go to sleep again." That man is alive now. He is alive still, and in good health--rosy cheeked, and he is carrying on some business. I met him not long ago and asked him how that trouble was. He said it was just the same, and he drinks several pailfuls of water every day. I mention this so you can see what enormous capacity the kidneys have for work when it is required of them. The amount of work which they are capable

of

of doing is enormously greater than that which is ordinarily required of these organs.

The same thing is true of the skin. As I said, the skin ordinarily secretes about an ounce and a half of water an hour; but if a man is working hard in a hot harvest field on a hot summer day, that man may sweat fifty ounces of water in an hour--fifty ounces of water in an hour! It may be increased more than twenty times, twenty or thirty, even thirty times beyond the normal amount. The skin activity and the kidney activity, you see, may both be enormously increased. The skin activity can be increased in greatep proportion than the kidney activity can, perhaps twice as much in proportion as can the kidneys; but here is an illustration of the enormous power of the body, the surplus capacity of the body in meeting energencies.

Increased heart capacity: I found a young woman who said her heart was palpitating; she came into the office, and I could not count it it was going so fast. So I got out my pencil and my watch. I set my watch down there, had one finger on the pulse, and with a pencil and a large piece of white paper I made dots upon the paper just as fast as the pulse beat for fifteen seconds. Then I counted it and I found that her pulse had beat seventy-five times in fifteen seconds. That was five times a second, or three hundred a minute. It was beyond belief; I could hardly believe it. So I counted it again and got the same result. I put on a sphygmograph, which writes down a little mark every time the pulse beats, and I got the same result,--300 times a minute. The ordinary beating of the heart is sixty a minute; but here was a heart beating

five times as rapidly as it ought to beat. Why does this heart have this capacity for enormous beating? Here is a boy lying down, he is and his pulse is beating at the rate of sixty a minute. He goes out and runs to a fire with all his might, and when he gets there he is almost out of breath; his pulse is 160, or 180 a minute--three times the ordinary rate. That is what it is provided for,--to help us to run to a fire, or to catch trains, and to get over emergencies. That young woman had suffered from autointoxication; she had eaten a dinner that would not digest, eaten a lot of pickles and things. The poisons which formed in her stomach brought about this condition. Her heart was beating hard to get those poisons out as rapidly as possible. The sick man, the invalid who finds himself out of breath has lost his heart capacity, don't you see; or it may be he has had pneumonia, and it has plugged up one side of his lungs--he has lost half his lung capacity. The rheumatic who is troubled because of a little change in the weather has lost part of his skin or kidney capacity. The man who gets bilious whenever he eats a little bit too much, or eats a little butter or something of that kind, and gets bilious very easily, that man has lost a large part of his liver capacity; and the man who finds himself shivering with cold when other people are warm, he has lost his power to make heat; his thermogenic capacity, heat-making function is wasted. The chronic invalid who has been long ill has lost his surplus capacity in all these things as a rule. He is like a boy burning with millions of dollars in the bank, who squander it, and throw it away with horse-racing, and one thing and another; his horses lose, or he loses in other many ways, and perhaps gets

down to just barely enough to live on. His income has got down to one thousand dollars a year, and he has got to live economically to get along. That is the chronic invalid. That is exactly the condition of the chronic invalid,--he has got to get along with all these influences about him, and how is he going to manage himself to deal with these changes? The only way in the world to do is to save, to economize, to lay up each day a little store. This man who has lost his fortune must manage somehow to lay up fifty cents a week. If he will keep on laying up a little, by and by he will get a little capital again. That is why it is advantageous for invalids to come to the Sanitarium,--because they can get away from home where they are making expenditures in the care of the house, the care of the family, business and social duties,--all of these things are consuming energy so that the individual has no opportunity to lay up energy; so he must come here in order to restore the capital which has been running out. That is the reason why you can not get well at home as quickly as you can get well at the Sanitarium. Very often about this season of year the patient says, "I think I would like to go home; I think I will go back; I will go home and do this thing myself. I think I have learned this trick pretty well, know how this goes. It is fomentations, cold rubs, compresses, wet girdles,--I can do that at home." So people often do. Now they might be able to do all these things at home, everything you do at the Sanitarium you might do at home; but nevertheless you would not get the good you ought to get there, and because it takes energy to react to these things. The vital powers of the body must be utilized in rebuilding, repairing, and storing up. That is why you are here--

to get stored up with energy again; to get an accumulation of energy. If you are using energy for that treatment at home, using energy about your business, you will see this thing does not work. You go back to the doctor and get some wine of iron and strychnia. You say, "Give me something, Doctor, to stir up my liver." He will give you some calomel or something else to make you think your liver is stirred up, whereas you are feeled again, for your liver is doing actually less work than before.

The chronic invalid has got to be rebuilt and reconstructed. He is like the mill pond that has run dry, so he has got to shut down business a little while. The stones must cease to grind for a little while in order that the pond may be filled up. That thing is necessary; that is what has made the Sanitarium necessary. Away back some so long as one hundred years ago, the peasant Priessnitz, away off in Austrian Silesia, made the discovery that he could do something with water to help people recover this lost margin I have been telling you about, that is below the natural margin. He began his work. Pretty soon people began to come there; they thought it was simply wonderful; for all he used was wet rags, cold rubbings and wet rags. That is all there was about it; yet the people came and stayed with him, lived in his father's barn; hoed corn, milked cow's, and did all sorts of things in return for what he did for them. He did not charge them anything; they were poor people who could not pay. When it took all of his time, he asked them to care for his farm, take care of his cattle while he looked after them. By and by he began to build houses for the people who came, and began to make small charges. Even yet,

the charges are ridiculously small. If you want a place where you can go and get hot and cold treatment cheap, go to East Austrian Silesia, Grafenburg, away up on the borders of Russia; and when you get there, you can live there cheaper than in any other place you were ever in in your life. But the accommodations there are very crude. About five o'clock in the morning you hear a roar coming down the hall until it gets to your door. There will be a knock at your door, and then there will come in a great, big wooden bathtub on wheels, of water at about seventy degrees, and the attendant will invite you to take your bath in it. Then perhaps they will throw a wet sheet around you and let you lie in bed for a hour or two. Then you will get up and take a walk in the mountains for a couple of hours until you are just ravenously hungry; and while you are walking you take a drink of water at every spring you come to, that is, if you drink all the water they want you to drink. If you have got any get well in you at all, you will certainly get well. Americans find it difficult to accommodate themselves to those vicissitudes; but those sturdy Germans and Russians thrive and get along very well. They have a simple diet, eat simple food that they find is good for them, mostly sauerkraut, sour milk, and black bread, somewhat similar to the Vienna bread you get over there now-a-days. Priessnitz found out he could help the people to get their margin back again, and out of that idea has grown this institution, and all other institutions like it have grown out of that idea of getting people to come apart by themselves for a little while in order to get health. The difference between this and that is that this represents the whole system; as I said the other night, it plays the whole orchestra,

represents the whole line of remedial applications known to rational medicine, all brought to bear at one place and at the same time. It is like, instead of raising a house in the ordinary manner,--putting up one corner, and then going around and putting up another corner,--it is like raising it all at one time, so that at one time the whole house goes up. So instead of striking with one hammer, we are striking with one hundred hammers coming down on the rock altogether with tremendous force, and the rock is broken. It is from this simple beginning that the idea developes.

