A U T O - I N T O X I C A T I O N, or

Self- Poisoning.

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Good evening, Ladies and Gentlemen! There are two vital processes constantly going on in our bodies, and the cessation of either one of these processes would produce death,—and immediate death. These two processes we call "anabolism" and "katabolism;" or, to speak of each of these processes in simpler terms, the first processess is synthetic, it is integrating, it is a building-up process; it is a process by which the foods that we take into our bodies are converted into living tissues and living cells. The second process, on the contrary, is just the reverse of the first; it is destructive, analytic, spoliative; it is a breaking-down process, a tearing-down process, a disintegrating process, and by this process, the tissues which have been built up into life are broken down into death. These processes are constantly going on in the body, the more active the processes, within certain limits, the more perfect will be the state of health of the individual.

All the foods taken into the body are by no means taken into the system. Putting food into the stomach does not put it into the blood, neither does putting medicine into the stomach put it into the blood, into the heart, into the nerves or some other part of the body that we intend to treat. The body lives by the food that we eat, and as Bouchard, an eminent French physiologist well says, "nutrition is life." Nourishment is life, because the maintenance of the body by means of nourishment the maintenance of life. These substances that result from the katabolic process, the destructive process, the analytical process, the disintegrating, tearing-down and breaking-down process--every one of these substances is a poisonous substance; all these substances are poisonous to the body, harmful to the body, and consequently it is an advantage to the body that these substances shall

be gotten rid of just as soon as possible. Man stands,as it were,on the brink of an awful precipice,and he would fall over it and go down into the abyss of death were it not for the eliminative organs which are constantly removing from the body the poisonous waste substances that are ever forming through normal tissue activity;and these are forming day and night as long as life lasts. These poisonous wastes are gathered up from all parts of the body,--from every tissue and cell of the body--from the muscles and from the brain and all the tissues of the body--by means of the blood,because the blood circulates everywhere,and it is constantly gathering up these poisonous wastes and carrying them to the aliminative organs--to the lungs,the skin,the intestinal tract,the liver,and last,but by no means the least,the kidneys.

Let us study for a moment the kidney secretion,looking at it from a physiological standpoint: An average healthy business man living in town,weighing from 140 to 150 pounds,will secrete through the kidneys,in about 2 1/2 days,enough poison to kill him,if retained in the body;- so poisonous is the kidney secretion that , to be more exact,in two days and six hours, an average business man of sedentary habits,weighing from 60 to 65 kilograms ,will secrete through his kidneys enough poison to destroy his life if those poisons were retained in the body. This is a fact that can be demonstrated by physiological experiment. The poison in the kidneys is not a single substance: Bouchard has shown as many as seven different substances which are poisonous and are eliminated through the kidneys. It is interesting to note that the kidney secretion formed during the day time is more toxic than that formed during the night time. During rest,there is a quiescent state of the tissues,and hence less poisonous secretion is formed. The reason of this is,that during the night there is less metabolism,or change,--at least that is one of the reasons. It is estimated that the kidney secretion for the day is from two to four times more toxic than the same amount of secretion produced during the night time. But how would it be if this man were to go out into the country and exercise in the

fresh air,engaging in vigorous out-door exercise? We might expect--and the majority of us would expect--that the effect of such exercise would be to increase the toxicity of the kidney secretion; but that is by no means the case. A man living under those conditions--passing a large proportion of his time out of doors in the country, engaging in good hard manual labor will secrete through the kidneys a substance which is one-third,or even less, poisonous than they were when he was living in town and engaged in sedentary occupations.

