

January 7, 1904.

ELECTROTHERAPY.

-----○-----

-----

---

-

"In the beginning God created the heaven and the earth. And the earth was without form and void; and darkness was upon the face of the deep. And the Spirit of God moved upon the face of the waters. And God said, Let there be light: and there was light. And God saw the light, that it was good:"

The very first act of creation was the making of light. Very little was known about light until very recent times. Within the last few years, and particularly in the last five years, most remarkable things have been found out about this remarkable agent called "Light". If we could look back through the ages, we should find a time when there was no light--when everything was dark. We can readily picture to ourselves a situation where there was no light, no heat, no warmth, nothing but absolute cold, absolute emptiness, absolute silence. There could have been no motion without heat, so we see that this wonderful light is really the foundation of all activity, the source of all energy and all life in the world. We look out into the world and see what is going on, see what light is doing. It is simply a marvellous picture that is spread out before us. In the spring time when everything is bare and brown we see the snow melt away by the sun acting upon it. A larger amount of heat is received by the earth, and it begins to penetrate down to the roots of the grass. The ice is melted, and within a few days, we see the grass springing up, and pretty soon the whole hemisphere is covered with a green carpet, a most mar-



Some years ago I went out into the woods and sat down on a grassy bank with two or three of my little folks, and we counted the grass in several square feet, and we found as many as 240 distinct blades of grass in one square foot of surface. Imagine the number of blades of grass in an acre, in ten acres, and in a square mile, and in the whole continent. Then think of all the leaves of the trees and all the shrubs. All these are created under the influence of light.

See what light does mechanically. The light evaporates water from the ice--from the lakes and rivers, and under the influence of the light the water rises and forms clouds, and the clouds float away in the air. Perhaps they float away until they reach the mountains, and they stop and condense in a higher atmosphere--condense into water--and the water falls on the earth. It runs down toward the sea, and a Yankee puts a wheel in such a position that the water runs over the wheel and turns the wheel, and this wheel communicates with a mill, and so we have mills--cotton mills and grist mills--run by the sunlight. Of course, the sunlight lifts the water up. The water falls to the earth again and turns a wheel as it runs down hill. It is really the sun that runs all the water mills.

The sun shines upon the trees and serves to excite the green chlorophyl, and carbon is formed. The wood takes it up into the air. It goes into the leaves, and is taken up into the air. In this way great cedars, great redwoods, and great oaks are formed. By and by these trees fall down and buried down~~are~~<sup>are</sup> under the earth forming great coal-beds. And now we are digging out this coal which is simply stored-up sunlight--sunlight stored up in the trees that were buried thousands of



years ago. We put the coal on our grate and light it, and the sun light shines out again. It is the same heat and the same light that shone out centuries ago. We put coal in the furnace of a locomotive, and heat converts the water into steam. The steam drives the piston, the piston turns the wheels, and the wheels pull the train. So the sunlight is pulling all our freight trains and all our passenger trains across the continent, running all our steamboats.

Here we put the coal into our boiler down under the hill, and it makes steam in the boiler as it burns. The steam goes into an engine and turns the engine, the engine turns a dynamo, and the dynamo generates electricity. The electricity comes up here to the house, and here we see the original sunlight shining out again. The very sunlight that shone out thousands of years ago is shining now in this room. Electricity is being produced in this way, or in any other way for that matter--wherever the electric light is being produced, it is sunlight shining out again. So the sunlight is running all the mills, steam-mills, all the steam engines and all the water mills.

Way out in Kansas or Nebraska or any other place where the wind blows, a man will put a wheel up in the air, and the wind comes along and blows it. Then, by means of shafting connected with this wheel, other wheels are turned, and mills are turned. The wind grinds the corn, cuts the hay, and so forth, by means of this wheel--this wheel which is blown by the wind. How is this? Away off at the equator the sun warms the air. The warm air rises, and if you get away off at the north pole, you will find very cold air. This cold air creeps



back along the surface of the earth, and as the warm air at the equator rises, this cold air rushes in underneath it and takes its place, and that makes the wind. It is the cold air going back to the equator to be warmed. And that is one of the things that makes wind--the principle thing that makes wind: the wind going back to the equator. It runs against this wind wheel and turns it and does the work.

So the sunlight does all the work of the steam mills the water-mills, and the wind mills. It turns the machinery of all the world.

One does not often realize that this same sunlight which is stored up in the wood and in the coal is also stored up in the food--in the wheat, in the corn, in fruits, in potatoes, and in all the different kinds of food. We are simply stored-up sunlight. We take this sunlight into our bodies. When a person eats grain, the amount of work he can do depends upon the amount of grain he eats and digests. If he is well fed he can work well. The grain that he eats to-day is walking around to-morrow, working, and it is exactly the same as coal put into the engine or burned in the furnace. This coal makes steam which will run wheels, pull trains and other loads. So when the ox or the horse eats grain, it is burned in its body and converted into energy in precisely the same way, though in a more direct and economical manner than in the engine. For in the engine it is not more than one tenth part that is utilized in work. Scarcely one tenth of the energy is used for work when coal is burned in a locomotive, but when it is burned in an ox, the energy is all utilized. At least one fifth of it can be utilized in actual work, more than twice as much as can be



utilised when it is burned in an engine. So we see that all the work of the world is done by the sunlight. All the growth that is taking place, all the activity of the world is due to the sunlight. So we see the force in that text, "God is light." Do not say, "life is God", for that would be Pantheism, but the Bible says, "God is light", the light that we see manifested, that shines out from these lights, that shines from the sun and from the stars. This light has creative power in it. It has the same almighty power in it that made the world in the first place. It is one of the manifestations of active creative energy that was set to work at the beginning of things, and has been at work all the while since the beginning of things, maintaining the things that were created. That very same power that made Adam in the first place, the very same power that made man in the first place, is making man to-day. The very same power necessary to make the first man is necessary to make the last man. No man can be made without that creative power. That same power is necessary to keep the heart beating and to keep the lungs moving, and to perform all the functions of our bodies.

Every second of our lives, there are created eighteen million blood cells to take the place of the eighteen million blood cells that have been destroyed--have died--have lived out their usefulness and are destroyed. Eighteen million every time the clock ticks--eighteen million cells created within our bodies. This creative power is continually operating within us. That is why it is possible for a sick man to get well. That is why it is possible for a man who is sick and emaciated



to be rebuilt. That is why it is possible for a little boy to grow up into a man, because of this creative energy that is acting within him. That is the healing power of man. That is the power which maintains life as well as creates it.

Now look into this <sup>light</sup> ~~thing~~, and we see it is a wonderful thing. We find something more in it than light, something more in it than luminosity. It has been known for many years that there are at least three different kinds of rays in light. Heat rays, some of which are luminous, and some of which are non-luminous. It would be possible to extract all the light out of a ray of sunlight. Pass it through a bottle of a certain solution, bi-sulphate of carbon, for instance, and all the light would be taken out of it and the ray would be invisible. Yet that invisible ray, with no light in it at all, if it should find a little bit of nitro-glycerine or a little bit of gun-cotton, it would inflame it right away. If it were allowed to fall on a photographer's plate, it would have a definite effect upon it. We may, however, take all the light out of it, and there will be some violet rays that are not visible at all--dark rays, and we can take pictures with these dark rays. So there are rays that are visible on both sides of the spectrum. Look at the rainbow and you will see that there is violet on one edge and on the other edge red, and different colors between. Way up beyond the violet there are rays that are not visible, and down below the red, there are other rays that are not visible, but they have heat. So there are heat rays, and there are light rays, and there are chemical rays. These chemical rays are wonderfully interesting. It has been found, for example, that these chemical rays, when applied to the skin with suffi-



sient intensity, will cause inflammation of the skin. It does not make any difference whether we get the chemical rays from the arc light or from the sun, they cause inflammation of the skin. A few hours after this application has been made there will be a reddening and burning, a tingling and smarting, and by and by there may be a blister--a swelling and a blister over it. This is what is called sun burn. Persons who go in swimming in the sun sometimes get sun-burned about their shoulders, and other parts of their body that had not been immersed in the water have sun-burn. That is due to the actinic ray. The arc light contains a larger proportion of these rays than the sun light even. The arc light is more active than sunlight in producing these chemical effects.

The most ~~strangest~~ curious things have been learned about these chemical rays. Animals as well as human beings are subject to these chemical rays. For instance, white cows get sun-burn while red cows do not. A spotted cow--red with white spots, will get sunburned on the white spots and not on the red spots. One curious thing is that sheep that have been sheared, or calves, white calves especially--that have been eating foods or certain substances, when they have eaten certain weeds, are subject to sunburn, when, at other times they are not. It is a very interesting observation. The reason for it has not yet been made entirely clear.

<sup>Finson</sup>  
Professor Vincent made the remarkable discovery that persons who have smallpox will not pit--will not form pustules--will not have any pitting, cannot have any pitting, if the windows are covered with red curtains. When the



windows are covered thick with red curtains, the chemical rays cannot shine through. The same way with the photographer. Over the light in his dark room he has a little red glass so there will be no yellow light or blue light received in this little dark room. His light must be a red light, and with this red light he can expose his delicate films which are very sensitive to the light, he can expose them with perfect immunity as long as the light shines through this red glass, for this glass shuts out the chemical rays that act upon the photographer's film .

This ray is the same as is used in the actinic ray, sometimes called the Finsen ray, but Finsen did not discover this ray. Professor Finsen found that these red curtains would prevent pitting in smallpox. He found by experiment that these chemical rays would destroy germs. Curiously, it seems to further the development of germs in smallpox, but in other things it will destroy them. It will destroy consumption and tuberculosis germs, and germs that produce lupus, that is, tuberculosis of the skin. He found that when these could be brought under the influence of the chemical ray, the germs would be killed, and recovery would be possible.

Four or five years ago I visited Professor Finsen at his place in Copenhagen, and again two years ago I spent a little time with Professor Finsen to study these methods, and after my first visit I introduced these methods here. I think ours was the first instrument brought into this country. I use it in treating lupus, and we have cases of this sort under treatment constantly now in our phototherapy department and we have remarkable results.



Some kinds of cancer I find can be cured by the application of these rays to the skin. The rays are brought to bear on the part and the germs are killed and recovery takes place without destruction of the skin. The skin is not destroyed at all, only sunburned. Very many other interesting things have been observed with reference to this actinic ray. We find great advantage from the use of this ray especially if we find the patient suffering from certain forms of disease. The patient is permitted to get sunburned all over. He is passed under the influence of these rays until one side is burned, and then burned on the other side, and this is sometimes kept on until a blister is formed. What good can come of all that? The average chronic invalid has too much blood on the inside and not enough on the outside. For example, the man who makes a specialty of raising and training horses is well acquainted with the fact that when a horse is hide bound he has a bound up skin--when a horse is hide bound there is very little blood in the skin. The blood lies underneath the skin, and there is very little blood circulated in the skin. The skin is capable of holding one half of all the blood in the body. The other half would be in the muscles, the liver, spleen, and stomach and other internal organs. The muscles may hold one half of the blood in the body. So you see it is possible for all the blood to be crowded into the skin and the muscles. The vessels of the abdomen may hold all the blood in the body. So the blood may leave the skin and muscles and the whole of it may accumulate in the interior of the body. When the blood accumulates in the interior of the body, as is found to be the case with a great share of chronic invalids, there is congestion



there. The patient will very likely have hyperpepsia or gastric catarrh. If there is an excessive amount of blood around the alimentary canal and intestines, there will be intestinal catarrh, perhaps, and other maladies due to the congestion of these internal parts. The best thing that can be done for that chronic invalid is to get a large amount of blood into his skin by sunburning his skin and making it active, by stimulating the blood vessels of the skin and making the circulation of the skin active. Then the internal viscera is relieved because the blood has been taken from the internal parts to the skin. You know when one end of a boat goes down the other end goes up, so if we get the blood into the skin we get it out of the liver and stomach and the other internal parts.

In this latitude the sun is not strong enough in the winter to sunburn, so we find the arc light a very great advantage. It is a frequent prescription we make that a patient shall be well-tanned. Some little boys do not like to get tanned but sometimes they do get tanned to their great distress. But the chronic invalid needs to be tanned for his sins--sins of omission and sins of commission, and the blistering is one of the ways we punish our chronic invalids here, so that when they return home they will remember to walk in ways of righteousness, and walk uprightly, and not get down into the sloughs of disease. This arc lamp by the application of the actinic rays to an area say a foot in diameter or six inches in diameter one time, next time to another area, and next time to another. After a while the whole skin will be gradually tanned or sunburned. We can regulate the effect produced to



any degree desired. It is under perfect control. The intensity can be controlled absolutely, and the intensity of the sun cannot be so, it has some advantages over the sun in this regard.