If the patient can not get his margin back, he must stop everything and give his whole time and attention to this one thing. It is by hard work that he gets able to do that thing. The hardest thing in the world that I have had to do in this institution, is to hang unto people long enough to get them well enough so they have appreciable benefit. There is probably not one in ten who come to this institution who gets anything like the substantial benefit from it that he ought to get. The trouble is, the man does not come here until he sees the yawning chasm just before him. If When he begins to think about ordering his coffin, making arrangements for his funeral, then he will come. When he comes to the Sanitarium he brings that vision with him, carries it with him about a week, and by and by he begins to feel better, and the vision begins to vanish. When it has got around the corner just out of sight, he says, "I am all right now; I am getting better, so I guess I will go back to my business again. Perhaps he has got two roads to be traveled by the chasm that is open ready to swallow him up, but he does not see it. He has not got back any of

his margin, you see; so he has not got any margin.

So long as you mind the weather; so long as the weather disturbs you, and you are upset by it, by changes of weather, by draughts, you have not but little margin, and you are an invalid, only waiting for an opportunity to come, something that will break you up. Any little change in the weather, a little extra change of some sort will precipitate upon you such a disturbance that your vital organism is so lowered, that you will have pneumonia, or get Bright's disease, or inflammation of the liver will set in, or of the stomach, or bowels, or pulmonary consumption or some other thing will manifest itself, and you will be carried off very rapidly; recovery will be impossible. If we could only get these sick folks to spend the time in getting well --"but there is my business. That business is worth more to me than anything else on the face of the earth." He has put the best years of his life into it; all the energy of his life into it; and now if that business is going to suffer, why he would rather die than see the business suffer. And he says he thinks he will take his chances; so away he goes home. Sometimes he takes the chance once too many times.

The ladies say, "O, it is time for my children to go to school; I must go home to get those boys and girls off to school. I must see that they are all clad up all right." Those children are going to want mother to look after them; but in a few years these women know more than they do now. It is my belief, my friends, that the average chronic invalid, and the average well man who has got where he can not get life insurance,-- that man is in a condition where he can not get life insurance at any price, on an average his life could be lengthened out

ten, fifteen, twenty, or twenty-five years by simple attention to these things I am speaking to you about; by going to work to cultivate health, to build up just the highest health he canget; to get just as wide a margin of vital resistance as he can possibly get, and when he gets it, keep it just as long as he can hang onto it. We should be niggardly of our vitality, parsimonious of it, stingy of it, instead of throwing it about in such a prodigal way as so many people do. Many a man throws his life away on a Christmas dinner; and many a woman throws her life away upon a party, or some great social event. You have all seen that many and many a time. We must be wise when we have an opportunity. You are here, and I beg of you don't leave this place unless some awful emergency carries you away, until you feel that your feet are on the solid rock; until you feel that youm have your feet planted on a foundation that will stand, and that you can go on building up upon that foundation.

Now you say, "Dr. Kellogg wants us to stay here just as long as possible." I should not if you were robust, healthy, well, and we had done everything we could for you, would not have you stay here for anything. We love to see people give us a little better chance, so that we can have a chance to show what we can do. Suppose a shoemaker who was repairing shoes had a set of customers who were alwayskkcoming to take their shoes away just before he got the shoes finished. He never could get a reputation in the world. Those shoes would all go all to pieces, the pegs would be rotting out, and everybody would say he was a poor shoemaker. If I were a shoemaker, I should insist on keeping the shoes in the shop until the work

was finished. If the public would use us as well as it does its shoemakers, if we had as good a chance as the shoemakers; if we had as good a chance as the carpenters; if we had as good a chance as the plumbers have, I should say that we should do some very fine work; we could wipe some very nice joints, and we could soon send out some splendid representatives of what a sanitarium can do. As I said before, I beg you to give this matter serious thought. Do not let troubles devour you. You have set out to get health. Whether you continue your pursuit of health here or somewhere else, give your energy, give your thought, give your mind to it until you have got health, and until you have got all the health there is in store for you. I want to say to you, a man can find ten times as much vigor, and energy, and life and health as you have any idea of. I don't believe we have a person in this house tonight but what can get well, and get margin enough so as to be comfortable, and to live comfortably. Some people here, I know, have got bad livers; some have got bad stomachs, some have got bad kidneys; but food may be adapted to that stomach so that it wont have to do half as much work as that stomach does; but we must give it just the right kind of food. A bad skin can be taken care of in such a way that the patient can get along, even though the skin is crippled to some degree. The man with one leg, you know, can have an artificial leg made that, although he limps, will enable him to walk again alone. I know a man who rides a bicycle and does it well with two artificial legs. That is doing very well. I do not suppose anyone seeing that man go on his bicycle would know he has two wooden legs, but he has, and he gets along all right. So it is with the invalid. The cold bath

is a crutch to help the man over the hard spots of that day. Pretty soon he comes to the place where he needs that cold bath, and can not get along without it. The neutral bath at night will help chronic insomnia so that that man can sleep as well as the man who does not suffer in that way. The man who has got a large liver, by wearing the wet girdle over night, and wearing it every night, he may be able to keep himself comfortable in that condition for years and years. That wet girdle will keep his liverdilated so it wont produce abdominal dropsy which is certainly coming by and by.

So, the man who has a dilated stomach is going to die, probably from autointoxication. He can postpone the calamity for for years and years by regulating his diet so gradually and carefully that there will be nothing on his stomach to decay, nothing to produce those poisons there. Probably he will die of autointoxication produced by some indiscretion when he does die. Men who die of apoplexy have just before done something wrong or they never would have died that way. It is because we make some misstep. The chronic invalid is a man of a small margin, and he must calculate all the while to keep within that margin, to be constantly stingy, parsimonious of his vitality, and it may be possible for him to add to his present stock of health.

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Appendix pp. [illegible]

LECTURE

Thursday Evening, September 22, 1904, at [illegible] P. M.
In the Battle Creek Sanitarium [illegible]
By J. H. Kellogg, M.D.