"But," some one says, "how do you explain that?" This is the explanation,-and it is a very simple one--that ordinarily, in his quiescent life,when ~~he was~~ a man is not earning the bread that he ~~ate~~ eats by physical labor,and ~~was~~ is engaged in holding down a chair at some desk a large part of the day, takes ~~a~~ the street-car and rides home at night and lolls in an arm-chair or rocking-chair--when this is a man's manner of living,the tissue activities of the body are incomplete, metabolism is not perfect, and consequently there ~~are~~ is formed a large number of substances that are not completely oxidized because there is not sufficient oxygen in the body to oxidize them perfectly,and ~~these~~ substances are far more poisonous,far more harmful to the body than are the products of perfect oxidation,--they are more harmful than the poisonous wastes would be if they were formed in the normal way.. On the other hand, the man who goes into the country and engages in good hard honest physical labor out of doors in the fresh air,by his breathing fills his lungs with the breath of heaven,--that man oxidizes the foods that he eats; he earns them and his body gets the benefit of them, and the waste-end products are less poisonous than in the other case which I have supposed.. This is a scientific truth, and the explanation of it is a simple one,and it contains a great lesson for us,viz.,that if we would eat,and at the same time be healthy,we must exercise,--at least to a moderate amount; that physical activity goes hand in hand with mental activity; that if a man wants to have a clear brain,with no cobwebs in it to interfere with its working,he must

perform a moderate amount of physical exercise every day; he must fill his lungs with pure,fresh air so as to to get an abundance of oxygen into his system so that he can oxygenate (that is,burn up) the foods taken into his body,and thus maintain normal life.

But kidney secretion is not the only secretion of the body that is poisonous. Let us look for a moment at the bile,the secretion of the liver: Bouchard says that the bile is six times more poisonous than the kidney secretion; that an average man in health secretes through the liver enough bile in nine hours,or about one-third of a day,to kill him ,if it were retained in the body,--in other words, the bile is six times as poisonous as the kidney secretion. How do we explain that ? Why, the liver is the gate-keeper,or door-keeper of the body; it keeps the gate or door through which the food passes ~~when~~ taken into the system . This f od undergoes a very careful scrutiny by the liver, for the liver, good guardian of the body,stands there and looks all the food over, examines it carefully, selects and picks out every detrimental substance or poisonous substance and says to it, "No further!Contraband goods!" and stops it right there, eliminates it and shuts it off and prevents its entrance into the system. So the liver is a very useful and necessary organ of the body. The stomach and the intestinal tract are oftentimes in a state of debility, ~~when,~~ not in a state of healthy activity, allowing foods ~~to gain an entrance~~ which contain substances that are poisonous and harmful to gain an entrance into the body; at such times it is a common thing that the liver will be in a state of activity so that it will stop the ingress of such foods, holding them back and eliminating the poisonous substances from the foods and then absorbing them; many of these substances are eliminated directly through the liver.

I don't know that I will say anything about the lungs tonight,although I might occupy a long time upon that part of the subject. As you know, a person could not live ten minutes without the use of the lungs; that if a person's breathing were absolutely stopped,he would perish in ten minutes--not so much from the loss of

hydrogen,--not because he is not breathing oxygen, but principally because of the heaping up of poisons to such a degree as would soon produce death.

Let us pass down to the alimentary tract;to the stomach and to the intestinal organs which have such important functions to perform in the preparation of food for the body. The sources of toxicity here, are three : (1.) Through the food that we eat; we may eat impure and poisonous food; (2.) Through a perversion of the digestive functions,so that fermentative and putrefactive processes may and do take place in the alimentary canal ; (3.) Through the excretion of the bile from the liver into the intestinal tract.

Let us note,just for a few moments, the second of these sources of contamination: . Normal digestion presupposes the preparation of food in such a way that it can be taken into the body and can be assimilated,as we say, enter the portal system and be carried to the liver,leaving in the intestinal tract merely the debris of the digestible food,--by the way, that would be an ideal,or normal digestion. But is that what always takes place? Such is the process that ought to take place , but unfortunately it is a process that rarely takes place. Now nature has made a very careful preparation, a very careful arrangement in these organs so that there will be no chance of contaminating this all-important digestive organ,because right here in the stomach we have secreted a juice that destroys infection, that inhibits or prevents fermentation and stops putrefaction,--and that is the gastric juice. It has been found by laboratory experiments that if we have a solution of less than one per cent.of 1.1 grams of hydrochloric acid to 1000 c.c.of water (that would be about a quart of water), that that solution is strong enough to stop fermentation. In other words, fermentation would not take place in a solution of hydrochloric acid of that strength; but that is a great deal weaker than normal digestive juice. I shall show you in a moment that normal digestive juice always contains an acid--a free mineral acid --what we call hydrochloric acid and normally,in amount equivalent to from 2 1/2 ~~quarts~~