In cases of spinal irritation--congestion of the spine--we find very great help and very great relief in the application of these actinic rays to produce congestion of the skin and draw the blood <sup>to</sup> the surface. In rheumatism or ulcers that will not heal very readily, or wounds that have not healed, tuberculous joints, and various other troubles of this sort, we find these things are very readily relieved by the application of this actinic ray.

Now there are some light rays that are wonderfully exciting, particularly the rays that are generated by a special device connected with the static-electric machine known as the X-ray. The X-ray is not visible but it can be made visible. These rays have the peculiar property of being able to pass through almost everything. They do not penetrate metals as well as organic substances. Paper they pass readily through. Metals they do not readily permeate. These X-rays much resemble light in many respects, if they are not exactly the same thing. It very much resembles in many respects the actinic ray. By means of this X-ray it is possible to take out the entire interior of the body. By having the patient mix a little bismuth along with his dinner, a harmless quantity of carbonate of bismuth, his stomach will become visible. So we can see how large the stomach is and where it is. It is possible to see the movement of the diaphragm or the heart beating. Sometimes the border of the liver can be marked out so that very interesting things can be observed in the interior of the body.



which were formerly entirely beyond our recognition, and it is probable still further observations will be made. This X-ray has been found to be capable of curing cancer and some forms of tuberculous disease. It is a question whether it cannot be of benefit to some internal parts, but it has not been determined yet. Dr. Senn, of Chicago, and some others have secured improvement and benefit in some cases of disease in which the spleen is enlarged. A certain form of disease in which the spleen is enlarged perhaps is associated with the bones. The blood is made in the bones, and there are certain forms of blood disease, which, Dr. Senn believes, and I think some others believe also, could be benefited by X-rays. I have made some observations myself since Dr. Senn called attention to it, which seem to give some effect to Dr. Senn's claim and contention that X-rays may be found useful in treating some of these internal maladies.

Still other wonderful rays have been recently discovered. A certain substance has been discovered known as radium and other substances allied to radium as uranium, from which rays that are visible may be thrown off. For instance, a couple of pieces of radium placed on the table in the centre of the room would take the place of a lamp, and this light given off by the radium seems not to diminish the weight of the radium. It seems to throw off without diminishing its ~~weight~~ weight. It throws off heat also. It maintains a temperature of two degrees above the temperature of the atmosphere surrounding it. This throwing off of heat from radium is more active when the temperature is lowered than when it is highered. If it is highered by ice it throws off more heat than when highered by



higher temperature. If the walls of this room were painted with radium it is said that it would give off light equal to diffused daylight--sufficient to enable people to read--for a billion years or more. A quantity of radium, say 100 pounds, would give off the heat of a small stove, and would continue giving off that heat for ten thousand years, and would only have begun to throw off heat at the end of 10,000 years. At the end of that time it would not have diminished materially in weight, and would go right on throwing off heat. It would be an economical kind of stove to buy, wouldn't it? But radium at the present time is worth several million dollars a pound, so that that kind of a stove would cost several hundred million dollars at the present time. So it is likely that this method of producing heat will not be recognised for some time to come.

There is another objection also. It is found that this radium, when brought into contact with living things, produces a very pernicious effect. An experimenter held a small bit of radium no larger than two or three grains of wheat, over a little case in which there were some mice, and in a short time these mice lost all their hair. Several became paralyzed and several died. So the probability is that if there were standing in this room a mass of radium sufficient to illuminate the room, if we should stay in here half an hour or an hour, we should all be paralyzed. Our skin would peel off, and in a little time we would find ourselves paralyzed. So this is not a practical kind of light. Professor Currie in Paris, who has been experimenting with this wonderful material, has been badly injured by it. His hands have been so badly injured that he has been obliged to have a servant to dress him,



and he could not use his hands because of contact with a small amount of this material to which he had been exposed.

It has been known that this radium light is present in the air of very deep wells, and some rays have been found in rain water. If rain water is caught in a vessel and evaporated, it is found that there is a fine residue in the vessel. These same rays will be found there. So it must be very widely dispersed throughout things. Where it comes from nobody knows. Perhaps it comes from the sun. The rays of the sun are supposed by some to contain some of these rays, because they are found in the atmosphere. But some new rays are being discovered every little while, are being found in other substances. Very recent observations have shown this much, that radium when heated, throws off rays known as ilium.

When radium is brought into contact with sulphide of zinc, there seems to be little atoms thrown off from it. Looking at it through a microscope it looks as though millions of comets or meteors are striking upon it. Little glowing balls of fire are simply striking continually upon the surface of the sulphide of zinc. So we do not know very much about light. These are just a few of the wonderful things that we have found out about light quite recently, but we do know that it has a wonderful, powerful influence upon the human body. When the body is exposed to light all the vital functions are stimulated to increased activity. People who live in the light have clear complexions, while people who live in the darkness are pale and unhealthy. So there is a vitalizing power in light that all classes of living things, animals as well as vegetables,



appreciate. There is no doubt but that civilized men and women suffer greatly because they have excluded themselves from the light. We shut ourselves up in our houses, put shutters upon our windows, make our walls impervious; we wear black clothing, and so shut out light as much as we can. The skin is enfeebled and the vitality depreciated. The very best thing a person can do who finds himself in a run-down generally depreciated condition is to get into the light--out into the sunshine. In Germany the out-door treatment is getting to be employed a great deal. Nearly all the large cities have out-door departments connected with them. There is one near Berlin which is kept open winter and summer. Sometimes we see people there getting sunburned in the winter time. We see them playing games of ball without any except very light clothing for the sake of modesty, so that they would not be entirely nude. A friend of mine who recently returned from Germany told me of a man there who for the last ten years had not worn clothing at all except scanty foot-wear. He carries with him a little cloak which he throws over him when he creates much of a disturbance, but summer and winter, rain and shine, snow and storm, he goes about with his body entirely exposed. He is healthy, hearty and vigorous. When other people wearing their overcoats and wraps are shivering with the cold, his skin is warm, his body is warm. He has gradually accustomed himself to this by exposure to the elements--to the air and sun. We shut ourselves away from the light, and become a sort of cave-dwellers, but it is to be hoped that some time in the future, we will get so thoroughly converted that we will build houses of glass. I should like to live a century from now in a glass house. I sometimes suggest to people that if they live in glass houses they must be careful



not to throw stones. But it would be a good thing if all our houses were made of glass. They need not necessarily be made of transparent glass--need not be visible to the outside world. They could be made of corrugated glass or frosted glass. But if we lived in houses into which the sun could shine into every corner, we would be wonderfully more healthful. We could not have musty closets in such a house, it would not be possible. Why? Because the sunlight destroys the germs which produce disease in the musty closets. Sunlight is deadly to germs. Sunlight will destroy tuberculosis germs. All germs perish in sunlight. The germ is a creature of darkness. It grows in darkness.

A very curious thing occurred to me as I was reading one of the Psalms the other day, and which I confess I never noticed before. It interested me very much. In the 91st Psalm it says, "They shall not be afraid for the terror by night nor for the arrow that flieth by day, nor for the pestilence that walketh in darkness." The pestilence that walketh in darkness. The germs which produce disease seem to thrive in the darkness. The plague seems to come out of the dark places, the dark holes. If our houses were full of light, we could not have any germs in our houses. We could not have must in our closets, and it would be a wonderful blessing if they were made this way. As we cannot have houses of glass, the next best thing is to so construct our houses that light can get into every corner. We planned this building so that light could not be shut away from any part. Our out-buildings are connected by means of a corridor on purpose so that there will be nothing to shade the house. By putting in the little palm-garden between these annexes and the corridor, we are able to



let the light get into the lobby, and the light can come into all parts so there are no dark corners. If we have any closets in this house, the doors open toward the light, so that when the door is open light can shine into the closet.

So, sunlight is the best destroyer of germs. It is only the spare bedroom, where the curtain is kept down, or in the best room--the parlor--that is shut up for company, it is only in these places where the germs can thrive. The growth of germs is encouraged in these places, because where the light does not come in in these places it is chilly and cold. The steam from the kitchen, and the steam from the laundry comes up and gets through open doors and cracks and through holes, through the floor, and the moisture gets into these spare rooms, and condenses upon the walls, upon the carpets, in the curtains, in the tapestries, in the upholstered furniture, it condenses upon the walls and soaks into the plaster, and accumulates until the whole place is saturated with it. If it is a bedroom it accumulates in the bed. The spare bedroom is always damp. Some of you have had the discomfort and perhaps the damage after visiting at your friends, and being put to sleep in the best bedroom, in the guest's bedroom. It is a dangerous place. I remember when I was a school teacher, and was boarding around, when I was sixteen years old, I had a good many experiences of that sort, and I remember some uncomfortable nights I spent in bedrooms. I wonder I escaped alive. But many a minister, many a good man, has been given pneumonia or some other trouble through being put to sleep in a spare bedroom. It is because of the accumulation of damp, the house is a sort of distillery. So it is necessary to let light into these spare rooms--



necessary that the curtain should be raised and that the room should be used. There should be no vacant rooms into which the light cannot get, and in which the dust and germs may accumulate. These should be kept out.

It is only recently that light has come to be used in the treatment of disease. The old Romans and Greeks appreciated the value of light, and employed sunlight very largely as a means of curing. Almost all animals employ the sun-bath. The sick dog will get away into the sun--get a chance to sun itself. The horse or the cow or the sheep, if sick, will get away into the sun and spread itself in the sun--take a sun-bath. Almost all animals are almost always sure to do it if they can. It has been found during war and at other times that injured persons who have been given positions on the sunny side of the hospital recovered more readily--a larger proportion of recoveries-- a larger portion of patients recovered in a shorter time on the sunny side of the hospital than on the shady side of the hospital. Recently we have come to appreciate the value of the sun. Not having the sun always, the arc light and incandescent lamp have come to be of very great value. Some ten years ago I conceived the idea of arranging these lamps in cabinets so we might have an electric light bath, and I arranged several forms of these cabinets. I was very much pleased when I was abroad a couple of years ago to find that these baths had been quite generally introduced into Germany. The baths were exhibited at the World's Fair, and a German came from there here to Battle Creek, made himself acquainted with them, went back, and started a large manufactory for making them. He told me that in the last three years he had placed over a thousand of these electric light baths



these had furnished two baths to King Edward, one for Windsor Palace and one for Buckingham Palace. I notice by recent telegraph dispatches in the newspapers that King Edward has benefited very much by his electric light baths. That he attributes his strength and vigor and endurance to the frequent use of the electric light bath. King Edward, our representative in Berlin tells me, was led to put the baths in by visiting Homburg. His physician prescribed electric light baths, and he took one hundred of them and was cured of his gout. So he put them in his palaces so that he might have the remedy always at hand. So that if he got gout at the dinner table, he could easily get himself into pretty good condition.

A few years ago, just before the coronation of King Edward, he was obliged to submit to a surgical operation the day he was expected to be crowned. I passed along the streets of London and saw the people wringing their hands, and placards were up all around that the King was dead. But he was being operated on that day, and all England was holding its breath. Late in the afternoon word got out and went like wildfire over the town that the King was dead, and the people were falling into one another's arms crying the King is dead, and it was really a very pathetic spectacle. But it turned out that it was not so. The surgeons only performed a very slight operation. They simply opened the abscess and told him that shortly he would need a more serious operation, and that this was only a temporary operation simply to let the pus out, so the King could be crowned before submitting to so great an operation as would be necessary for the removal of the diseased appendix. The King recovered after a time and was put on board ship and kept away from business, and after a time he was able



do his work again. Then the doctors talked to him about when he would be ready to take his other operation. He said, "I am not going to have any operation, if you please. I have had enough. I do not propose to have any more operations." About the same time he went to Homburg for treatment for his gout, and began taking these electric light baths, and recovered such good health that he has not had the second operation. Mr. Fletcher told me that King Edward is chewing thoroughly and taking electric light baths. So he will probably have a pretty good chance to escape the operation for appendicitis.