Our preparation for Battle Creek Sanitarium Day at the World's Fair is going on very satisfactorily. We expect to have an interesting time. I have discovered that some of the manufacturers of various things which are to be sold to the public are looking forward with a good deal of interest to this occasion. I recently learned that the manufacturer of a certain popular baking powder, who has erected a factory just outside of Battle Creek for the manufacture of extracts, which I suppose he makes here in order that they may get something of the Battle Creek flavor, has been spending a week in town in getting his extracts ready for exhibition on Battle Creek Sanitarium Day. He wants to get a little of the Sanitarium flavor in addition; so I presume we shall have quite a number of these fakirs on hand on Battle Creek Sanitarium Day. They had an impression that it was going to be Battle Creek Day and all the food pirates were to be on hand with their various wares; so he proposed to be on hand with the rest; but I presume that Price's Baking Powder will not be represented at the Sanitarium Show.

VARICOSE VEINS. Somebody wants to know what to do for <u>varicose veins</u>. That question was asked me a few months ago in Boston. I was called to Boston, and a man asked me if I could cure varicose veins. When we got down to curing those, we had about three yards of veins. The only way to cure varicose veins is to dissect them out, simply annihilate them; then they are cured.

Sometimes it is sufficient to make a circle around the leg and cut the veins all off all the way around. The veins are not inside. It is not such an awfully serious thing. I removed a couple of feet of veins yesterday, and the patient is getting along all right. Before we understood about antiseptic surgery, before we knew how to be clean in surgery, these operations were very hazardous; but since we found out how to do surgery in a cleanly way, the operation is very safe and very little painful. Before the days of the anaesthetic,--ether, chloroform, laughing gas, or cocain--I have done the operation often with cocain, and under the influence of these anesthetics the vein is dissected out painlessly, sometimes there is a slight pain in the skin; the vein is simply cut out, and the two ends picked up and united together again. Afterwards there is no pain at all.

There has been a wonderful change recently in antiseptic surgery that I want to tell you about. We used to have a terrible time with bichlorides. We had to be careful that someone did not swallow them; we were always afraid that some nurse or patient would get a dipperful of bichloride and drink it. It was as clear as water, so we used to stain it blue, red, various colors, and write poison on the jars; but still, once in a great while, some nurse would make a mistake and get t the wrong solution. The solution was three to 1000, a saturate solution, so a cloth dipped in it and laid on somebody would make a blister. We thought formalin, and formaldehyd; they were harmless because they were not poisonous, but malodorous; there were strong gases rising from them which would cause the tears to run sometimes; but now and then we found a patient who had a very sensitive skin, and this formalin or formaldehyd coming in

contact with the skin would produce dermatitis, inflammation just like sunburn, a blister worse than sunburn. Finally I became afflicted myself from using the solution. I used it stronger than usual one day, bathed my hands in it, and I soon began to suffer many from acute inflammation which was very uncomfortable indeed before morning. That set me to thinking. Poisonous substances that will produce such an effect on people can not be of very great advantage in healing up a wounded surface; so I began to make experiments. I finally found--also from the observations made based on bacteriological studies made in Paris,--I found that ordinary soap, not Pears' Soap, nor Yankee Soap, nor any other patent soap, but ordinary soap, soft soap, if you please, is the best of anything you will find; yellow laundry soap, just the commonest, most old fashioned soap you can find, is the very best sort of skin disinfectant; it is better than any of these medicaments we know anything about; better than any drugs we know of; so for the last six months, I have used nothing but just soap. The green soap you get at drugstores is very nice; but as I said before, ordinary soft soap is just as good as anything. Potash soap is the best. It has been proven by experiment that a soap solution, 5% strong, a 5% soap solution will kill any disease producing germ that is known. It will kill all the germs that are known--any germ-so in our combat with germs, all in the world we have to do is to be clean. Typhoid fever patients must be looked after, or else the bedding will be contaminated, and the hands of the nurses will be contaminated, and perhaps the food will be contaminated, and the disease may be spread about in that way. Nurses often take typhoid fever in that way, from their own hands, because the germs are in all the excretions,--germs in the saliva,

and all the fluids of the body,--they all contain typhoid fever germs, and the nurse contracts typhoid fever; so it is necessary that the patient should be cleansed every day with some sort of disinfectant. We used to wash them off with bichlorides; that was not a very nice thing, but now-a-days it is only necessary to give the patient a soap and water bath once a day, and to keep the skin clean. It makes bed sores also, by the way, because these typhoid fever germs and other germs infect the skin and produce bed sores. So if the patient is kept perfectly clean, the patient is not likely to have bed sores, and disease is not likely to be contracted.

The best method of cleansing the patient is to take an ordinary cake of yellow soap, dip it in hot water, and rub the patient all over with that yellow soap. After the patient has been thoroughly rubbed, dip the hands in the water and rub it in. Or, take the corner of a napkin, moisten it with hot water, and rub the soap in thoroughly all over the skin; and by that time it is ready to be wiped off with a towel wet in warm water; and then, if the thing is thoroughly done, thepatient is thoroughly disinfected and thoroughly clean. Washing the hands with good, strong, hot soapsuds will cleans the hands more perfectly than anything else that it is safe to use; and it is perfectly safe to employ.

We have a very fine method of preparing for surgical operations. . We wash the hands with soap, then simply wet the hands, smear the hands with a solution of guttapercha in benzine. The result is a very thin pair of gloves. When the benzine evaporates, it leaves a thin film of the gutta-percha all over the hands. It is skin tight. There is just a very

little, thin film of rubber all over the hands, and it is just tacky enough so that it does not puncture; you can not puncture it any more than you can puncture a coating of fresh glue or molasses. You put something into it, and when you draw it away the rubber closes up again. So the little layer of gutta-percha keeps all the germs in the skin out of the way; keeps them safe so there is no danger from them. They are out of the way of doing any harm. The skin is pressed in manipulation of the fingers and germs are squeezed out through the follicles upon the skin, but the gutta-percha covers this all over. When we get through, we wash the hands in benzine, and they are clean again, and safe; and the patient has been perfectly protected. Before beginning the operation, a solution of gutta-percha and benzine is poured over the patient, and that makes a thin coating of rubber, so that germs can not get mixed into the wound. That is a very great advantage. Using the gutta-percha in this way, we now have absolute asepsis.

APPENDICITIS. Someone wants to know what to do for appendicitis. I am very glad you asked that question, because it is getting to be very fashionable now to have appendicitis. I think in the last week or two four or five people have come here to be cured of appendicitis, and I have found that none of them had appendicitis; that none of them required an operation. Now I will make just a little bit of a chart, a sketch on the blackboard to give you an idea of something. Here is, we will say, the umbilicus. Here are the hips. Here is the tip of the hip bone right up here. The anterior superior spinal crest of the ilium it is called,--right over here. Here is the colon. Here is the appendix. When a person has appendicitis there is an inflammation of the appendix here; the pain is right at this

point; so that if pressure is made just at this point, about half way between the most prominent point of the hip bone, and the umbilicus, there is where the tenderness and pain will be felt. That is where the pain is felt.