grams up to even five grams to the quart. So you can see that that is at least double as strong as would be necessary to inhibit and prevent fermentation;and when the stomach is in a healthy condition, a gastric juice is formed with free hydrochloric acid which inhibits or prevents,within certain limits,putrefaction and fermentation.

It is impossible to take food without swallowing a smaller or larger number of germs,--I am not speaking particularly of pathogenic germs now, but also of non-pathogenic germs,which are constantly found in varying quantity in the mouth.and are floating about in the air. The healthy man does not escape the ravagesof germs; he is meeting them all the time, but he escapes their ravages because he is so strong and healthy that he is not attractive to germs; there is no attraction ~~in this~~ for germs when they come in contact with a healthy living substance; bacteria cannot make a nidus there,they cannot stop there and grow; they perish there,and are destroyed. So every man and woman ought to be so healthy and vigorous and strong that he will resist the action of germs. If,every time we came in contact with germs,we would contract disease or become infected thereby, we would all of us be having typhoid fever,diphtheria, small-pox or some other germ-disease continually, because we are meeting these germs all the time,--we would all have tyberculosis also,for tubercle bacilli are constantly in the air in greater or less numbers, especially in the summer-time, when the germ-laden dust of the street is sent in every direction, even into every room of our houses, by the wind. But the man in health is able to resist the action of germs,destroy them and maintain his existence in spite of them. But when one's physical health and vigor and vitality have been lowered through exposure, mal-nutrition or some other cause, he is unable to resist the action of germs, and then they find in him a very hospitable host, they get a foothold, in the stomach ~~there~~ and live and grow at the expense of their host,and produce their deleterious effects which develop into some disease or other. So nature has placed a secretion in the stomach which,under ordinary ordinary ~~com~~-

normal conditions is able to destroy the germs that are taken into the system.

I hold in my left hand a test-tube containing a solution of gastric juice,which,if you please, we will call normal: it is pure gastric juice which was taken from the Laboratory to-day. Here I have a piece of red paper,--you can see the portion which is still red; the other end has been dipped in the juice; this is what is called "Congo red" paper. Just as soon as this red paper touches any fluid that contains a free acid,it is at once changed to a characteristic blue color,--there you see the blue color. Here you see I have another fluid which is also a pure solution of gastric juice taken from the Laboratory to-day. This fluid is by no means healthy,-- it is what we call "extreme hypopepsia," where there is no free hydrochloric acid at all. In that condition of the gastric juice you see there is nothing which is capable of inhibiting fermentation; fermentation can take place abundantly and germs can multiply in abundance and form large colonies and thrive in such a fluid.

I might make other tests to show that this specimen contains free hydrochloric acid. Now it is the presence of free hydrochloric acid in ~~this juice~~ the digestive juice that destroys germs,because the free hydrochloric acid is an antiseptic . So you see nature has provided,in the stomach, a natural antiseptic in the normal digestive juice, for normal gastric juice ought to contain,and does contain an abundance of this free hydrochloric acid,--such an abundance of it that it can inhibit and prevent fermentative processes. But many times free hydrochloric acid is lacking in the digestive fluid; it is frequently either entirely absent or is much diminished,or if that be not the case,there are other ingredients or factors in good digestion wanting,--for instance,there is a lack of motility of the digestive organs; they are weakened by disease, or they are prolapsed or pulled down. Can we expect normal digestion in such a condition? It would be unreasonable to expect normal,healthy digestion with the digestive organs in that condition. So we find,when that condition exists, that digestion is not normal;that it is a

perverted digestion; that the processes which are going on under this condition are perverted processes,and consequently that the products of digestion are not perfect or normal. This forms a large source of contamination of the body, and there are produced many substances, a long list of names of which I might give, of substances that when taken into the system irritate the nerves wherever they come in contact with them; they clog the blood, and they overwork the and overtax the liver and other organs,of elimination,and produce disease. These substances are constantly being taken into the system in a state of ill healthgin a state of disease--when the digestive organs are not healt y.