King Christian, when he found King Edward was thriving so well--King Christian was also troubled with gout. Almost all royal personages are. Gout is due to royal dinners--is quite necessary to the position. It is the royal dinner tables that generate gout--When King Christian found that King Edward improved so much from taking electric light baths, he had electric light baths put into his palace, and the Emperor of Germany also had electric light baths put in his palace. Our representative told me that he had furnished these baths to quite a number of other royal personages.

I found that nearly all the leading hospitals in Germany were utilizing the electric light bath. In Vienna there is a large establishment under the supervision of Professor Winternitz, in the great Royal Medical College there. When I was there I went to see him and he took me over his establishment. We went into the treatment rooms, and he pointed to the corner and said, "There is something that belongs to you." I observed it was an electric light bath, and it had a head sticking out the top of it. He introduced me to it, and I



learned it belonged to one of the ~~xxxxxxxxxxxx~~royal people of Europe. I was told in Berlin that all the leading hospitals there and in all the other important cities of Germany were supplied with these electric light baths. The arc light bath is also employed. It is more intense than the actinic ray, more intense, and there is a certainty of response. The actinic ray is stronger while the heat ray can be applied quite as advantageously with the incandescent lamp. Really we are only just beginning in this country to learn the value of these methods of using light. We do not have enough light in this country. We have a good share of cloudy weather. It is only in the center and mountainous regions that we have any light. In the arc light and incandescent light we have a source of light which is as powerful as the sunlight, and we can get an effect just as powerful as the effect of sunlight, and we can control it better. I am satisfied that in the future very great use is to be made of light as a method of treating disease. It is one of the most powerful therapeutic agents that we have. So it seems to me that there seems to be great force to all of us in the fact that light was the first thing created. "Let there be light, and there was light, and the light was good." So let us utilize it. We must let the light as well as the fresh air into our rooms, and we must get out into the light. Christ said to His disciples, "Walk in the light," didn't He? But we have lived in darkness and walked in darkness, and our bodies are filled with darkness which is disease. If our bodies are filled with light there is no darkness at all. How are we going to fill our bodies with light? Live in the light so that it may shine into our bodies. Then eat light.



The food we eat, if it is pure food, is pure light simple, and it is organized into living material by this magic working of light. If we take food into our bodies the light shines out again in heat, in bodily heat and in bodily work, and there is life behind the dust which is the excreta which is thrown out through the skin. This is the dust. It was organized by light. The light goes out in energy, in heat, in work. If we take food that has only light in it then our bodies will be filled with only light. But perhaps we eat food which has only darkness in it. What would be food that has darkness in it? Tea would be one. Why? Because it has theine in it. What is theine? Theine is a substance which, taken into the body, forms uric acid, and uric acid is disease. It is not life it is disease. It is the product of death. Coffee has caseine in it and caseine is the same thing. In the body it is converted into uric acid. Cocoa and chocolate have theobromine in them which is another maker of disease also. The poison that is taken into our bodies is darkness and not light. There is no food in tea or coffee. There is very little in chocolate. Twenty years ago we imported into this country <sup>nine</sup> twenty million pounds of cocoa annually. Last year we imported into this country sixty three million pounds which is seven times as much as twenty years ago. In twenty years the consumption of cocoa has increased 700%. This cocoa contains about 3 or 3 1/2% of theobromine which is uric acid. Let us see how much that would be. Three and one half per cent on sixty million pounds would be something more than two million pounds of uric acid. This two million pounds of uric acid is eaten by



the American people every year. That is just so much darkness introduced into our bodies. When one eats the body of an animal he eats something besides light and health which are synonymous. When one eats the body of another animal he eats death because there is death in the animal. If there were not death in the animal, the animal would not be dead. When death gets into our bodies and gets control of them then we die. We lose our lives. We cease to breathe. The more readily we accumulate death the sooner we die. The more readily we accumulate uric acid the sooner we die. If we take excretory products into our bodies, the excreta of other animals, you can readily see that the time will soon come when our bodies will be filled with darkness. Then we will die for lack of life and light. Death comes by the accumulation of the elements of death or darkness. The animal consumes light and energy. Light is stored up in its food. Animals are consumers of energy while vegetables are storers of energy. The vegetable stores energy for the whole animal kingdom--the consumers. When animals consume animals it is like one man eating another man. It is like feeding a locomotive with small stoves. It is like feeding a stove with kerosine lamps. It is like feeding a big steam boiler with a lot of small steam boilers. There is a little fuel in the stove. There are a few cinders there. There is a little oil left in the lamp. If you throw the lamp into the stove there is a little oil, and you will get heat out of it. So with the animal. When death is taken into the body of another animal the animal has to suffer the consequences. I was very much interested in reading a paper some time ago in which the author described how to make fine pork. One of



the very best remedies for consumption, he said, was pork. He recommended it very highly as one of the very best remedies for ~~pork~~ consumption. I observed in the same number on the cover that there was an advertisement for somebody's superfine hams., for special people. The author of this article had gotten hold of my article showing up the evils of pork eating. He said, "It is necessary only that the pork be properly fed. The pig should be fed corn and nice clean clover. Pigs should never be allowed to eat offal of any kind. If the pig is fed offal from dead animals, it becomes very badly diseased and absolutely unfit for food." Now it is very curious, isn't it? This writer could see so very clearly that meat was not good for the pig. The pig that eats meat becomes unhealthy and is not fit to be eaten by any other animal, but if the man eats the pig, it is all right. If the pig eats a dog, it makes a poor pig of him, but if a man eats the pig it makes a good man of him. It was a very curious kind of reasoning he had that would lead him to this result. If he had applied the same philosophy to the man as to the pig, he would have excluded meat from the man's diet as well as from the pig's. He recognised the fact that when the pig ate the dog or any other animal, it became sick, although he has got a far stouter stomach than the man has and a more effective liver, but if the man eats that same thing that the pig must not eat, it is good for him, and makes him strong and robust. This is certainly a very strange philosophy. The fact is that if the pig eats wholesome food it is a better pig. If the pig eats corn meal mush, or bread, or oatmeal mush, or other simple, wholesome, nourishing foods, the pig is a better pig. Certainly. And the man, of all beings, requires the



purest and sweetest diet, and he will be a pure man if he adopts a natural bill of fare, and avoids everything that is unwholesome.

Hundreds of years ago a certain Roman general in India found a peculiar tribe different from most of the people of India. This tribe had some very strange habits, and one thing he observed was that there were no cemeteries there. He wondered what they did with their dead. After considerable enquiry he discovered that it was the custom of this tribe when a person became sick to call the friends in and have a big feast. They did not wait for them to die. No one ever died. They believed it was better not to wait until they became dead. So if a man got sick, his friends were called in and they all had a big feast. So when people became emaciated and were no longer useful, they called all the relatives together and there was a very big feast. Then the Roman general protested against this horrible custom. He said, "How much shall I give you to abandon this terrible custom?" and they would not listen for a moment to this proposal. It was a custom, and they intended to adhere to their customs. "But," he said, "how terrible to think of a man eating his mother, and of the whole family getting together and eating a brother or sister or some other relative". What do you think the reply was? The old chief said, "In what way could a man show greater respect for his friend than to offer himself to be his tomb?" One can imagine that a person could reason himself into such a philosophy as that, but who would care to offer himself to be the tomb of a pig?

Dr. J. H. Kellogg, in Sanitarium Parlor.



POST-GRADUATE NURSES' DIETETIC CLASS, TUESDAY, JANUARY 10, 1904, 2 P.M.

Dr. J. H. Kellogg.

There are three food elements--proteids, fats, and carbohydrates. Proteids consist of such food substances as Gluten, white of egg, albumen, the casein or curd of milk. These are good samples of proteid. Animal proteids and vegetable proteids are alike with one exception. Animal proteids are contaminated with the products of tissue waste. They contain tissue poisons and vegetable proteids do not. We have animal albumen and vegetable albumen--just alike with this one exception. We have animal and vegetable gelatin just alike with this one exception. Animal and vegetable casein the same way. In animal proteids are poisonous substances that are found in all animals. They are found in living animals. That is why the kidneys must act and why the skin must act. If you stop the breathing and the liver action and the kidney action, the animal dies in a short time of poisoning. It is just the same as though we brought a stove into this room and built a fire without connecting it with the chimney. The smoke would all come out into the room and smoke everything up, and soon there would be soot all over everything, and there would be an accumulation of ashes and cinders. The room would be spoiled. It is the same with the animal. If you connect the pipe of our stove with the chimney, the chimney would carry off the smoke. So the lungs carry off the poisons of the body. The skin, the bowel and the kidneys are the grates, if you please, through which the ashes etc. are carried away. Suppose we have a hole in the roof like the Indians do, there would be a little smoke in the room, but the draft would be great enough to carry most of it out. That is like the body. The



poisons are cinders and smoke all through the body, but they are carried off fast enough so they do not accumulate. If we had a hole in the roof just large enough to carry off the smoke from this stove and we brought another stove into the room and set it burning, the smoke would soon accumulate and become denser. When an animal is dead the poisons accumulate. You not only have the poisons that were formed during life, but you have the poisons that are formed in death. Then there are germs in the bowels, in the intestines, and on the skin, and as soon as an animal dies, these poisons penetrate the body very rapidly. In 24 hours, you cannot find a place where the germs are not. You cannot find a beef steak on the market so fresh but what it is all filled with germs to the very center of it, and these germs are working and causing decay, and that is what makes the flesh tender again. Living flesh is tender. When I operate upon a muscle, I have to be very careful. The muscle seems to be almost fluid. When an animal dies rigor mortis occurs. Then the muscle coagulates and hardens and becomes tough, and never gets tender again until it rots. So, you see, if we are going to eat animals, we ought to eat them while their flesh is still alive and quivering, because then it is tender and the poisons are not very abundant, but if we wait until it has been dead for 48 hours, poisons have accumulated to a great extent, and it is hard and tough and indigestible. So, if you must eat an oyster, it is best after all to eat it alive. If you must eat beef steak, eat it while it is still warm and quivering. That is the way the Tartar does. He drives the cow before him all day and when he comes to a suitable stopping place, he runs a long thin knife into the flank of the cow, and draws out a long thin piece of flesh. Then he presses clay into



the wound and drives the cow on. He uses great dexterity in this, being sure not to cut where it will cripple the cow or where it will cut into a large blood vessel. So he drives the cow along each day, and the warm, live flesh he gets is very tender and toothsome. The Tartar is very fond of live steaks. He gets so accustomed to live steaks that sometimes he does not object to a little taste of human blood. I saw a report in the paper a few days ago that the Cossacks when they capture a Japanese soldier, cut his throat and drink his blood. And it is reported that these Cossacks lived largely on the blood of murdered Turks during the Turko-Russian war. It is because they have the real taste of flesh, and they have been accustomed to live, warm flesh, and human blood does not taste so very different from ox blood. When one must eat animal food, that is the way to take it, just as the wild carnivorous animals do. They catch an animal and eat it while it is still warm and quivering. There is as much difference between fresh cow or ox or hen and decomposing cow or ox or hen as there is between a fresh apple and a rotten apple. It is just exactly the same difference in another way.

Well, there is a difference between vegetable and animal proteid, and it is that the animal proteid contains poisons.

Fats tell the same story. You are all familiar with what they are. Fats are also both animal and vegetable. We have fats that are fluid at the ordinary temperature of the body like olive oil and the oil of nut nuts. Then we have other fats such as lard, butter, and the fat of the cocconut. Lard will melt at a lower temperature than butter. Tallow melts at a high temperature. Oleomargarine is made from tallow and lard and oils. Cotton seed oil has about the consistency or melting point of butter. Vegetable oils differ from



animal fats only in that they contain no poisons of any sort. They are sterile. They are free from bacteria, whereas animal fats very often contain germs, but they contain less germs than the proteids.

Carbohydrates are also animal and vegetable, but almost exclusively vegetable. There is a little in flesh, but flesh is almost entirely composed of fats and proteids, while vegetables are for the greater part carbohydrates--starch, sugar and dextrins. These are carbohydrates. These carbohydrates are found chiefly in vegetables. There is animal sugar, animal starch or glycogen, and these are so-called carbohydrates. They are very necessary. We have the analogues of starch and sugar in the animal kingdom in the form of milk sugar and glycogen or liver starch. Glycogen is found in the muscles, in the liver, in all of the gland structures. Glycogen is the source of energy in the body. It is practically identical with starch in its composition.