There is another thing that is down in this region that most doctors do not seem to know anything about. It is not in our English literature, so they are not to blame, for there is nothing said about it in any English literature I ever read. There are some little sympathetic nerve points--everybody knows about that,--but these are what are known as Leubart's (?) points. None of our English books call attention to the fact that these points sometimes become exceedingly sensitive,--these lumbar ganglia of the sympathetic nerve. Just above here is the solar plexus; that is another group of ganglia, just behind the stomach, and with branches running up over the stomach. All these together constitute the great abdominal brain; and under certain conditions which are very common--it is always the case in persons suffering from nervous dyspepsia, and in most persons who have hysteria,--nearly all people who have sciatica, lumbago, and the great majority of sedentary people whose bowels get fall down and get prolapsed,-th--these ganglia are found to be very sensitive. So branches of nerves run out along the blood vessels into the intestines; some branches of them go to the kidneys, some to the stomach, some branches to the intestines; these are very sensitive. Some branches run down and come to the crural nerve; other branches run over to the sciatic nerve in the other side of the leg; some run to nerves in the back. Wherever these nerves run to, if there is congestion or irritation of one of these ganglia, the nerve will be sensitive and sore. I found a man the other day who had sciatica very badly.

I knew right away as soon as I saw him, the moment I observed his manner of sitting. I examined him and found sure enough, sciatica on the right side, and there was a very sore lumbar ganglia on the right side; on the other side it was not sore; there was no pain in it. It is a very common thing for people to have nervous headaches on the left side. You examine them, and you will find that the ganglia of the left side is sensitive. These nervous headaches are sympathetic nervous headaches, always. Now, this patient I found yesterday I think it was, I found he had sore lumbar ganglia; there was nothing in the world the matter with the appendix; but there is another place that is sore; and ~~xxxxx~~ without taking great pains to locate the exact point, the two might be easily confounded, for they are only about an inch apart, and these two points have been confounded many times, and the doctor had thought this was a case of appendicitis when there was no appendicitis about it. So that patient never had an attack of appendicitis. He had pain there, but never had an attack,--never had vomiting, or chill, or any other indications of appendicitis except pain. With appendicitis there is something more than that. So you see most cases of appendicitis are not appendicitis at all. There is no appendicitis about it. It is simply pain in the lumbar ganglia of the abdominal sympathetic, and it is due to prolapse of the bowels, or, perhaps, to some other cause of irritation in the stomach, or over-eating or something else, and in a few days you will recover.

But suppose you really have appendicitis, what are you going to do. In the first place, be sure youhave it. Don't send for a surgeon until you have found out that there is a real

necessity for having something cut out. Persons with appendicitis have pain. They do not always know just where the pain is, at the start, because they are generally sick at the stomach, and vomit, and have pain at the pit of the stomach; but after while they locate the pain down in the right side. I remember one man who had chronic appendicitis, and he had his appendix removed on the right side. After a while he had another pain, and he came to me and said he had appendicitis on the other side, and he wanted another operation; but there is only one appendix, so you do not have to have that operation but once. The appendix is on the right side. Then there is pain up in the pit of the stomach. There is a chill in connection with it, and there is fever following the chill. This vomiting is quite persistent; the pain is persistent. The patient perhaps has bloating of the bowels, and loss of appetite. If you can not get a doctor to examine the blood, which is a very important thing to be done in these cases, to count the blood cells, count the white cells, if that is done, a very remarkable change would be found. The white cells ordinarily are found in the proportion of about 7000 in one cubic millimeter. A millimeter is about one-twenty-fifty of an inch, and a cubic millimeter contains 7000 white cells. But it contains a lot of other cells besides. It has 5,000,000 red cells, so you see they are not very big. One cubic millimeter is only a cubic twenty-fifth of an inch; not twenty-five inches, but the cubic twenty-fifth of an inch contains 5,000,000 red cells, and 7000 white cells. When a man has appendicitis these white cells increase very rapidly, and the man shortly has 14,000, or 15,000, and by and by the number goes up to 25,000; and if he has got 25,000 white cells, that means

suppuration; that means that pus is forming; so it is very important. It does not always mean there is an abscess formed; but if the doctor will count the blood, examine it, he can find out. He should always do that thing. I found that out from a French surgeon. It is a wonderful thing that is not commonly known in this country; but it is important to know it. It is important for youto know it. If your doctor does not know it, tell him about it. Ask him to count your blood. If you find suppuration, youneed not be scared, because nature can cure inflammation inside the body as well as outside the body. If you have inflammation of a joint, and you have suppuration there, it must be laid open and the pus must be let out. If you find suppuration, it will get well without anything being done to it at all, it will get well by itself; for the ~~information~~ inflammation will by and by subside, and the absorption will take place, and the joint be limbered up by degrees, and it will return to its normal condition again. If you have got inflammation in an eye, or inflammation of a finger, you do not go straightway to find a doctor to pluck your eye out, or to cut your finger off. A great many people very foolishly have a tooth pulled as soon as it begins to ache; they do not care about that, because they have got several teeth to spare; they think they have, but they have not. Not one single tooth can be spared. It is the most unwise thing to have to lose one single tooth. You would better lose a one hundred dollar bill than to lose a tooth, any time. If you lose several teeth on one side of your head, you will get flat on that side. Your head will get one-sided, your face will get one-sided, and you will look askew; so it is not wise to lose a single tooth. Some people have their teeth

pulled as though they wanted the privilege. One of our medical missionaries in the South Sea Islands visited an island where a doctor had not been before for ten years, and found a great many people suffering with terrible toothache. He pulled a tooth for one man, and immediately he was surrounded with people. The natives all came in crowding around him to have their teeth pulled. He said to them, "Does the tooth ache?" The native would reply, "O, no, it does not ache; but it will ache some time, and you better pull it now so it wont be there when the ache comes." They wanted him to pull a number of extra teeth that did not need pulling. Some people have the appendix removed on the same principle,--that if it is not inflamed today it is going to be sometime. Many people say to me when I am preparing them for an operation, "Now, Doctor, I wish you would take my appendix out at the same time, because I do not want to have appendicitis." It is a great big scarecrow. Nature can cure inflammations inside of the body just as well as outside of the body. If you had an inflamed finger joint, you would not have it cut off; if you had inflammation of the ear, you would not go to a Doctor and have him shear your ear off, would you? The appendix is a great deal more important than an ear. It is worth a great deal more than an ear. If necessary you could put your hand up, and your hand would take the place of your ear very well even though your ear was a large one. You can hear without the external ear. It is just simply a convenience, perhaps for good looks. We could spare it. So if you have inflammation of the nose, you would not think of having your nose cut off. One would look so awfully without a nose; yet, you could smell just as well without it. The appendix has been attacked so recklessly, and people have thrown away

their appendices with such extravagance and with such little thought because of the false doctrine which has been propagated very widely that the appendix is of no use except to fill doctors' pockets, and to make operations for surgeons; that the appendix is simply a relic of a bygone age when man was a monkey and lived in a treetop, brushing the flies off with his nose with his ear; that he had a third stomach; that it has now gradually shriveled up until there is nothing left but this little bit of a pouch; that man is not in any need of it; that it is simply a relic. There is nothing in the body that is a vestige of bygone days that has been left behind, simply remains behind to be a nuisance, and to be a trouble, and to be a source of damage; there is nothing inside of our bodies but what is absolutely necessary, and for our welfare; there is nothing there but what is designed to be there. Man is not simply an accident; he is the product of the highest degree of creative skill, the masterpiece of all creation; and he is made as perfect as he can be,--the most perfect of all created things is man. The appendix is just as necessary in its way as the nose is, or as the ear is, more necessary than the external nose or the external ear.