While the system is in this condition,suppose we take just one step farther and pass from the stomach into the intestinal tract where the largest part of absorption takes place,and where the largest part of digestion takes place: In the first place the food which comes there has not been properly predigested by the stomach fluids, and digestion must proceed slowly,and you see this must be the case,if the stomach is out of order,if it is dilated or prolapsed,or there is a deficiency of hydrochloric acid or some other factors of digestion. But there is something else that takes place: The small intestine is not provided with the acid which would stop fermentative and putrefactive processes; so we find in the intestinal tract a large number of these putrafactive processes almost constantly taking place,--so much so,that until just a few years ago it was stated by eminent physiologists that microbes are necessary to intestinal digestion,--that normal digestion of food in the intestinal tract would include the action of bacteria. While,right on the face of it, that theory could not be physiological,it has been demonstrated more recently,that such is not the case. The reason why that erroneous conclusion was drawn was because almost every one,even in a state of apparent health,does have a larger or smaller number of microbes in the intestinal tract where they are producing their deleterious effects upon the food which they find

there,,leading to putrefaction and to another condition,which,unfortunately is a common condition, viz.,constipation, and that means that there has been ~~absorption~~ an absorption into the system of a large number of poisonous substances which are due to putrefaction. And what else takes place ? The poisonous substances that are all the time being formed there in a state of indigestion, especially if there is catarrh or some allied trouble present. Now the system has plenty of work to do to begin with: It is already forming its own poisons,and it has plenty of work to do to take care of its own tissue-poisons which are constantly forming. But if we add to these the poisons formed in the intestinal tract,then you see, very soon there will be a chance for the eliminative organs to break down, as well as for the digestive organs to give out, and a chance for the liver to become torpid, and then we may have what we call "auto-intoxication," which means self-intoxication; for self-intoxication, as the term is usually understood,means a poisoning of the system from the absorption of poisons formed by a perverted digestion. Absorption into the system of poisons formed in the alimentary canal is self-poisoning. The average healthy body is well able to take care of the poisons formed by tissue-wastes and in the blood; for even in the healthy man,the blood is, to a great extent, poisonous, although,of course,it is much less poisonous than the kidney and liver secretions. But Bouchard makes the statement that if the toxicity of the blood were increased tenfold,it would produce instantaneous death. It is true that the blood is poisonous to a certain extent, and the reason of that is because it must necessarily gather up all the poisonous wastes of the body and carry them to the eliminative organs in order that they may be gotten rid of .

You can readily see that all the poisonous wastes formed in the intestinal canal will be added to the tissue -wastes already formed, and if there is a large amount of poisonous material taken into the system,the poisons of which are to be added to the natural tissue -wastes,there will be a disturbance of digestion which leads

to depression,irritation,bad temper, a feeling of lassitude and weakness and a feeling of general malaise; these feelings accompany the condition of auto-intoxication and lead to fainting-spells,--the man weakens and wilts down easily,because he is poisoned. This condition interferes with the activity of the brain,so that the brain is cloudy; it produces headaches,--~~xxxxxx~~ fierce headaches--and frontal headaches. We say these things are due to digestive disturbances indirectly,but they are directly due to poisons taken into the system.