Perhaps I might tell you a little of the history of these substances. When vegetable proteid is taken in by an animal it is converted into animal proteid. It is transformed in the process of digestion. Of fat the same thing is true. It is converted into animal fat. Some of it is used at once and some of it is deposited in the tissues and diffused through the tissues, more or less, stored up for use at some future time. There is a little bit of fat behind the eye, and all round the kidneys and other organs, and it serves as an overcoat to keep it warm. That is why we get fat in the fall.

Carbohydrates are for the purpose of producing heat and energy in the body. They burn in the body. They are digested and dissolved and carried into the blood, then burned.

A few words more about the process of digestion. I might



mention that there are two more elements. They may be a little differently classified. The carbohydrates are divided into starch and sugar, and then there are salts. So we have five food elements: albumens, fats, starch, sugar and salts. They are the food elements we have to be familiar with.

Now about how they are digested. Suppose I begin with starch. Starch, albumen, fats, sugar and salts. We will put it that way. We put the starch into the mouth and chew it. It comes into contact with the saliva and some of it is changed into ~~starch~~ sugar. When the food is swallowed rapidly--bolted, the saliva does not act on it to turn the starch into sugar for about one and a half hours. You will find in your books it says about 30 or 40 minutes, but all the latest investigations have shown different results. It continues for about one and a half hours on the entire mass of food in the stomach.

Albumen comes next. Starch is digested in the mouth and in the stomach, but in the stomach gastric juice is brought in contact with the food, and acts upon the albumen and digests it. If you take the white of egg, it is dissolved by the gastric juice into a clear slightly opaque solution.

A little farther down the food meets with the bile, and the bile digests the fats, and converts them into an emulsion. So, starch by saliva; albumen by Gastric Juice; fats by bile.

We encountered in the upper part of the small intestine another juice--the pancreatic juice, and that is a very wonderful juice, because it is as able to digest starch as is the saliva; to digest albumen as well as the gastric juice; and to digest fats as well as the bile. So while we have the saliva for the starch, the



gastic juice for the albumen, and the bile for the fats, we have the pancreatic juice which digests all. So the pancreatic juice is capable of digesting all the food elements with the exception of sugar. So farther down in the intestines you have the intestinal juice, and the intestinal juice digests all these things: starch, sugar, fats and albumen.

There are three different kinds of sugar with which we come in contact, viz., milk sugar, malt sugar and cane sugar. Chemically they have practically the same composition,  $C_{10}H_{20}O_{11}$ . But these each require a special digestive fluid to digest them. One requires one kind, the second another kind, and the third still another kind. The milk sugar requires lactates, and that is present in the intestine of the small child up to about two years old. That is why children often get sick upon a milk diet after that age.

Cane sugar requires a special digestive juice which is present in one of the stomachs of the cow in great abundance. The cow has a stomach especially for digesting sugar. That is cow sugar. It is grass sugar. It comes from grass. It is found in beets, and that is a root, and these animals live on roots and grasses. So that is the food which is naturally adapted to the cow, which belongs to the cow, and we have robbed him of it, and we suffer much more than the cow does.

The sugar required by human beings is malt sugar or maltose because it results from the action of the saliva on the starch. When the saliva acts upon starch, it is converted into malt sugar. And when that malt sugar enters into the small intestines, there is a juice there always ready to digest it. The milk sugar digesting



fluid may be absent; the cane sugar digesting fluid may be absent, but the malt sugar digesting fluid is always there and that is the reason why we have malt honey. I learned that fact about 20 years ago. So many people could not digest cane sugar and I have worked for nearly 20 years to get over that difficulty. Malt honey is simply starch that has been digested by the starch digesting ferment.

Before we understand fully this question of the digestion of starch and the relation of sugar to starch, I must tell you a little about the nature of these substances. When you were children and went to school, your mother put up for you a little noon-day lunch. And she put into that lunch everything she thought you would need. There would be bread and butter and perhaps a piece of pie and a piece of cake, and some things that were not good for you--pickles, etc., but she put in everything she thought you needed. She did not put in merely a dry crust or something of that sort, she put in everything she thought you would need. Nature does the same thing for the little plant. When nature makes a little seed, that is a dinner basket, if you please, put up for the little tree that will grow, because when that little plant is down in the dark underneath the surface of the ground, it cannot make enough for itself. It is like an infant just born. It cannot prepare food for itself. It must have a package already made. It must have prepared food. So everything is put into that little seed to make ready for it. And in that little seed is some sugar. Why is that there? Because a young plant of that description feeds on sugar. It takes this sugar and makes roots, leaves, stems and bark out of it. All these are in part made up of sugar. It is the substance out of which a plant is built. So the plan could not begin to sprout if it were not



--8

for sugar. And so there is sugar, but not only sugar but also starch, and just as in a kernel of wheat--just on the inside there is stowed away some digestive fluid called diastase, the same as we have in our saliva. And when this is moistened it begins to work and converts some of the starch into sugar. So when the seed begins to grow, it uses what sugar it has, and then there is some made for it every day, and there is sugar and starch enough there to keep it until it gets up to the air and the light. When it gets to the light, the sunlight does for the plant what the diastase did before. It seems that there is almost creative power in this diastase laboring to convert starch into sugar. That is a wonderful thing. We cannot understand how that insoluble and tasteless starch is converted into a most soluble and highly flavored sugar, but this diastase does it. Thus this sugar enables the plant to grow, the roots go down and the plant comes up. There is a little fat there also. That little white piece at the top of the seed. People take it out of the flour because it might make the flour rancid. They compress this and get out the fat or the oil from wheat, and make corn oil and it is one of the best vegetable oils you can get. It is sent to France and then sent back here labelled "Olive Oil." But it is olive oil that grew in corn fields, nevertheless. It is just as good as the olive oil, however. Perhaps the man who makes it rather than the man who buys and consumes it is hurt.

So this little plant when it begins to grow makes its own sugar. So it keeps on growing until it gets to be a great tree-- a maple tree, perhaps. When the fall comes, we will suppose that tree to be intelligent, and it begins to think: "I have got to lose all my leaves. They will be dropping off." Remember that the



for sugar. And so there is sugar, but not only sugar but also starch, and just as in a kernel of wheat--just on the inside there is stowed away some digestive fluid called diastase, the same as we have in our saliva. And when this is moistened it begins to work and converts some of the starch into sugar. So when the seed begins to grow, it uses what sugar it has, and then there is some made for it every day, and there is sugar and starch enough there to keep it until it gets up to the air and the light. When it gets to the light, the sunlight does for the plant what the diastase did before. It seems that there is almost creative power in this diastase laboring to convert starch into sugar. That is a wonderful thing. We cannot understand how that insoluble and tasteless starch is converted into a most soluble and highly flavored sugar, but this diastase does it. Thus this sugar enables the plant to grow, the roots go down and the plant comes up. There is a little fat there also. That little white piece at the top of the seed. People take it out of the flour because it might make the flour rancid. They compress this and get out the fat or the oil from wheat, and make corn oil and it is one of the best vegetable oils you can get. It is sent to France and then sent back here labelled "Olive Oil." But it is olive oil that grew in corn fields, nevertheless. It is just as good as the olive oil, however. Perhaps the man who makes it rather than the man who buys and consumes it is hurt.

So this little plant when it begins to grow makes its own sugar. So it keeps on growing until it gets to be a great tree--a maple tree, perhaps. When the fall comes, we will suppose that tree to be intelligent, and it begins to think: "I have got to lose all my leaves. They will be dropping off." Remember that the



leaves are the stomach and lungs of the plant. It says, "I must lose my stomach and lungs. What will I do till spring time? When I want a new stomach and lungs, how shall I get them? I must have sugar to make them from." So the plant begins to draw in the nutritive elements from the leaves. Did you ever notice that a dead leaf is not as heavy as a green leaf? That is, because all the nutritive part which made it green has been taken into the tree, all the chlorophyl which makes the leaf green has been taken out--sucked into the tree. The sunlight acts on the chlorophyl and the chlorophyl acts on the material that is brought into the tree. That is all drawn in and stored up in the bark, and when the spring comes, the chlorophyl is sent out again in new leaves. So in the fall, the plant pulls down the blinds, so to speak, to get ready for next summer. Now if this sugar and dextrine were allowed to remain in the tree, great damage would be done. One thing would be that the tree would freeze up and burst if all that water were left in it. But the next thing would be that during the winter time this precious sap would be taken out and carried away, because it is working downward and would be carried off into the ground and lost. So there is a wise preparation made. These soluble food stuffs--the dextrine and sugar--are converted into insoluble starch. If you put some starch into water it falls to the bottom, and does not dissolve until it is boiled, and then not properly. Raw starch falls to the bottom like sand. So in order to preserve this food stuff, and have it ready at hand in the spring time, the maple tree and all the rest of the trees store it up in the form of starch in their roots, and along with this starch, there is diastase. Then when the spring time comes, and the sun begins to shine into the soil and melt



the frozen earth and warm the frozen roots, the diastase begins to act on the starch and converts the starch into sugar again. There is a digestive process in the roots of the tree in the spring time about the time maple sugar is made. The digestive process is preparing a meal for ~~itself~~ the tree. The tree must have sugar out of which to make new buds and roots. The farmer goes along and steals that away and boils it down and gets maple sugar. The same thing is going on in hickory and beech trees. The same thing is happening in the sorghum plant and in the sugar cane, and the same thing in the sweet corn and the field corn and the wheat and rye and barley. There is sugar in the sap. That is why the corn is so sweet when it is green. Sweet corn is not so sweet when it is ripe as when it is green. There is just a little sweet on the outer edge. There is enough sugar in sweet corn so there is still a little left when it gets ripe. So before the tree can use the starch, it must be converted into sugar again.

The same thing is true in our bodies. In order to use the starch, we must convert it into sugar the same as the trees do. So in our digestive processes, we are doing the same thing that the plant is doing, the same thing as is being carried out in all the animal and vegetable world. It is all the same process. Digestion is not a thing that is confined to the animal at all. It is taking place in the vegetable the same as in the human being. So we have a power in us to convert starch into sugar. The saliva converts starch into sugar in the mouth and in the stomach. The pancreatic juice converts starch into sugar and the intestinal juice converts starch into sugar. So the starch is converted into sugar and circulates as far as the liver and the liver takes some of that sugar and



converts it into starch again for storage, just as the trees did. It would not do to send all that blood sugar into the blood at once because it is more than we need. Sugar is to the body what fuel is to the locomotive. So the liver is a sort of tender to store starch. So the liver converts starch into glycogen and retains it until it is needed, and hour by hour converts it again into sugar and sends it out. That is one of the most interesting things I know of. And when the sugar comes along in the blood, the muscles take some of it up and they store it up in the form of glycogen or liver starch because by and by the muscles will need that to keep you warm with when you are sleeping. If you could eat a little starch right along every five minutes, you would supply it just as the body needed it. But since you cannot do that the body must supply some means to regulate the supply for heat production, as the fireman must shovel coal out of the tender into the fire. The liver is a coal box, we will say, and the muscles are another coal box, and there is a fireman that stands by in the liver and muscles converting starch into sugar and sending it into the blood--shovelling coal into the furnace just as it is needed. What is that fireman? It is a digestive principle or ferment. The same thing is found in the muscles, in the liver and in the white corpuscles. There is found there a digestive agent with power to convert starch into sugar. So, you see, digestion does not pertain to the mouth or bowels or stomach alone, but goes on in the liver and muscles and blood. A digestive process is taking place everywhere throughout the body. It is found that most of the <sup>actions</sup> ~~institutions~~ of the body are carried out under the influence of this ferment. When you say to a muscle I want you to pick up a book, there is a little notice in advance. It is a small



--12.

fraction of a second, about two or three hundredths of a second, but during the short time in which I think about doing that there is a process going on in the muscle by which the sugar necessary to give the muscle energy to life that book is formed. The same thing is true all through the body. When you think, "I guess it is dinner time, I will go to dinner," your stomach begins to get hydrochloric acid ready to digest that dinner, and if you keep it in your mouth and chew it thoroughly, the taste buds will send a message to the brain, and the stomach begins to get gastric juice ready to digest your dinner when it comes. Your pancreas is getting ready. A few weeks ago it was discovered by an eminent French investigator that the liver is prepared in the same way. As soon as you begin to eat the liver begins to make bile. The same is true of the stomach. And thirty minutes after you have eaten, the gastric juice begins to pour into your stomach again. The same thing is true of the liver. Five minutes after you begin eating some bile is formed, and three or four hours after that there is another flood of bile, because the food does not usually get into the intestines for three or four hours after you have eaten. So we see that digestion begins in the mouth and ends in the tips of the fingers and the tips of the toes, ends in the tissues. Digestion begins by converting solid matter into soluble matter; insoluble substances into soluble substances so that they can be absorbed, and on the other hand, it is a process of solidifying substances. It is by the process of digestion that the blood is converted into muscle and nerves and glands, and that the body is built up.