What is the purpose of the appendix, then? The appendix is the disinfector. The appendix is a disinfecting organ, an organ which fights germs; and this is the wonderful way in which it does it. Sometime you have got a cold, and your nose begins to run; you say, What a nuisance that is, to use my handkerchief all the time; I have to carry four or five pocket handkerchiefs. My friends, it is not a nuisance at all. That mucus flowing down in your nose is indispensable. It is nature's

disinfectant poured out to kill germs when they assail you. If it were not for that, they would kill you; if it were not him for that they would multiply so fast that they would overwhelm you. Germs double in number every fifteen minutes,--some of them do. Here is one germ. Doubles in fifteen minutes, that would be four times an hour; or it would double in number 96 times in twenty-four hours. In twenty-four hours they would double so many times that you would have four octillions, 4,000,000,000,000,000,000,000,000,000. That would be the number of germs that would grow in twenty-four hours if there was not something to hinder them. Let us see how much space they would occupy. Suppose one germ is 1/10,000th of an inch in diameter, how many germs would there be in a cubic inch. Let us see. Let us cube the ten thousand and see what that would be. It would be afigure with twelve cyphers, or 1,000,000,000,000. What would be the number of cubic inches then? How many cubic inches in a foot?--1728. We ~~mmmd~~ will throw in a few inches and say 2000. We will cut this off and divide it, and you see we have that number of cubic feet,--500,000,000,000 cubic feet. How many would that be? Let us see, how many cubic feet are there in a cubic mile? 125,000,000,000; so you would have just exactly four cubic miles of germs produced in twenty-four hours from one germ that got into your nose. There would not be room for all these,--Four cubic miles! But why don't we get the four cubic miles?--Now, germs do not grow so fast as this; and though it is possible for germs to double at this rate, you never find them going on indefinitely doubling, because they must have food; germs must have material out of whichto grow, and they consume all the food in their vicinity so there is no more food to get

at, and then they have to stop growing. But germs manufacture poisons while they are growing, and these poisons which the germs produce destroy them. Here is a solution of sugar. You put some yeast into that, the yeast sets the alkali free in the solution, and the alkali frees very rapidly for the first half hour; for the first half hour it generates very rapidly, and at the end of two or three hours, the yeast has been acting, the activity of the yeast has only been one one-thousandth part of what it was when the yeast who first added; because the presence of even a very small percent of alkali cuts down the activity of the yeast. There are certain conditions, temperature and other things, which influence the growth of germs; but if any of the germs get into the nose, there is the mucus which is poured out by the mucous membrane; and this mucus is a powerful germicide, and it prevents these germs from multiplying at this tremendous rate at which I have illustrated to you here, as we have estimated it here; it prevents this enormous growth of germs, and that is what saves your life.

The very same thing is true of the mucus formed in the mouth. Mucus is poured out continually into the mouth, and this mucus poured out there destroys the germs and keeps the mouth clean. That is why you do not have a coat on your tongue. If you should go to sleep with your mouth open and breath through your mouth, it dries the mucus up; the air coming in through your mouth dries up the mucus; the mouth not being closed the mucus can not circulate, because it accumulates in those organs first. When the mouth is closed, the tongue moves about, and the mucus is distributed through the mouth. When the mouth is open and the jaw drops down so that the person sleeps with the mouth open, the tongue becomes dry, the germs are not killed by

the mucus, and you wake up in the morning with your tongue stiff, and covered over with a horrid, nasty tasting coat of germs that has been growing over night, just as mould grows on the wall or on bread. So germs have grown on your tongue. Whenever you have a coated tongue, it is because there are germs on it, and because the mucus of your mouth is not able to kill those germs. Germs are taken into the nose continually, and the tears running down from the eyes are to kill the germs. The germs are taken down into your stomach. The stomach is a disinfecting chamber; the gastric juice is a disinfectant,-- kills every germ that is known. Gastric juice will kill every known germ, and the germs in the nose and mouth are swallowed, carried down into the stomach, and there they are destroyed by the hydrochloric acid of the gastric juice, by the pepsin, and by the mucus of the stomach; and a great many [illegible] of the germs escape along with your food; but many germs taken in with the food, especially if you swallow along with your food such abominations as old cheese limberger, for example, in fact, any kind of old cheese. Cheese is nothing but rotten milk. It seems almost like an obscene word. Some of you I am sure will sympathize with the Spaniard down on the West Indies some time ago on a steamer sitting at the table, and he found a German beside him. The German took out of his pocket a little tin box shut up quite tight. He opened it up and helped himself to a very strongly flavored variety of cheese, passed it over to the Spaniard and asked him if he would have some. He shook his head and showed some little aversion to that strongly aromatic cheese, and the German said to him, "O, do you think it unhealthy to eat limberger?" "No", said he, "I consider it an unnatural crime." Well people committ this kind of unnatural

crimes yet, beefsteak, for example, and other things that are filled with poisons, with germs; for flesh meats always are swarming with germs, within twenty-four hours after an animal is killed. Within twenty-four hours after an animal is killed, the whole body of that animal is swarming with germs; and those germs manufacture poisons, and they work away rapidly,--that is what gives meat the high flavor; why it gets green, yellow, and other colors; why it becomes so tender, because the germs have been gnawing at it. It becomes weak, less tough and vigorous than it was when it was well and alive. I am telling you the solid truth about this thing. It is the scientific fact. When one swallows that kind of foodthe result is the development of great numbers of germs in the small intestine, the colon bacillus, it is called, a bacillus, a certain germ that is found in the alimentary canals of all warm-blooded animals. These colon germs multiply and grow with enormous rapidity; and this is especially true in the colon itself, because there the conditions are very favorable for the growth of the germs. The colon looks something like this; it is something in this shape. Here is the appendix. Here is the small intestine coming into this point; here are two little valves. Food passes in between these valves into the colon. Here is the small intestine, twenty-five feet long, coiled up inside here. Finally it passes on up here to the stomach. Here is the stomach, there is the small intestine; and here is the large intestine. Food comes down in the colon, and remains here for from twenty-four to forty-eight hours. Many chronic invalids observe that their stools, their fecal matters excluded from the body are terribly offensive, have an extremely loathsome odor. That is noticeable in the carnivorous animals. The fecal matters of