Now let us look for a moment at the food that we eat. One source of contamination of the intestinal tract ,as I have stated, is found in the food eaten. Many experimenters have made investigations along this line,so that we can speak from scientific data and from a scientific foundation. Certain foods are pure and contain substances which build up the body,and do not irritate it or poison it at all. These substances which are easily digested,--that is,which are digested with comparative ease--when taken into the system make healthy muscles,strong nerves and tissues and good blood. On the other hand,there are foods which are impure or poisonous,and they contain substances which are going to irritate and poison the system when taken into it; and even though the digestion of such foods should be perfect,and the individual may be in apparent health,and the digestive function be well performed,yet,if impure foods are eaten,it is possible for them to contaminate the blood and the whole system.

I have not time to go into the detail of all these poisonous foods,but I wish to speak particularly of one class of foods that are poisonous,--and that is ~~the~~ animal foods, including butter, cheese, milk, ice-cream, etc.. Just now a statement comes to my mind that you will find in a work entitled ""Ptomaines and Leucomaines" by Professors Vaughn and Nova,of the University of Michigan,-that a German ~~professor~~ investigator by the name of Körner had tabulated a statement to the effect that of 75 cases of sausage -

poisoning,36 proved fatal. But that is not very strange,because we know that in the making of sausage it is very easy to use the "left-overs" of meat,cheese and milk. A very interesting case happened down near Ann Arbor,some seven or eight years ago,where a family of three,consisting of a man, his wife, and daughter,were taken sick, one after the other. They called upon their home physician,and he did all he could for them,but he had not made a special study of contaminations and their effects, and his patients did not recover. Dr. Vaughn was finally called in,and he found the whole family confined to their beds and very much prostrated. Dr.Vaughn then made an investigation as to their diet and mode of living: he found that they were living on a simple diet,--breads,fruits and milk. They had four cows and a lot; they were a poor family and depended largely upon their cows and lot for their living. They used little or no flesh-foods,practically none. Dr. Vaughn thought the trouble might be due to tyrotoxicon poisoning, this class of poisoning sometimes occurring from the use of milk. He took a specimen of this milk to the laboratory, examined it,and injected the guinea-pigs and the rabbits with it; but they all took to it kindly;it didn't seem to do them any harm at all,--in fact they seemed to thrive on it. Dr. Vaughn then went back to the house of this family and made another examination. While examining the pantry,or "buttery" where they kept their food,he noticed an unpleasant odor there. He then had the pantry floor taken up,and found that by scrubbing the old floor to keep it clean,~~and~~ during a long period, it had rotted to such an extent that another floor was laid over it, so there were two floors in the pantry. As soon as the most recently placed floor had been taken up, the odor became so strong that one of the workmen was nauseated by it . Then Dr. Vaughn made another experiment with this milk: He put some of it in the pantry after the last-laid floor had been taken up,and left it there over night. In the morning he took it to the Labo-

-ratory and injected the guinea-pigs with it,and they didn't thrive on it any longer; it didn't take but a small portion of this milk to poison them and kill them,and the doctor was soon able to isolate the poison,which was found to be tyrotoxicon. I mention this incident to show you how easily milk is contaminated. Bread might have been left in that pantry for a week without being contaminated. You know how easily milk will take the bad odors and bad taste of substances around it. If you keep milk in a refrigerator, for instance, and put other things there which become rancid or putrid milk soon acquires the same flavor and oder,--you notice it at once.

Animal foods, as a class, are poisonous foods. Flesh foods are poisonous foods because they always contain a larger or smaller amount of the tissue wastes of which I have spoken; these wastes are always poisonous. And you cannot get flesh foods that are absolutely free from these wastes. "Extract of Meat" or meat-broth,so far as the poisons contained in it are concerned,is practically identical with the secretions of the kidneys, the same substances being found in the "Meat Extract" as are found in the kidney secretions; meat produces the very poisons which are excreted by the kidneys,--and is it any wonder that we find them there ? They are always present in flesh foods in varying quantity, ~~adding~~ and when flesh-foods are eateh, these poisons, as I have already remarked, are added to the natural tissue wastes of the body ,overworking and breaking down the digestive organs as well as the organs of elimination.