8.



## P N E U M O N I A.

-----

Dr. Kellogg, to Medics, Feb. 16/04.

Things to Diminish in Pneumonia : In certain phenomena we have a splendid illustration of a fistula involution of such a severe character that it seriously affects the patient's life; and in general the methods adapted to the treatment of this disease will be adapted to the treatment of any case of visceral inflammation. It is a good thing to remember. We have there a disease which is typical ~~inflammation~~ infection, ~~infection~~ localized ~~inflammation~~ infection, which calls forth the most active resistance on the part of the body, with very strong reaction. So we have here an opportunity to apply those measures which will develop active resistance, and these measures are just as applicable to every other form of local inflammation as to pneumonia. Now, it is a febrile disease, and so the general measures which are adapted to pneumonia will be applicable to every other form of febrile disease, in which there is localized inflammation, or visceral inflammation. It covers a very large territory, and when we become thoroughly familiar with this malady, we shall be able to deal with every other malady of a similar character.

Now let us rapidly review what we have gone over so far. We found that there are certain things to be increased, --leucocytosis, oxygenation, oxidation, the alkalinity of the blood, elimination of toxins, destruction of the toxins, heat elimination, general vital resistance, heart action, blood movement, final absorption of exudate.

There are certain things to be diminished; these things, we found especially, are pain, cough, heat production, dyspnoea, bacteria



in the seat of the disease, cerebral congestion, pulmonary congestion and nervous irritability. Perhaps we ought to have a little different grouping. Say, pain, cough, dyspnoea, pulmonary congestion, Bacterial growth; put those things in that order. Heat production, nervous irritability, cerebral congestion. Now we produced these two tables, by a studying the symptoms, and these symptoms we have we have found, affected chiefly the lungs first, then the circulatory system, and then the digestive system, with the nervous system, and there are certain miscellaneous systems, sometimes. Let us see which are amenable to treatment. Under the lungs there is the cough dyspnoea, pain, and exudate shown by the dulness.; bronchial catarrh shown by the bronchial breathing, expectoration, and rales, congestion, which is shown or indicated by the pain.

Now the circulatory organs : we find there, leucocytosis, which may be increased rapidly, or increased slowly, or not increased at all; rapid, feeble pulse; cyanosis, --two sorts,--mottled cyanosis, and diffuse cyanosis.

The nervous system : insomnia, convulsions, headache, chill.

Under the Digestive organs : the symptoms are gastric pain, jaundice, tympanitis, pain in the abdomen, constipation, nausea, vomiting, diarrhoea, herpes.

Under the Miscellaneous : symptoms, we have fever, variation of temperature--that is one characteristic of pneumonia; scanty urine; albuminuria; crisis, lysis.

Certain applications of these, that might occur in this disease are Bronchial pneumonia, pleurisy; endocarditis; pericarditis, myocarditis; apoplexy; meningitis; arthritis; peritonitis; gastro-duodenitis; septicemia; otitis media; phlegmasia alba dolens; nephritis

We have found in our study so far, that the wet sheet pack is



the most effective measure. We found certain precautions that we must take with reference to this, in reducing temperature and increasing vital resistance. We must be careful to see that the patient warms up thoroughly at the time, and before a second application is made, we must have a thorough reaction, and we would not use an evaporating pack for anything. We must take great precautions that the patient does not suffer from prolonged chill, so any cold application must be very brief. As the disease advances we prolong the pack, and in every way encourage or produce the crisis. Wet sheet pack is one of the best means of reducing leucocytosis, which is being encouraged for the purpose of destroying the toxins and the microbes. We found at the same time that this wet sheet pack raised the temperature, and also increased the oxidation, the alkalinity of the blood, thus destroying the toxins by increasing the leucocytosis, and developing the anti-toxins, of the body, and the activity of the toxin-destroying glands : the supra-renal capsules, the liver, the spleen, and the lymphatic glands. We encourage oxidation by stimulating metabolism, We found other methods of reducing leucocytosis, also. There is the towel rub, cold mitten friction, and the wet sheet rub, and the cooling enema. These cold measures all increase general vital resistance, and in general accomplish the same thing, that the wet sheet pack does, only in not so vigorous a manner.

Now let us consider things to be diminished.: pain, cough, dyspnoea, pulmonary congestion, bacterial growth,. Now, what is the best method of accomplishing this ? We will use the cold compress for the purpose of increasing the destruction of toxins,

Here we have pain, and cough; bacterial growth, and dyspnoea. Now let us see., what is involved. Let us begin with pain. What is the cause of the pain ? Pleurisy. Where is the pleurisy ?



It is in the pleura, adjacent to the morbid process in the tissue. If you have pneumonia deep down in the lobe of the lung, and it does not affect the pleura at all, it is not very easy to tell where it is. Pain in the pleura helps you to localize it. Now, here is a very interesting and important question here. Pain is due to pleurisy. Now, how are we going to relieve that pain? The pleurisy may be visceral; or parietal. But it is most likely to be visceral, to start with, anyhow. Suppose it is visceral; suppose it is parietal. Are the conditions the same? Would the same remedy be good for both kinds? Pain in a lung affection is indicated by the involvement of the pleura. Now let us look at it. What is necessary to relieve pain? Suppose you have pain due to congestion, no matter where it is; we can influence both the nerve supply and blood supply of every part. Suppose you have pain; in what ways can you relieve it? You can do it by reflex through the circulation, by diminishing the amount of blood in the part, or by fluxion. The definition of the word 'fluxion' won't do, so we have to call it 'reflex.' We make a cold application, and that causes contraction of the surface vessels. Another way is by derivative application, diverting the blood to some other part. A third way is by the specific inhibitory pain-killing power of heat.

I knew a lady who had a felon on her finger, and I said "Put it in ice water." She placed the whole of the fore-arm in the ice-water, and it stopped the pain. That went on for a week, and then she came to me and said she wanted me to cut the finger open. She says, "The minute I take it out of the ice water, it is bad." So I cut it open, and let out a lot of pus, and she was well in a few days. The ice simply held the thing there. That is not the best



way to accomplish it, for it simply palliates the thing, and is not remedial, because it does not remove the cause.

Then we can lessen pain by the reflex control of the circulation, by derivative application, and by the inhibitory power of heat. The lessening and palliation of the nervous irritability will bring about a condition of repair also. The derivative application helps but the lessening of the pain will also bring the part into a better state for activity. When parts are in a state of pain, they are over-excited, and their action is irregular and abnormal. Here are three things to be accomplished; one through the nerves, and two through the blood vessels.

The nerves on the chest are connected with the respiratory centers, and with the structures of the lungs. Now the blood vessels of the pleura, of the chest, and of the lung, have entirely different connections. Here are the two pleuras close together, but the blood supply is far apart. Where does the parietal pleura get its blood supply? From a branch of the internal mammary supply. Now the visceral pleura: whence does it get its blood supply? From the bronchial arteries. We see then, that if we are going to apply fomentation to relieve pain by derivative action, we must take into account this distribution of the blood vessels. If you should apply a fomentation to the front of the chest, and not get results, what is the trouble? You would say, very likely you have visceral pleurisy, and that is why you don't get relief. Put the fomentation round the chest, clear round. Suppose you have a pain on the right side, and put a fomentation on, and it does not relieve the patient, then you would make it bigger, and put it clear round. You want to be sure to reach the very lowest extremities of the internal mammary. Then you have done all you can by local application. Suppose that don't relieve pain? Then give a hip and



leg pack. That would bleed the whole body; ~~at least~~ that will still further lessen the tension in the lungs. How much blood do you suppose you could get into the lower part of the body? At least a quarter.

Hip and leg pack, cold mitten friction, and then heating compress to keep it there. Bleeding in pneumonia is good,--bleeding into the legs. If you get a man's blood into the legs, it may as well be there as in a pitcher. Then you can let it back again, when it is safe. How long can you keep the blood out? Just as long as you want to.

Do you know any other way to relieve this pain? The old-fashioned way of treating pneumonia, was by bleeding. The general blood pressure was lowered to such a degree that the pressure on those vessels was relieved, and so the pain was relieved. One way is by fomentation over the seat of pain, big enough to accomplish all that a fomentation can accomplish in that region. The next thing is a hot application to the hips and legs, and this fomentation dilates the blood vessels, and then that is followed by cold mitten friction, and heating compress, which will detain the blood in those parts. Do you know of any other way of bleeding? There are two ways of bleeding. Remember that the great remedy for pain in pneumonia is bleeding; by relieving the portal system. How much blood can you get into the portal circulation? It is capable of holding all the blood in the body. Will that do the patient any particular harm? No. You can bleed it into the portal circulation for some time, without any harm at all. Give a fomentation followed by heating compress or wet girdle. Give a hot hip and leg pack, from the umbilicus down, and then a chest compress round his body. Now we will see what we have accomplished here. We have diverted the blood to the surface of the chest; dilated the surface vessels



and they diverted the blood into the lungs, and into the portal circulation. That means you can count on to relieve the pain in every case. Now can you imagine a case in which you chiefly depend upon hip and leg packs and heating compress to the abdomen, as a means of relieving pain? Yes; when you have an excited heart, perhaps pericarditis, or endocarditis, or your heart is weak to such a degree that you are afraid of the depressing effect of prolonged hot applications over the heart. It is first excitant, then depressing, because you get the inhibitory effect and the depressant effect; but you don't want that. Pain in the head is relieved by a hot foot-bath. See what a simple illustration that is.

The application of heat to the whole surface of the body brings the blood to the skin, lessens the general arterial tension, and so relieves the pain, and we can ~~use~~ use the lower half of the body if we choose. It will divert the blood away from the lungs, but there is one advantage we lose, and that is the inhibitory effect, the pain killing power of heat. We have had the defivative effect, but beside that we have the inhibitory, which is more important, because so far as the immediate relief is concerned. When we apply hot applications to hip and legs, will we get this inhibitory effect? No. Cold over the heart, and hot hip and leg pack, and a small hot fomentation over the seat of pain will give the inhibitory effect and won't affect the heart. You can put ice over the heart, and a rubber bag full of hot water, covered with a moist flannel. The skin over the ~~diseased~~ inflamed surface is the area that is directly connected. That is the apparatus through which you will obtain this inhibitory effect. We relieve pain by relieving the congestion.

When we have made application for the relief of pain, one should take into consideration that we have a pleurisy in which the parietal



tissue is involved. We would expect the largest effect to be produced when we had the parietal pleurisy as well as the visceral pleurisy. Since you are likely always to have visceral pleurisy what ought you always to treat in making applications for the relief of pain? Put a fomentation on the back. In order to continue the effect of that fomentation, both the derivative effect and the inhibitory effect, how would you follow up that fomentation? What would you do? Give a heating compress. So whenever you have pneumonia, whether there is pain or not, in order to relieve the congestion, there should be heating compresses on the back all the time, and with them, you will use intermittent cold compresses, because that is where the reflex area is, and the most sensitive nerves are. The intermittent cold compress for the front of the chest will energize the blood, will constrict the vessels, of the lungs, it will keep the procession of leucocytes passing through the lung channels and at the same time conduct away heat. At the same time, the heating compress on the chest will relieve pain, dilate the surface vessels, relieve congestion, and also maintain the inhibitory effect upon the sensitive nerves of the lung, and so relieve pain as well as the cough. If you apply a fomentation every hour, you put a heating compress on the back after the fomentation, and leave it there. There is no objection to your applying a fomentation clear round the chest, with an icebag over the heart. Then you take that off and put a heating compress on the back, and leave it there till the next cold application. On the front of the chest put a cold compress, wrung out of water at 60, changed when it begins to get warm. If you have very extensive pneumonia, and the lungs were largely blocked, so that there is anemia, and a period of gray hepatization has occurred, and a considerable area of the lungs is



involved, what effect does it have on the heart? There is an enormous increase of the work of the right heart. How can the work of the right heart be diminished? We want to lessen the work of the right ventricle. Here is a wonderful thing. How does the bronchial blood get back to the heart? It goes back through the pulmonary veins. So you see here is the circulation of the blood from the left heart up to the portal circulation here. There is a fourth circulatory system in the body. There are four. One is from the left heart around through the body to the right heart. The second great system is from the right heart down through the lungs to the left heart. A third, partial, system is from the arteries through the viscera of the abdomen, the portal vein, then to the liver. Another system, a more complete system, is from the left heart to the lungs from the right ventricle, to the lungs, straight back to the left auricle. So here is a person that is nearly asphyxiated, and is getting less air in his lungs than in a state of gray hepatization. If we can get his bronchial arteries wide open, so that he can get as much blood as possible in his lungs, we can in that way relieve the blood. When a patient's blood is all venous, and he is sinking from asphyxia, this is what may save that man's life. By opening up his bronchial arteries so that his blood can go flowing out from the bronchial arteries, we may maintain sufficient purity, and keep him alive.