the cat, the dog, the hog are very repulsive; but not so with the sheep, the ox, the horse and other animals of their class; their fecal matters are not so terribly repulsive, because they are herbivorous animals. The fecal residues of herbivorous animals are not extremely offensive; whereas the fecal matters of the carniverous animals that eat meat are horribly offensive. You notice in a menagerie, the difference between the cage of a lion, a cat, and that of a squirrel. Even in the elephant's quarters, there is nothing so very offensive; but the lion's cage is horribly offensive; you can hardly stay there, although the greatest pains is taken to keep it as clean as possible. This is true of most human beings who eat flesh. The colon contains quantities of these offensive, putrefying fragments, corpses of various kinds that have been swallowed; dead things, dead hogs, dead cows, dead fishes, you see; all the dead things that have been swallowed are lying here, the fragments, and are undergoing putrefaction. The colons of people who eat flesh are veritable potters' fields in which a great variety of creatures may be found in a fragmentary state.

Now where does the appendix come in to this story? Right here, observe. Here come these putrescent, we may say these putrifying materials, all kinds of abominable things, come down here into the colon loaded with germs. If it were not for some provision, if it were not for some provision, serious results might happen in any case. Here is the appendix: The appendix is a large gland. It is a little valve similar to this one you see here; and this large mucous gland is pouring out continually a large quantity of thick, glary mucus, and this mucus goes through the alimentary canal, and pours out into the alimentary canal this mucus, covers over the mass, and

and prevents the absorption of these poisons through the blood vessels into the mucous membrane; also disinfects the mass and the prevents putrefying process from proceeding to a dangerous degree. The appendix has been proven by Dr. Andrews of Chicago to be a most important organ. It disinfects this mass of food and prevents the serious consequences of putrefaction.

If you have appendicitis, you do not want an operation unless you can not help it. You want to save your thumb, or your eye; so you want to save your appendix. If you had a kidney inflamed, you would not say to the doctor first thing, "Take out my kidney." If you had a liver inflamed, you would not want the doctor to remove the liver right away; you can not live at all without the liver; so you have but one appendix, and you want to hang onto it just as long as you can. Especially people who are flesh eaters, those who eat any kind of nitrogenous material are laboring under the necessity of utilizing those organs which destroy germs, and which furnish mucus and the toxins which protect us against them.

Suppose you have an attack of appendicitis, what are you going to do to save your appendix? I will give you just a few points ~~[illegible]~~ which may be of value to you. In the first place, stop eating absolutely, stop eating. You say, "O, I just take a little light food, gruel, or something like that." Not a bit of it. Not a crumb of bread, or a single thing that has any food in it whatever. Even fruit juice must be excluded, and everything but water. You want to know the reason for that. If you know the reason, you will be likely to remember it. Attached all along the under side of the colon here there is a very curious body called the omentum. It is a layer of fat just like an apron, and would make you think of a blacksmith's

apron hanging down here. It is attached all the way to the colon; when you open up the abdomen, the first thing you see there is this apron. When people say they are fat, very often the fat is not in the flesh at all. I found a man the other day who looked as though he was very fat, but when I made him lie on his back, I found it was nothing but skin. There was not any fat there; it was nothing but skin lying over his muscles. When he raised up his legs so as to contract the muscles, I could pick the skin right up; but he had an enormous store of fat inside. This little, thin apron here, which is transparent, if you hold it up to the light you can see through it it is so clear, and transparent. If you pick it up, you will see the fat extending five or six inches along the back here. Sometimes we do not find it that way, but generally there is more or less fat in it. Often there is very little fat. But this omentum, as it is called, has been designated the abdominal doctor. If a man gets a gunshot wound, if the doctors do not cut into it too quickly, he will very likely get well. The Japanese have found that out. It was published in a paper some little time ago that the men who are wounded with bullets are gathered up and given the first aid, which is simply to tuck in some gauze,--the same thing was found out in the Philippines,--that if they were given the first aid to the injured, and carried to the hospital, by the time they got to the hospital they were doing so well that they were let alone. Simply by tucking in a little gauze, they got well. What was it that cured them? This abdominal doctor does the business. The abdominal doctor is a great deal better than any surgeon. Whenever there is an injury of that kind, this omentum comes down and wraps itself around. Dr. Ochsner of Chicago has laid special emphasis on

that. I have observed it myself in a case in which I removed the appendix. Almost invariably I have found that this omentum has come down and wrapped allaround the appendix, just covered it over completely, wrapped it in so as to protect it from the rest of the abdominal cavity. This is a most wonderfully interesting thing. This organ has not got a brain, it has not got eyes; it has no fingers with which to feel; but if there is inflammation anywhere, an inflamed ovary, or tube or other organ, in the intestines, or anywhere else, this omentum works its way down into that corner, glues itself fast to that inflamed part. Why does it do that?--It does it to heal it. In order that an injured place, a place that is invaded by germs, should be healed, it is necessary to have a large number of white cells there. These living cells that I was telling you about some time ago, the living cells, the leukocytes, the white cells of the blood, as I told you, multiply in the appendicitis, increase to three or four times their normal amount, they increase until there are 25,000 instead of 7000,--these white cells come down there, flow out of the vessels, they find their way out through the walls of the vessels, pour through, make their way through, and arrange themselves in layers, just like an army marching in ranks, to surround the enemy; they capture the germs, destroy the germs, actually digest the germs, annihilate them, destroy the poisons which have been produced by the germs, and in that way the inflammation is brought to wounds. This omentum is filled with little blood vessels, and with lymph channels for breaking down these cells. That is why it is called the abdominal doctor. It is a veritable whole faculty, you may say, a whole faculty of doctors who have come down there to take care

of any part that is wounded or injured.

Suppose we have here a man who has appendicitis. The very first thing that happens is that the omentum comes down there, hugs itself around the appendix. Suppose you eat; suppose you take food into your stomach; that food taken into the stomach sets the stomach and the small intestine at work, pulling, twisting, and it pulls the omentum away. If the omentum is down here at work binding up this appendix, taking care of it, this pulling and twisting of the stomach and small intestine pulls the omentum out of place, pulls it away; it finds its way back again when the intestine gets quiet, and the next time you eat, it is pulled away again. Every time you eat it is pulled away, and every time it is pulled away it brings along some germs with it, scatters them through the abdominal cavity, and sets up general peritonitis. So you see the purpose in not eating is to keep the stomach and intestines absolutely still. That is the only way it can be done,--is to put nothing into it, because food is the stimulus of the stomach and intestines.