Pure foods are found in the Vegetable Kingdom; they consist of the fruits, the grains and the nuts,and as they contain no poison they cannot poison the body. We don't get trichiniae from eating bread; it is only obtained by eating flesh food, as raw pork,or raw meat. A man takes trichiniae from eating raw pork,and dies. Rats come to the cemetery where he is buried and feed upon the corpse,for he is a scavenger. Then a hog comes along,and as he is a scavenger,he eats the rat. Then a man comes along and kills

the hog and eats him,--the man is a scavenger--they are all scavengers. (Laughter.) So men and women are willing to sit down at the table and feed upon a corpse and make cemeteries of their stomachs, just for the purpose of ministering to this palate and tongue, which standing at the opening of the alimentary canal to determine to a large extent the amount and kind and quality of the food that should be taken into the stomach,--all is determined by the taste, while the stomach is left entirely out of the question. And so it goes in other things: People are more willing to kneel at the feet of fashion than they are to have health and strength. But those who minister to custom and fashion and appetite cannot escape the results of such a mode of living. Those who eat fresh foods, wear corsets, conforming to fashion, offer themselves to this Moloch,--and not only themselves but their offspring. When we read in Bible history that ignorant heathen women offered their innocent babes to the god Moloch where they suffered an immediate and agonizing death, we think it was a most horrible thing to do,--and it was ; but we do far worse, because by our manner of living we bequeath to our offspring shattered nerves, a broken down system, and a short but miserable existence. But "Fashion, fashion! What says the fashion?" And when it comes to eating, it is the palate that must determine everything,--not what is good for the man, but what he likes; not what will build up the body in all its parts,--good strong nerves, vigorous muscles, etc, but what will minister to the palate, and thus we "live to eat, instead of "eating to live."

Pure foods, as I have said, are found in the Vegetable Kingdom, and when we recommend to the man who has hypopepsia, fruits, toasted breads and nut-foods, we recommend to him not only the purest food, but the best ~~xxxxxxxxxxxxxxxxxxxxxx~~ food that he can possibly eat, because it is the most nourishing and the most easily digested of all foods. That is the food that he can get the most benefit from, because it is food that will build him up. And if that food is good for the sick man, it is good for the well man, because it will keep him well.

Foods need to be cooked, and I have some experiments here for the purpose of showing that. If foods are not properly cooked, they cannot be well digested. Suppose we compare this green banana with this ripe one: Let us take a piece of this ripe banana and a piece of this green banana and try and determine why it is not a good thing to eat raw green fruit, or why it is that the little boy who eats green apples gets sick and gets sympathy,--and it should be explained to him what is the cause of his trouble. Ripe bananas are most excellent food,--in fact, chemical analysis shows that the ripe banana is fully as nutritious as beef; it contains 26 per cent. of nutrition, while lean beef contains about 20 per cent. nutrition. (Experimenting on ripe banana.) I am making a test here for sugar,--and it requires only an instant to make it: I take a piece of this ripe banana, and when I put in a little of Fehling's solution, which is the test for sugar: if there is any sugar present, this piece of banana will be red,--we shall have a little red precipitate; you see it is red. Applying the same test to the piece of unripe banana we find that there is no sugar present,--or, at any rate, not the slightest trace of it. But when we boil this piece, it is red, so we see that there is an abundance of sugar present; if we had boiled it longer, it would have been very red. This experiment teaches us that the ripening process of fruit is akin to the process of cooking it; it changes insoluble starch into soluble sugar,--first changing it into dextrin and then into sugar. So the well-cooked food that we eat, is, to a large extent predigested. This is the reason why the majority of people, whether in health, in sickness or disease, take kindly to fruits and can digest them, when perhaps they cannot digest anything else. (Experimenting.) This shows more distinctly than before; this has now been boiled as long as the other, and you see that there is a marked contrast between the two.

The blue appearance of the unripe banana,when tested with Lugol's solution,indicates the presence of starch, but, when boiled and tested as before,there is a red precipitate,showing the presence of sugar in abundance .