In this disease there is a distinct crisis, and if he passes it, he will almost certainly recover, and the thing to do, is to keep him alive until he gets over it. If you can open up a way of circulation through the lungs, so as to improve his oxygenation, you have increased the movement of the blood through the lungs. How are you going to dilate the bronchial vessels? By fomentation. Where?



If you put it all over the chest, what would be the effect of that ? The specific effect of a fomentation on the whole chest is that you get a reflex action; while the application to the back would be a reflex action, but fluxion too. So make the application all over the chest. How do you follow that application ? By a heating compress to the chest; a chest pack. Would you cover it with a mackintosh ? Yes. Why ? You want to dilate the surface vessels as much as you can. Cover it warm enough to get as quick heat as possible, But you say, if you do that, you are going to make stasis in the lungs. How will you get over that ? Renew the pack occasionally. You want to change the compress about once an hour.

Now, what else can you do to keep the blood moving through the lungs, while the vessels are dilating ? It is the left side of the heart doing the work now. So put an ice bag over the heart, to keep the heart pumping. By cold mitten friction to the arms, you can keep the blood moving through the chest. There is a contraction of the vessels of the arms and of the lungs. The patient breathes better. The rapid breathing ceases with this chest pack, and so it becomes a regulation measure. This is the thing that you do in practically every single case. Apply heating compress on the back, all the while. The heating compress in the front, the intermittent compress warms up; and every time it does that it opens up the bronchial arteries vessels, and sets this little side circulation in operation. Thus it makes the new way for the pulmonary circulation. Always keep the shoulders, the tops of them, covered in pneumonia.

End.



"H O M E H E A L T H C U L T U R E"

A LECTURE IN THE SANITARIUM PARLOR BY

DR. J. H. KELLOGG, Feby.

Twentyfive, 1904.

oooooooooooooooooooo

"How to Cultivate Health in the Home" : that is a question that ought to be of interest to every family in every home. The savage does not need to give special attention to the cultivation of health, for the reason that his environment is health-begetting. Ingersoll once said ---well, somebody asked him a question : if he knew how to make the world any better than it was, if he could make any improvement on things, and he at once made the reply that if he has been on hand at the beginning of things, he would have suggested that health be made contagious, instead of disease; which was certainly a very witty answer, but really a very shallow one; for as a matter of fact, health is more contagious than disease. We have to work hard to catch disease. If a man wants to get small pox he has to hunt up a man that has small pox, and rub himself against him, in order to catch it. To get typhoid fever, he must swallow bad water; and to get consumption, he must breathe bad air for ten or fifteen years; to make a monumental dyspeptic, he must work hard at the dinner table, for twenty or thirty years, or longer, before he can be a splendid dyspeptic. If he wants to catch health, all he has to do, is to open his mouth, and breathe; eat wholesome food, drink clean water, breathe pure air; simply live in a natural way. We can catch health in our surroundings. Health is all about us. Nature is abounding with health, life, vigor, energy. All we have to do, is to drink it in. There is life in every mouthful of food we take; energy in every breath of air we draw; a vehicle of



life in every swallow of water. We contract health much more easily than disease. When a person <sup>is</sup> well, and is taking in health all the time, it is awfully hard to kill him, he has such abundant life.

At the Peace Congress, at the Hague, the representatives of the English recommended that a certain kind of bullets,--dum dum bullets,-- should be retained in warfare. The representatives of some other nations thought they should be repudiated and abandoned, and not be used in civilized warfare; but the English said "We cannot dispense with the dum dum bullet, that tear with great violence when they strike, because the savages with whom we have to contend, in our attempts to Christianize and civilize the world, are so tough and so hard to kill, that the ordinary bullets won't destroy them," and told a story of how that a peasant said he saw where a savage charged upon an officer, --and he was discovered in making his charge,--and he had his hatchet in his hand, and was making his charge upon the officer, and they levelled their muskets at that man, and riddled him with bullets,--he kept going and split open the officer's head; he levelled him to the ground, and then fell dead to the ground, but his body was penetrated with seven bullets.

A man told me, once, he was struck by a bullet, --a soldier in the Spanish American war,--and I asked him how it felt. He said he did not feel it at all, and when the bullet struck him he was simply stunned, and fell right over, and was somewhat staggered. But this other man had seven bullets go clear through him, and he kept right on with his charge. Of course they had been dum dum bullets, and had exploded inside, they would probably have blown him to pieces. And the English are going right on with the dum dum bullets, in their efforts to civilize the heathen.

Now, the argument was that it required seven times as much to



kill a savage as to kill a civilized man. A savage is certainly remarkably tough and enduring. Everybody who knows anything about the savage knows that. Among primitive people, there is vigor that we don't find among civilized people. Occasionally we do find a man who returns to savagery, and who wants to be enduring. A man who wants to be a great walker, a great pedestrian, a great oarsman, a great wrestler, a great boxer, straightway makes a savage of himself. He eats simply; instead of eating for the sake of having a good time, he eats to get strong muscles. He changes his diet. He knows strength comes from food. Every farmer knows that. No farmer would ever feed his animals what he feeds himself. He knows that they would be dyspeptic in a month, and he would have to send for a veterinarian before morning, if he should give them what he himself eats.

A man had four boys and four dogs. He himself took care of the dogs, but his boys he turned over to a tutor. One day a friend asked him how it was that he looked after his dogs himself, but turned the boys over to the tutor. "Oh", he said, "my dogs have a pedigree." His dogs had a pedigree, but the boys had not ! So the dogs must be looked after, and properly fed; because he wanted to keep those dogs up to their ancestry. He did not want it to run out. Now his boys-anything was good enough for them to eat. They could eat whatever the cook found handy, whatever she had in the pantry. But that was not good enough for the dogs. He gave those dogs the very best dog food known. He took pains to get the very best kind of food for dogs but what was the best for the boys he did not take any notice of. He let the cook, a poor, Irish ignorant girl, prepare the food for the boys. The savage lives in the natural way. The monkey, in the forest, finds the things that are good for him to eat. If he can't find what he wants in one forest, he goes to another; and if he can't



find it there he goes to another till he does find it. All animals migrate until they find an environment which is favorable to them, to find the right food, and the right air, and the right home to live in. But man lives where he can make the most money. He lives where chance happens to find him. He eats food that is cheapest or that he likes best. He has a fancy for it, or it is the custom of his country, or time, to eat without regard to the influence of that food upon his body. . Now, if a man wants to become strong, he seeks out food which he knows to be best for strength. How different is the food which the man who is in training eats, from that which the ordinary man eats. Some time ago a friend sent me a clipping from a newspaper. It told that a man started out from a port in New Zealand, two years ago, to sail round Cape Horn, --no, there were two men,--they started to sail round Cape Horn to London, in a little yacht, a two and a half ton yacht, just large enough for two men. They had a cabin just large enough for two to sleep in. These two men started out in that little yacht, to sail round Cape Horn. Their friends tried hard to prevail over them not to go, but away they went, notwithstanding. They had been out seven days, --they had a very good sea vessel,--and the captain, while fixing something in the rigging up aloft, fell to the deck, and was injured so seriously that in a few hours he died., and left one man all alone, on that yacht. He was hundreds of miles away from land. He was a thousand miles away from the coast, and the winds were against him. In traveling that thousand miles, he was obliged to travel more than six thousand miles, but after a while he reached his destination, He had kept the body for some little time, as long as he could, and then had had put it overboard. Most of his food spoiled, his store of provisions



and he had nothing left but granose biscuit, honey, and lime juice. And he lived that long journey on granose biscuit, honey, and lime juice. That was the newspaper report. The friend noticed granose mentioned and thought I should be interested, so he sent me the clipping. He reached port sailing all alone, standing right at the tiller of his vessel, and did not sleep at all for 18 days. But occasionally he noticed that the compass had changed, and he believed he must have fallen off occasionally, but he was the captain, the whole crew, of that little ship, till he got back to port again. Finally he surprised everybody by turning up, as they never expected to see either of them again. And he lived wholly on granose, biscuit, honey and lime juice. He really had the whole thing; all but fat; and possibly there is a little fat in ~~the~~ honey.

Now that is exactly what the man who goes in training, who wants to have endurance, does. He immediately cuts off mustard, pepper, pepper sauce, and ginger, and rich gravies, and all fried foods, and griddle cakes, and Saratoga chips, and tea and coffee, and the whole category of things which constitute the great part of the ordinary bill of fare are cut out. A man going in training eats very little meat, and if he eats meat it is plain beef steak, and mutton chops, but no pork; no pork in any form. He takes no tea and coffee, nothing but water, and he does not drink while he eats. And he takes his meals regularly. He takes no intoxicants of any sort, but subjects himself to the very plainest <sup>fare. Why?</sup> ~~ways?~~ Because he wants to have strong muscles so that he can knock out the other man. And he sleeps with his window open, and takes regular sleep. And he goes out of doors when he exercises. And he takes exercise in the gymnasium, and he goes outdoors to run; and he lives outdoors as much as possible. And when he goes out he exercises hard enough to



sweat. When he comes back, he takes a cold bath, and then rests a while, and then he goes to work again, and he does this several times a day. And from day to day his muscles become stronger and tougher and firmer. At the beginning, very likely his muscles were soft, and a blow with the fist would leave a blue spot, but after a few days, the heaviest blows would make no more impression upon his flesh than on a piece of rock. So you see a couple of pugilists pommeling each other, and you might think they were suffering; but they are not suffering a bit. Their tissues are like leather, and they don't suffer any more than a punching bag does in the gymnasium. The ordinary pounding of their soft tissues gives them no pain. The tissues have become so thoroughly hardened and toughened.

Now this man who wants to become strong so that he can fight another man, makes himself a savage, and becomes hardy and vigorous. Fitzsimmons and Corbett, when they were ready for their great fight were not only ready to meet their opponent, but they were able to meet anything else. They were not afraid of meeting any germs. They were not afraid of getting the grippe. Do you ever hear of any such thing as a fight or a racing match being called off because one of the principals had a cold? If a man is really in fighting trim, he don't catch a cold. In ordinary conditions, he would not take cold. He would not take the grip, or pneumonia. He is above it all. Now the savage then, has no occasion to cultivate health, for he is living a natural life. It comes natural to him. And so when a civilized man wants to get strong, and to get health, he naturally goes back to savagery. He goes back into conditions in which the savage man lives; that is, to a very large degree. Of course I don't mean degraded savagery, but the nearer he goes to the natural life, the more rapidly he accumulates strength. That is



the whole secret of healthful living. It is simply to live naturally. Our lives are to become natural. We live in unnatural homes. We shut ourselves up in air-tight boxes, that we call homes. A North American Indian or a South American monkey would take consumption in such a place, in six months. Why do we live in them? Because we have to some extent got immune. We have got used to it, to bad air, to foul smells, to disease-producing germs, and so we are really able to endure some of these evil things better than the savage can: for the same reason that an old smoker can smoke more cigars than a boy; ~~the~~ The people of Chicago don't get typhoid fever from the water they drink, but a countryman who had been used to drinking pure water and goes to Chicago, he gets typhoid fever <sup>right</sup> ~~gone~~ away; because the Chicago citizen gets used to typhoid fever germs. The whole secret of health is naturalness; living in the natural and divine order.