Another very necessary thing is to empty the colon. You must keep the upper end of the alimentary canal empty; and you must empty the lower end by a large enema of hot water, adding a little soap to the hot water, because the soap will disinfect. The patient should lie on the right side so the water will pass up the colon. If the patient lies on the left side, so the water passes in here, you see it runs clear down to this point. It must be a large amount; and the patient must feel the water passing on its way along; it must be quite hot so the patient can feel it,--a temperature of 105° to 109°. The patient will then feel it as it passes along through the colon, passes down into the right side. The quantity should be made large,--

two, three, or even four pints, sometimes even five or six pints in some cases, until the colon is completely emptied of the large amount of foul smelling matters; so that the fecal matters are carried off. In this case the same thing must be repeated. It must be repeated two or three times, until the colon is empty. When there is no food in the stomach, no new food introduced into the human stomach, and the colon is empty, then let the patient alone. The patient must lie still in bed with no food,--simply water.

There is something more to be done; there are inflammations here; I do something more. The patient has inflammation down here. We want to help nature about the healing. So we put two ice bags over this region, right where the seat of pain is. But we wont do that until we have done something else first. Put on a hot blanket pack. Wring a large blanket out of hot water,--large enough to wrap up the patient from the arm pits down to include the feet,--a large blanket wrung out of hot water, and wrap it around the patient. The patient begins to get warm after two or three minutes, then slip two ice bags underneath the blanket, right down to the groin, on the right side, and wrap the patient up in the blanket again quickly, and the patient will very soon be comfortable. The patient will not like the ice at first, but pretty soon he will observe it he feels a great deal better, very much more comfortable; the vomiting will cease within fifteen or twenty minutes in nine cases out of ten. It is kept on for fifteen or twenty minutes, or thirty minutes, and then it is taken off and the ice bags are taken off; and then each leg is wrapped with a wet towel, wrung out of cold water, then with mackintosh or oiled muslin, or oiled newspaper, and a dry blanket wrapped about each leg.

Then, as soon as the legs get warm, the ice bags are put back again and kept there all the while. Every half hour they are taken off and a fomentation applied for five minutes; then the ice bags are put back again. The packs continue in this way for three hours. Then the hot blanket pack is applied again. In treating appendicitis by this method, very few patients, indeed, ever require a surgical operation. If that method is adopted at the very beginning, it willbe sure to cure almost every case; but if the patient has had half a dozen attacks before, it is possible that there may be some obstruction, that the appendix has become obstructed. It may be that there is a calculus in it that is setting up irritation. There may be a chronic abscess there; so that every case should have a doctor's attention, and the doctor should examine it. If he finds a lump there, there may be an abscess, and there may have been inflammation there a long time; but an operation for such a case is much more safely done, not at the time the patient is having acute inflammation, but several weeks or months later. In 99 cases out of 100, the patient will never have another attack if he takes proper care of himself; but he will have to take care of himself.

One cause of appendicitis is meat eating, because the products of the meat get into the colon, putrify so that the colon germs become more virulent, and these colon germs are so numerous that the appendix can not make mucus enough to disinfect and destroy the germs, and they find their way down into the appendix and the man has appendicitis, of course. Another cause is hasty eating, eating so rapidly that the food is swallowed in chunks, that is, large morsels of food coming

into the colon lie there, putrefy, ferment, decompose in the colon; and the food remaining there, the germs multiply because there is food for them; they can multiply with tremendous rapidity when they have plenty of food, warmth and moisture; so the colon germs multiply to such an extent that inflammation of the appendix is set up. But first, before this inflammation of the appendix, there is nearly always inflammation of the colon. By and by the inflammation extends from the colon down into the appendix; but this is only long after the inflammation of the colon has been going on, for perhaps many years.

Now, another thing is the use of tea, coffee, beer, intoxicants of all sorts; and they cause it by lowering the resistance of the alimentary canal, diminishing the power of the body to resist disease, to resist germs,--these things will also set up appendicitis. When you have once had an attack of appendicitis, take great care not to have another. An accumulation of fecal matters in the bowels will encourage the development of congestion, inflammation; so we have in this another cause of appendicitis.

ECZEMA. What is eczema? some one asks.

Eczema is a disease of the skin due to lowered vital resistance of the skin. The skin has become weakened to such a degree that the germs which are always found upon the skin are able to set upinflammation there, and that is eczema. Eczema producing germs are always found on the skin in great numbers, and it is only necessary for the skin to get reduced a little in vigor and vitality, and then these germs set up inflammation. When a person has eczema, the first thing to do is to raise the vitality of the whole body. When this is done, the blood makes

germicides, and forces these germicides out upon the skin, and the germicides produced on the skin kill the eczema germs; then the patient gets well. Now it is necessary in order that this should be done, for the patient to give attention to every rule of life. The renunciation of meat eating is absolutely essential for the cure of eczema. Nobody who has eczema can get permanently well unless he gives up the use of flesh foods. Why?--Because in order that the person should use flesh foods, he should have a surplus of poison-destroying power. Man was not intended to eat flesh. The dog can eat flesh. The dog has sixteentimes the power todestroy uric acid that man has. Experiments have been made upon dogs, and it has been found that dogs can destroy sixteen times as much uric acid as man can; so dogs can eat meat without suffering great injury. But if a man eats meat, that is, if man gets down on all fours and grows the bone along with the dog, the uric acid-destroying power that the dog has is lacking; man is lacking in that power, having only one-sixteenth the power to destroy uric acid that the dog has, and the uric acid accumulates in his body, and as it accumulated in his body, it renders his blood acid, or, rather, it diminishes the alkalinity of the blood, and as the alkalinity of the blood is diminished, the ability of the blood to destroy poison is diminished, and consequently the body becomes a prey to germs. Do you understand the point? The body becomes a prey to germs. It can always be cured by manufacturing gas(?) By and by it gets around to where the germs begin to grow, and inflammation sets in; he gets gout from the uric acid; he gets bronchitis; gets inflammation in his head; gets heart trouble; gets consumption; and he gets eczema and other kinds of skin

diseases. The doctors who make a specialty of ~~xxx~~ treating skin diseases, years ago found out they could not cure eczema when a man was eating meat. He had to stop eating meat in order to get rid of the eczema. They found they could not cure eczema as long as a man continued to smoke tobacco; could not cure it as long as the patient continued to drink whiskey, or beer; could not cure it when the patient was using tea, or coffee; long ago this was found out by experiment; but now we know the reason for it: The reason for it is that the resisting power of the body is diminished, and that must be raised; So we raise the resisting power of the whole body in the first place by renouncing meat eating, and by renouncing tea, coffee, and tobacco.