Now I am going to have my assistant make some experiments with the apple: We have here a ripe,raw apple, also a baked apple. We are going to show,if we can,whether or not baking the apple makes it more digestible than when raw: If this test proves successful we will get a better test for sugar in the baked apple than in the ripe apple, showing that in the ripening process not all the starch is changed into sugar, but that baking helps that process along,so that the baked apple is usually more easily digested than the raw apple. (Applying tests.) The experiment is successful,and you see the result is as I have stated it. I don't know of anything that is more wholesome dor a sick man than a Tallman sweet baked apple; it makes a wholesome and also a very appetizing and palatable food. We also have here two specimens- different kinds-of bread: later on, I will show you an experiment with them,and show you the effect of baking.

In order to prevent auto-intoxication we must have pure food. That is the reason why I took pains to show you some pure food the other evening,--and why are they pure ? Because they contain no detrimental substances: They do not contain uric acid,urine,xanthin, indol or other poisonous substances which are found in greater or less abundance in flesh-foods,especially in beef. These substances are not found in milk. Milk is perhaps the least objectionable of all the animal foods. But flesh-foods do contain these substances in varying quantity,consequently a person who has indigestion,or who has not perfect digestion should entirely avoid such foods. I might call attention to another fact,which is true of all flesh-foods as well as of plants, and that is, that just as soon as a living thing dies it begins to decay. This is a matter of common observation, whether of animals or plants;and it is just as true of an ox or a sheep

that is killed as it is of a plant or other living thing that dies: Just as soon as death comes to the animal,decay and putrefaction begin: and so, flesh-foods contain,not only the poisonous substances formed in the animal during life,but also containg putrid substances which are intensely poisonous. But,strange to say,the more abundant these putrid substances are in the animal that has been killed, the more valuable is the flesh-food considered to be. So the butcher takes the carcase and hangs it up to decay and putrefy so that the flesh will be considered a little more palatable,--I was going to say "i--itable," for that is what it is: it is highly stimulating,--and that is what is desired. Beef is sometimes hung up and kept until it possesses a peculiar,characteristic green mould,and then it is said to be "ripe" and ready for food. During this process of putrefaction,germs are at work,--in fact you cannot have decay without the action of germs; so you will find an abundance of germs at work upon the carcase; they produce a sort of liquefactive process ,so that when flesh has been kept for some time--until it is nicely "ripened"- it is always more tender than fresh beef:it then has more of the stimulating property,and consequently is preferred to fresh beef.

I have here a raw apple: it is a fair representative,although rather under size. I have two test-tubes,--the one in my left hand containing a portion of the raw apple,and the one in my right hand containing a portion of baked apple; it has not been held in the flame very long,but even now you can see a marked difference between the two,--the one is a brighter red than the other; both contain sugar,and the only question is,which contains the most? There is not a very great distinction between the two--and you would not expect it, for they both contain sugar; but if the experiment is properly made,the dead baked apple will show the presence of sugar more distinctly than will the raw apple.

I am now having my assistant make some preparations for testing ordinary bread. I have here a piece of aerated bread,also a piece of granose,and will try and explain scientifically why granose is preferable to ordinary soft bread. We will not now take time to make experiments with zwieback, as I will explain that in connection with the other experiments.

The cooking of food changes the insoluble starch into soluble starch; and if that cooking is carried still further along, it changes it into the sugar called dextrin,--in other words, the cooking of food renders it more easily digestible; the system gets it with less labor in that condition --and that is why the food is cooked; that is why it is properly prepared by cooking,--and it takes some time for the cooking process to be complete. In baking bread in the oven the starch is changed from insoluble to soluble food,and the part found in the periphery or crust of the loaf is changed into dextrin, hence the crust is sweeter than the pulp within the loaf. Now ,if you take a slice of that bread and bake it in the oven,you will find that the twice-baked bread,or "zwieback" as we call it--is more digestible than the fresh bread, and it is so, simply because it has been partially predigested,--two or three of the stages of digestion have already been completed--so there is less work required of the digestive organs in order that the body may be nourished by this toasted bread. ~~If we examine,~~ If we examine all three of these specimens,we shall find that ~~the~~ granose is digested more easily than ~~the~~ zwieback,and that zwieback is more easily digested than ordinary bread.