We sometimes say that the Creator established certain laws, which we must obey, if we wish to live; that if we deviate from these laws, we are punished. That is a wrong way to put it. The Creator made man, and adapted him and his constitution, to certain conditions. The people of this world are adapted to a certain power of gravitation, a certain direction. But a man could not live very comfortably on Mercury, or on Saturn or Jupiter. He might possibly live on Venus. The conditions of life are so different there, that a person who can live on this earth, could not live there. At any rate, that is the opinion of astronomers. Man is adapted to this world, to the kind of atmosphere, and to the proportion of oxygen and nitrogen, found in the atmosphere. They are just adapted to man's needs. And the foods that were made are adapted to man. There are fruits and grains and nuts, were just adapted to give man the right kind of nutrition. The conditions of life are



such as are adapted to man's needs. All these things were made for man. He is provided with conditions of life that are just adapted to his needs. And the same is true of the meteorological conditions.

As long as a man relates himself properly to these things, he enjoys health. But when man conducts ~~he~~ himself improperly, and establishes wrong relations, he suffers. For instance, in his food. If, instead of eating the food made for him, to eat, and on which he can enjoy the best and longest life, suppose he chooses the food of another animal. Suppose, for instance, a man should say, "I am tired of these things, of fruits, and grains, and nuts, and I think I'll eat grass for a while," and he gathered in the sweet grass from the meadow, and the clover, and then he eats that; he would soon starve to death. He could not subsist for more than a short time. Then when he found that grass did not agree with him, suppose he said, "I'll try the food of the giraffe., and live on twigs, and leaves, and things that grow on trees." That is very good for the giraffe. He eats them and enjoys health. The camel, and the sheep, and the goat all live on this kind of food. ~~a~~ But when man tries it, it does not agree with him. He has only one stomach. And it takes four stomachs to digest that kind of food.

Then, finding that does not do for him, suppose he says "This don't agree with me; I guess I'll try what the lion eats." I will kill a sheep and eat it. I will kill an ox and eat him.". And he tries the diet of the lion, for a time. What happens to him? If he goes on long enough, in that way, after a while he finds his joints swell up, and begins to find his nerves twitch. Then he gets stupid in his brain, and he gets stones in the gall bladder, and stones in the kidneys. He gets a variety of other troubles well known to be due to uric acid. Why? Because he has not the power to destroy



uric acid that the animal has; that the dog has, that the lion has. There are poisons in all these foods., that man can't destroy. Why? Because the animal consumes energy. The vegetable stores energy.

As the sun shone upon the green plants, the chlorophyll, it converted the material into living substance. The trees have been cut down, and now, ~~is~~ under the influence of this elevated temperature we see the same light and heat coming out that formerly went in. This light that we see here is sunlight, sunshine, sun heat, which was captured and held captive for a time in the wood, and now it is coming out; the very same light and heat and warmth from the sun is shining out from this hearth now at this moment. An animal is a fire, just as much as this fire on this hearth. When we <sup>see</sup> ~~see~~ a living being we <sup>see</sup> ~~see~~ a fire burning. We don't see any flame, but if we feel this living animal, we feel the warmth. The temperature of the body is continually maintained at about 100 degrees, irrespective of the surrounding temperature. If the temperature around the body is more than 100 deg. the temperature will rise a little; if below, it will fall a little. The ~~vary~~ temperature will vary somewhat according to the external temperature, but practically it is 100 degrees. If you had a pitcher of water here, at 100 degrees, and left it here for 24 hours, and then came back, you would find that it was just about 100 degrees. A Frenchman has recently made a very interesting discovery. He has found that it is possible to see sunlight in the body. Whenever there is a pain in the spinal cord, by holding up a little test object, a little instrument, over that part, it becomes visible. There are <sup>rays</sup> emanating from the parts of the body all the while. If you hold up this little test object above the muscle, you can see that it is contracting. If you apply it to the head of a man who is talking you will find the language center, and a little spot will shine out, because the language cells are at work. And so



with other parts. These wonderful rays are being sent out from the body, and all of them came into him through the sunlight, and the fire that we see here, was ~~made~~ made too, by the sunlight. The food too, that we take, was organized by the sunlight. All the properties of the sunlight are concentrated and focussed so that when this food is taken into your body, and this fire is being burned, that sunlight shines out once more, and we can catch all these wonderful rays. Now, I want to impress this point particularly : that food is simply concentrated, --you might say crystallized, consolidated sunlight. That is what food is. Because the thing in the food that gives us life and energy is the force and energy from the sun. The sunlight takes the dead inert air, earth, and water, those utterly dead, inert elements, organizes them into living substance. The transformation of apples and bread and potatoes, and these common food substances, into living human beings, is still more marvelous a transformation than the alchemists have sought for, in the transformation of the baser metals into gold.

The things we eat to-day, are to-morrow walking around and talking. And the apples and bread and such things that we eat should be good talk; and when we eat beef steak, and mutton chops, and polonies and sausages, and the scavengers of the sea, --oysters, and clams, and shrimps, and lobsters, it ought to be cheap talk.

Now man is an animal, and he consumes <sup>food</sup> ~~energy~~ like the ox, so if a man eats an ox, it is like one locomotive swallowing another; it is like feeding a big steam engine with sewing machines. When a man eats oysters or frogs or toads or worms, --all these things are eaten by some people, --and considered delicacies, --whatever animal a man eats, he takes into his body, when he takes these things, he is taking into his body creatures that like himself, were intended



to consume energy, to feed upon the products of the earth, which represent the energy of the sunshine; and we have in the animal, not the refined food, as many people suppose. For instance, in the ox, we have not refined corn, which has been brought up to a higher level so that it can furnish greater strength, and energy to our body, but instead, we have corn that has gone down the scale, because it has been used. It is exactly like going to a second-hand clothing store and buying a second hand coat. When a man eats pig's liver for example, he is getting second-hand liver, Where did the pig get his liver? From the corn and the grass that he ate. But when a man wants to improve his liver, he goes to the pig, and eats his. But the pig got his from the sunlight, which is food coming down from heaven. All life comes from above, and this life and energy is communicated to us from above.

When we eat an animal, we are taking into our body a second thing ~~that the animal has~~ <sup>for an</sup> is a consumer of food.

Now then, we look upon the fire here on the hearth, and see, besides the wood and the flame and the smoke, we see ashes. And we notice with the smoke there are foul and poisonous gases going up the chimney, and if we did not have the chimney, the whole room would soon be full of poisonous gases, and we should be suffocated. Sometimes the house fills with smoke, and our eyes smart and we cough and sneeze, and find ourselves very uncomfortable. Because this wood has been converted into poisons. The very same thing happens in the deadly burning that takes place in our bodies. The bland, simple, innocuous food, the bread, and apples, and potatoes etc. are converted in our bodies into deadly poisons. Then smoke, this smoke, would end a person's life very quickly. That is how they very often commit suicide in France. A person locks himself in a room



and burns charcoal, and awaits death. Now, slow suicide is going on with everybody who sits down in an unventilated room, because the poisons of his body are being accumulated in the ~~room~~, air, and taken back into his body. And poisons are in the flesh. That is what gives the flesh its flavor. If a piece of beef steak were washed, what would be left would be like rubber. What you wash away was poison, and that is what gives meat its flavor. And the various broths and such things, beef tea, chicken broths, Armour's Extract, and Bouillon and so on,--perhaps you don't know that they are all solutions of poison, and have no food value whatever, except in a very infinitesimal way. Now these poisons, when taken into our bodies, add to the poisons generated in our own body. When a man eats meat he takes poison as food, and when a man eats an animal he eats cinders; that is, half-burnt fuel, which is called cinders. Then there is a little wood. But when a man eats potatoes, and bread and other natural foods, there are no ashes. There may be some little indigestible substances, but there are no ashes. There is something ex-creted, and there is smoke, but no poisons; it is all material to be made into bone, blood and muscle.

To be hardy, then, a man must eat natural food. If he avoids natural food, a man might eat grass like the ox, but finding himself starving on it, he might turn to the diet of the dog or the lion or the cat, and would soon find himself getting prematurely old and rheumatic,; and if he lives long enough, --he will die early anyway; if he does not die of rheumatism or some other disease, directly due to uric acid poisoning, he will die of premature old age. His arteries will harden, too early; his brain arteries will get brittle, and he will have a stroke of apoplexy, perhaps; or he will have Bright's disease, and die of the poisons of another animal, in addition to the poisons of his own body. Man does not have the power



to destroy these poisons, whereas animals have. The muscles and the liver and the kidneys of a dog will destroy uric acid, but a man cannot do so much. That is why a dog can live on meat without injury, or without so much injury as a man can.

Well, this man returns to the ordinary hotel dietary. He sits down at a hotel dining table and the first thing he finds on the menu perhaps, is fish, various kinds of fish. Fishes are food for whales. Whales have seven stomachs to digest fish. It takes seven stomachs and some whales have as many as nine; because the animals of the sea are so complex, in character, and of such great variety, that it takes a very complex stomach to deal with them, and the whale, that is a carnivorous animal, has seven to nine stomachs, to digest fish.

Now besides the fish, which requires seven stomachs, there are grass of various kinds -- lettuce, celery, cabbage, spinach, cauliflower, perhaps other kinds of leaves, and grass, which were intended for herbivorous animals, the camel, the sheep, and the goat. It requires four stomachs to digest grass. Then there is meat. It requires one quite strong stomach, that can make a large quantity of very acid gastric juice, to digest meat, according to Pawlow. It takes a stomach that can disinfect things because the meat is very likely to be decomposed more or less, and it is likely to contain parasites, more or less, -- tapeworm and trichina parasites, and it requires a gastric juice capable of destroying these; and it takes a <sup>dog's</sup> strong stomach for that.

Now we have seven and four stomachs, that makes eleven; and one. Seven whale stomachs, and four goat stomachs, and one dog's stomach, -- twelve.

In addition, we find perhaps at the end, some fruits and nuts. This is the dietary, the food, of the monkey, and he has a stomach adapted to the digestion of fruits and nuts, and a stomach which would make gastric juice not very strongly acid, but with a great



digestive power, because it has very little disinfecting work to do, and it has a good deal of digestive work to do. So the monkey has a stomach exactly adapted to the fruits and nuts. Now, all these things we find on the bill of fare. We find them on an ordinary hotel bill of fare -- all the things that all the animals in the world eat. Everything the whale, and the cow, and the goat, and the dog, eats, even down to the offal, which it would seem ought to be left for the dog--intestines, kidneys, liver, and brains even; and these are spread out on the hotel table.

|   |   |
|---|---|
| There are seven whale stomachs for the fish,  | 7 |
| four cow's stomachs for the grass,  | 4 |
| a dog's stomach for the meat,   | 1 |
| and a monkey, a chimpanzee, stomach for the<br>fruits and nuts which come at the end of the<br>bill of fare | 1 |

13

A man sits down at that table, and undertakes to go through this whole bill of fare, which requires thirteen stomachs; but man has only one puny little stomach, to wrestle with the things that require thirteen stomachs to digest! Is it any wonder that he has stomach trouble, and has to get the doctor to come along, and give him some pig's pepsin, or something else, to help him thro? Only one animal in the world can manage that, and that is the wood chuck; he has fourteen stomachs, and it takes fourteen-stomach-power digestion to deal with the hotel dinner.

We had a lady here a short time ago, from Chicago, and a letter from the doctor came with her. This letter said that she had not any particular disease, but was generally out of sorts, and it said he had sent her up here to get her away from the hotel dinners. This



lady was suffering from dinneritis, hotel dinneritis.

Well, our homes cultivate disease, instead of health, our home habits generate disease instead of health. The other day a man said to me, "Well, doctor, I am getting well now; can't I go home, and keep on getting well?" Here we are, getting well by cultivating health. People get sick only cultivating disease. "Whatsoever a man soweth, that shall he also reap." And if we sow disease, we get disease; and if we sow health, we get health. Here is the Sanitarium --a place where we simply sow for health, and get health. The trouble is, people don't get all the health they ought to, before the harvest time comes. You plant potatoes, and you don't expect to dig up new potatoes the next week, nor the second, nor the third, but you expect to wait four months, You have to wait for the new potatoes to sprout and to seed, and for the little potatoes to form, before the harvest time comes, and there are splendid great potatoes. We see that a good many times. People have tried so many things that they have got in despair, and they come here and stay till they are satisfied.