I remember very well a patient some time ago who was cured of eczema, and after he was cured, he went back to smoking; and his eczema came back again. I told him it was all right; good enough for him; he ought to have eczema. All he had to do was to stop smoking, and he would get well of his eczema. But he loved his cigars so well--he smokes still,--he smokes until he is full of nicotin, the germs get too many for him, and he gets eczema; when ~~xx~~ he gets eczema, he is so uncomfortable he can not endure it, endure the pain of the eczema, when the pain of the eczema is greater than the loss of the pleasure of smoking, he stops smoking for a while. So he alternates between eczema and smoking. Another thing: The patient must do everything possible to build up his vitality. He must exercise out of doors, take sun baths to make his skin healthy. He should take a cold bath every morning, but the cold bath is hard for many of such patients to take, because sometimes it irritates the skin. In taking the cold bath he must avoid

those parts where the eczema is actually active. Abundant exercise is essential. Something may be done to encourage the vitality of the skin itself. The alternate hot and cold application is the best thing for that purpose. I have cured many and many cases of eczema with the hot spray followed by the cold. I have seen a great number of cases of people who had eczema very very bad, and they got rapidly better after simply applying the hot and cold spray. ~~Now~~ It should be very hot for a few minutes, then cold. It may be hot and cold both. Eczema in the hand should be treated by soaking the hand in hot water, as hot as can be borne for half an hour; then cold water for a few minutes; then put it back into the hot water for four or five minutes until it gets red and hot; then apply the cold water again. It is a good plan to use a little resinol soap. The ordinary, old fashioned laundry soap is god for eczema. A bicarbonate of soda solution is good. By taking care to observe these suggestions I amgiving you, if you will build up the body itself, the body will cure the eczema; the skin will cure itself. The skin will cure itself. The body itself is its own doctor; the healing power is in the body. Eczema is one of the consequenses of bad habits of life.

Q. What about Fairy soap?

A. I can not recommend it especially. I have found that soft soap is just as good as anything. There is nothing better. Why? Because it is the potash that kills the germs, you see. The solution of potash will do it, but the soapy solution of potash is better because it is less irritating.

Eczema is increasing all the while. If we keep on eating beefsteak and pursuing evil habits so many of which we have become accustomed to in our civilized communities, the filthy habits people are accustomed to

filthy habits people are accustomed to,--you can not help but note the contrast between our habits, and the habits of some of the semi-civilized people, like the Japanese, for example. I do not think they would like to have us call them semi-civilized any more. Go into the Japanese house and see how beautifully it is constructed. Instead of being made air tight, as ours are, their walls are of paper, and the paper is translucent, so that the light can shine through. You can not actually see out--some of the paper you can almost see through,--but the light can actually come in, and that light that comes in gets into the corners, so that there are no dark corners. For many years I have contended that the real hygienic house of future generations, sometime, if we keep on, will be made of glass. We will hang up curtains here and there whenve want to get a little seclusion, but the houses will be made of glass so that the whole house can be full of light. And this light is a disinfectant; it destroys germs; but as it is, we shut ourselves up in dark houses, barricade ourselves against the fresh air and sunlight. I remember a few years ago I went into a house to see a sick baby, and that house was banked up around the outside with earth and stable litter, and inside the house the windows were all fastened tight, and they actually had some cotton stuffed into the keyhole so there should not be the smallest breath of air get into the house. In the house it smelled worse than a tan yards. It reminded me of an experience I had in bad smelling
Naples a few years ago. I went out to a [illegible] place, and my Italian guide was showing me about, and he said, "This bad smell which you feel comes from this tannery." One can actually feel it, it made his nose fairly tingle, it was so ammoniacal. We

shut ourselves up in these dungeons, I say say, in places where the North American Indian, or the South American monkey could not live for six months. We only live because we have become in a certain sense immune, by having breathed the same poison over and over, people become immune; just as Chicago people become immune to their own sewage that they let run down into the lake, dilute it, and bring it back in their water pipes, and drink it; they become immune. But if a farmer comes to a fair, or to do business in Chicago, and drinks Chicago city water, he gets typhoid fever right away. People living in the city do not have it because they have become sort of ? vaccinated to it, or immune. Living in these dungeons, these polluted houses, we lose our vital resistance , and our bodies become an easy prey to germs. What do we do? We go out of doors, and travel along the streets. The street dust is made up of the excreta of animals. Every place we cross it, it is filthy, vile; it is a frightful, dried sewer; and we gather up the dust, the horrid germs and filth upon our feet, and bring them into our houses, rub our feet off on the carpets, and the carpets become saturated. By and by the housekeeper comes around sweeping. The old cat has sense enough to go out when she sees the housekeeper coming with the broom; but the people do not ; the people do not. They brush away, and the dust all gets thick, and then they go right on. By and by this dust settles down, when things get quiet, and the housekeeper comes around with the duster, goes around stirring that dust all up again; and every time she sees the dust settling somewhere, she stirs it up again so as to keep the air full. What are you inhaling. You are inhaling the powdered excreta, and filth of animals that have been going along in the street, and have deposited their

excreta. It is powdered up into dust, and stirred up by every passing vehicle, brought into the house on your feet, until the house is filled, and the housekeepers are continually keeping it stirred up so that we get the benefit of it. You go into a Japanese house, and the first thing you meet is an invitation to take off your shoes. It is hallowed ground inside. You take off your shoes and go in in your stocking feet. There is the floor covered with rugs, and everything is just as sweet, and clean, and nice, and the people in that house have clean wholesome habits; for they have a bathing place a little ways off behind the house, and everybody takes a bath every day. Every day in the afternoon, before dinner, everybody goes and takes his bath, a hot bath first, until he begins to sweat; then ends up with a cold bath, cold water thrown over him; then he dons his nightgown, and runs home through the street with wooden clogs. He has wooden clogs, and he leaves them out of doors; never takes them into the house at all They never go into the house. My friends, as Senator Hoar said a little while ago,--and I think it was a very good expression,--he says, "We have ceased to be troubled about how to Christianize the heathen; the great thing that troubles us now is to know how to get the heathenism out of Christendom." It is not a question how the physician shall heal his patient, but how shall the physician heal himself. To the people who set out to save the world, the question is not, How shall these people make the world better?, but how shall they save themselves from absolute annihilation, the consequence of their own evil habits.

We are going down hill faster and faster. A few centuries more would end the whole thing up in anarchy, confusion, and annihilation unless something stops it. I have figured it

out, and I can show by statistics that in 265 years from today, we will all be lunatics, and idiots if we do not stop doing the crazy things that we are doing at the present time; and appendicitis is only an effect; it is not an accident at all; it is aneffect of our own wrong eating and wrong habits of life. Eczema is another of the leaves that grow upon this tree of bad habits. We must correct our habits of life, and live above eczema, live above appendicitis, live xkkx above all these chronic maladies that are pulling us down.