A man said to me the other day, "Doctor, how long do you think I will have to stay here?" I said, "That question is like asking me ---well, if you were going out West, and you found a gold mine, and you should say to me, 'Doctor, how long will I have to stay here with this gold?'; I should say, 'It depends upon how much gold you want; you can't get it all in a minute, or in a week, or a month, but you will get gold according to your digging, according to the length of time you take. The longer and the harder you dig, the more gold you will get.'" The experience at the Sanitarium is the same thing. It is 'striking oil', if you please, and the longer you work, the more you will get out of it. A thing that is good for to-day is good for to-morrow, and what is good for to-morrow is good for the



next day, It is a great deal better than taking drugs. A cold bath never loses effect, but the drug loses its effect. A cold bath increases its effect. The first time you took a cold bath, you found it was not such a very comfortable thing, and it did not do you so much good. As one increases his power to react, he gets more good out of a cold bath. As one's power to react increases, he can take more cold water, and get more good out of it.

Now, it is true with good food. Good food never gets to be unwholesome. Good bread is always good. Pure air never gets so unwholesome for a man, that he needs bad air for a while. Pure water never gets so stale that it loses its effects: it is always good. So with electricity applied to a muscle. It makes the muscle contract. The healthier a muscle is, gets to be, the more sensitive it becomes to the electricity. It does not become obtuse to it. But the very reverse is true. At first it takes a good deal of current to make it contract, and as it gets better, the greater the current it will take to make it contract. So with all these natural curative forces, that are set in operation in a well-ordered scientific Sanitarium. They increase the power. Their efficiency remains. As the body gets more and more power to react towards them, their power increases it. That is very different from mineral springs, and from drugs, and from narcotics, the effects of which wear out.

There is no end to this thing. I find myself learning something new every week, something that I would not miss for anything, about these wonderful principles of getting health in a natural way.

When you go to your homes, don't think, 'Well, now, I have spent a certain length of time at the Sanitarium, and now I am well, I can go home and enjoy some of the old things again; I can have some more Saratoga chips, and mince pies, and things of that sort. Don't



think any such thing, my friends. Don't go back to the feeding troughs. I tell you, my friends, there is something better. You have come up on a higher level; now live up higher. The only way to keep away from disease, is to live above disease. You will find it will pay. Look around on people to-day. Ask this gentleman, what brought him here. He will probably say, "Oh I worked too hard." Ask this lady, and she will very likely say, "I Got too hard work." Inquire, and you will find that it was not anything that ought to break anyone down. It is not work that breaks so many people down, so much as worry. For work there is a natural cure, and that is sleep. But ~~far~~ worry will do ~~maxs~~ mischief that rest won't often cure. Rest and sleep will cure any mischief that work does. It is worry, not work, that tears down.~~the misssin~~ The fact of the matter is that it is our wrong habits that make us sick, and generally, our wrong eating. At least nine-tenths of all the diseases are due to wrong eating.

A doctor brought his wife here some time ago, and one day she said, "I must go home." I said, "What is the matter?" "Oh," she says, "I can't stand your diet; it is so flat. I have to go home, where I can have something good to eat," and she went, and in about three weeks he brought her back again, and she told me what wonderfully good things she had at home, and did not know whether she could stand this diet. However, she stayed three ~~weeks~~, months, and got well. Some years after, I was in her town, and I had some time to wait at a depot, and I thought I would call at this lady's house and see her. So I went up to her house, and knocked at her door, and the hired girl came, and I asked for Mrs. So-and-so, and she smiled and she said, "She isn't in the house, but she is out in the back-yard. You go round, and you will see her" I went round, and found her at the top of a cherry tree, eating cherries, and she had lips



and cheeks as red and rosy as the cherries, and she came down, and we had a nice little chat, and I said, "Well, I suppose you returned to your heathenish ways of eating?" "Oh, no" she said; "don't say anything about that. When I got home, I wondered how it was ever possible I could have liked such horrible things. Those greasy dishes, and those hot and burning things, --and the first thing I did was to have all those mustard jars, and all those wicked things, taken out in the garden, and we buried them." I said, "And what did your husband say?" "Oh," she says, "I just brought him to it." And so she had, and their children. That reminds me that we are endeavoring to organize our old friends, and those who have been patients here, and have gone away, feeling helped and benefited, by their stay here, --we are endeavoring to organize this multitude of people, into our Reform Association, and to endeavor to get each one interested in this new and better way of living, and to get each one to organize a little group of ten, and we shall send a letter to anybody who will do this, and we want to get into correspondence with them. We propose that every month we will send them a letter of some special instruction, presenting these principles, so that they can introduce them to their neighbors. We will send them instruction about exercise; and we will send instruction about diet; about cookery; and send them the latest recipes; the best things we are getting out of our laboratories here; we will send instruction about dress, that will be adapted to the season of the year; and if the time comes when ladies want to change their patterns, we will send them some things developed in our dress department, and we will endeavor to keep each of these little groups posted in all the progress we are making, and thus extend these principles into every community where we can find receptive minds that will co-operate with us. This movement for health has become a necessity. At the



At the rate we are going down, the human race cannot last more than two hundred years, at the longest. Anyone who studies the question thoroughly will be convinced of that. Increasing is insanity at such a rate that if it keeps going at the rate it has been going for the last fifty years, we shall all be lunatics and imbeciles in 265 years from to-day. In 265 years we will have the whole population ~~idiot~~ idiots and imbeciles ~~and epileptics~~ at the rate we are going down. Consumption is increasing with the same enormous rapidity, and is making terrible strides. Pneumonia is coming like a great tidal wave. Four out of every hundred in every community are sick with pneumonia, every year, and one fifth of them die. That is a terrible thing. And it is increasing at a rapid rate. So it has become a necessity that we should give attention to health and systematic attention to health, and we propose to organize these Schools of Health.

When you go home, then, cultivate health in your homes, and not only do that, but do your best to interest your neighbors in the same thing, and we shall be glad to co-operate with you. Thank you for your attention.

The End.

R.



211

JUNIORS CLASS. DR. KELLOGG.

Feb. 29/04. Obesity.

We found there were some things to be increased in obesity : one was to increase oxidation, oxygenation; hematogenesis; muscular strength; elimination; vital resistance; cardiac energy, and heat elimination. We were talking about some things to decrease. They were the reaction. We were talking about increasing oxidation; first by work. Second, by the hot baths, Third by cold baths. Now, we were talking about exercise, about work; walking on a level.; going up stairs. I think it is important that in every Sanitarium we have roads marked out in regular systematic courses, and that we take elevations, and indicate the amount of work required to walk on that road. The question is, to know how much work a patient does.

The muscles most used in walking are the calf of the leg. In walking exercise, the strength of the calf muscle is the principal thing. You can test the strength of the calf muscle by an ordinary spring balance. Multiply the strength of the calf muscle by 30, and that will be the number of times the patient must lift himself, the number of times he must lift himself a foot high. If a patient has a weak calf, the amount of work to be given would not be as much as if he had a strong calf. You may use ten or twenty or thirty it is arbitrary, but it must be adapted to each patient. A person with a small calf will have a small amount of work to do. The average man's calf is about thirty. Suppose your calf will lift about 350 pounds. You must lift the body 100 times. A person must ascend an elevation of 100 feet. Suppose he walks on a level; that would be 20 times that, or 2,000 or half a mile. That is a good place to start from for feeble folks. Strong people can do more than that. They should work till they have sweat and have gotten out of breath.



breath. Now the way to make out a course for a person to travel on, is this. Suppose this is a level, and here is a little hill, and you go a little farther, and there is another hill. You travel over this course, and survey the altitude of each hill. You have to climb up this hill, but when you come down it don't count. Now sometimes coming back you don't come down so far, so you have to determine the altitude both ways. Of course, if you are on a level, and climb a height, and come back to the same level where you were, all you have to do is to determine the altitude. You add these verticals all together, and then you divide the horizontal distance by 20, and add that to the vertical and that gives the total of foot pounds of work. Get all the vertical ascents together during the trip over a certain course, and then ascertain the actual distance, divide this distance by twenty and add to the vertical.

Put down the distance, add the vertical feet. The vertical distance will be  $1/20$ , which will be 50 plus vertical feet 80. The patient will multiply the vertical feet by his own weight.

Make out an itinerary for the patient, and that shows just what work is done at each station. Put a signboard up at each station, (it is a good plan to have a station at every thousand feet), showing the distance and the number of feet. Then when a patient gets there he knows his weight, and at every station he figures out how much work he has to do. It is important to do this. You can't get people to work systematically, until you get down to simple practical methods, that they can comprehend. It seems as though it takes a man a whole life-time to find out how to do things, and then he has but very little time to do them.

Now the question was raised about going up and down stairs. That is, as to the amount of work you do in going up a flight of stairs ten feet high: in going up those stairs, whether you actually do any more work; whether you actually do any lifting at all in the



horizontal distance you travel. When you are walking ordinarily, you come down. When you rise on the stairs, you put your feet up, and then bring yourself up to them; but you don't come above the stairs

When you raise yourself, on your toe, to go to the next step, you take that into account, and when you figure up the height of the stairs, you have accounted for that. I think you will find that in ascending ten feet of stairs you only travel ten feet vertically. You don't need to take into account anything at all for the horizontal travel. What work you do is simply pushing your feet ahead.

The weight of the leg is sustained from the pelvis, so you only have to swing the leg. You don't have to lift the leg. You simply move it.

Now you say the weather is bad out of doors, and I can't walk.

Now, how can we get the same amount of work in some other way, besides walking? The thing to do, is to do the work. Now here is one important suggestion. A patient has to walk around his house, or in the gymnasium, and he says 'it takes so long to do this work.

I would like to do it in less time.' Alright. Tell him to rise on his feet an inch and a half. Now he is an inch and a half above his ordinary height, as he passes along, advancing, rising on the toe.

Then he comes down, an inch and a half, and that makes 3 inches. When his leg swings up, he comes to the vertical; so in every way he doubles the work. That is the spring step. He could do that in the gymnasium. This is a splendid drill for the cramped muscles, because the calf of the leg, has to lift the entire body weight.

Now the patient gets tired of walking with one step, so you may suggest to him that he change steps. Walking in one manner gets monotonous because you have to lift the body each time. In this way you can double the work, and so it can be done in exactly half the time. So instead of having to walk three hours, he will get the work done in an hour and a half. But he has not the ~~time~~ gymnasium. He only has a bedroom, so what can he do? He can stand still. He can



rise up and down on his toes. It don't matter how fast he does it.

Say an inch and a half every time. If he can rise three inches, an inch and a half would require how many risings to make a foot? Eight just the same as the other. So it takes the same number of heel raisings as you take steps. So the patient must take eight steps. To equal a mile, he will have to raise his body 2,112 times; that is just the same number of steps it would require. Rising on your toes is equivalent to taking a step.

Now how much would a patient do of work in rising himself 2112 times,--how much actual work would he do? How many footpounds of work will he do? Suppose he should raise the heels, and then bend the knees, or he put his hand on the table, and then raised himself up and down. That simply distributes the work between the arms and the legs. He might use a chair, or 2 chairs, and he could transfer the work. The more the work is done by the arms, the less there is for the calves to do. Now suppose we vary that in order to bring every muscle into play. We rise on the heels, and then bend the knees

Now, see how much we can increase very greatly the amount of work given. We can change the work, but when you come to study the rate at which you do it, you find things are about the same.

The spring step is really the best method of shortening the time. You can walk as fast as you can rise on the heels. In the other way, you have to stop and strt. When you take a step, you have to rise on your heel, and you are simply going through the air.

In running, you lift yourself off the earth. There is another factor to come in. You do more work. This raising your body one foot in travelling twenty feet is faster than a three miles an hour gait. When you increase your gait beyond that, you have considerably increased your work., because the amount of work accomplished, increases with the squares of the velocity. So the amount of work



in going four miles an hour would be as 9 is to 16. You can increase the work still more by taking dumb bells in the hands, and so calculate your weight for the weight ~~and~~ of the man plus the dumb-bells. Or you might put some shot-bags on the shoulders, or you can put something on the shoulders and in the hands besides. You can go still further. Suppose I had a couple of dumb bells, each weighing 200 lbs. I rise on my heels, and come down. I have lifted 200 lbs. two feet. Then I come down and then rise again, and now I have lifted 200lbs. two feet, and fifty lbs. one foot. You can increase the work, and make it as much as you like almost.

This illustrates how by very simple means, patients can be made to do work, and a definite amount and an exact amount of work, so that we may know exactly what they have done. Then it is a very easy thing to set exercise such as will enable you to precisely gauge his work. First, walking on the level; second, walking on an ascending grade, such as up and down stairs, or climbing hills; and another is exercise in which his body will be lifted, such as heel-rising, heel raising combined with dumbbells, etc., and with added weights, and combined with arm flexing and carrying weights.

-- -- -- -- --