"But what has all this got to do with auto-intoxication?" Just this : that one of the causes of auto-intoxication is the taking into the system of impure foods and foods difficult of digestion, causing a perverted digestion,and that in the process of such digestion a large number of poisonous substances will be formed and absorbed into the system,poisoning the body and overloading the eliminative organs. You have all doubtless heard of uraemic poisoning--where the poisonous portion of the kidney secretion is held in the body. Uraemic

poisoning is a very fatal disease. In this disease the secretions found in the kidneys are,strange to say,non-poisonous--and yet it is not strange at all,the poisonous portion of the secretion being held in the body. So that what really takes place in uraemic poisoning is the heaping up in the body of all the poisonous wastes formed in the body,and which should be excreted through the kidneys,--the substances in solution,which are poisonous--and when these are held in the body it does not take many hours to poison the whole system. That is why it is only a question of hours as to whether this disease can be cured,because, as I have said, a man can excrete through his kidneys in less than 2 1/2 days enough poison to destroy his life if that poison were retained in the body.

I have here a solution of ordinary bread,and in this little vial I have a solution of granose; I will make a test for starch in each of them,using Lugol's solution,which is a test for starch,and which gives a blue color when starch is present. (Applying test to bread). Now you can all see a bluish tinge here,showing the presence of starch. (Applying test to granose.) Here you can scarcely see any bluish tinge at all,showing that in the granose the starch has been changed into dextrin,one of the sugars,whereas,in ordinary bread,only a part of the starch has been changed,a considerable part of the starch being present. This experiment shows very clearly that the process of cooking changes starch into sugar. If I were to go further,and test these solutions with saliva,we would find that the same principle applied,--that bread requires a longer time for digestion than granose,--in fact experiments show that as soon as a little of this solution of granose comes in contact with the saliva,it is almost immediately digested,whereas the solution of bread when brought in contact with the saliva would require a longer time for digestion.

ADDRESS TO MEDICAL-CLASS STUDENTS, Feb. 15, 1900.

Complications and Treatment .

J.H. Kellogg, M.D.

---X---

Pleurisy.	Capillary Bronchitis
Heating compress,	Hot blanket pack,
Hot fomentation,	Cold friction,
Revulsive compress,	Full-chest compress.
Alternating compress.	

This morning we are to consider complications; we will begin with the lungs. (Writing complications etc. on blackboard.) What is the order in which you use these applications,--what is the first thing? ("For relief of pain.") Yes; and you want to limit the inflamation as well as the pain. ("Fomentation over the seat of the pain.") How does the fomentation relieve the pain? By removing the internal congestion. What does it produce? Collateral hyperaemia in the skin, and that produces a relative anaemia of the pleuritic surface. What would you use, as the next in order? ("Revulsive compress.") How long would you use hot fomentation? ("Half an hour at a time .") What would you do when you got through? ("Use friction.") What would you be likely to be doing about the same time, if you had a case of pneumonia? ("Putting on cold compresses.") Would you be doing that continuously ? ("Yes.") After the hot fomentation, you would put on the cold compress,--that would make a revulsive compress of it, wouldn't it?--so if you wanted to get the greatest possible effect, you would apply the hot fomentation about five to ten minutes, then the cold cloth, and so on, renewing the effect of the fomentation. ("I think the hot and cold would be good.")

Then the revulsive compress takes the place of the fomentation,--it would be a fomentation interrupted every five to ten minutes,--with a short cold application,long enough to prepare the skin for a more intensified fomentation; then what would be another effect,the cold compress being applied for a short time at intervals ? ("It would have a reflex effect; there would be a contraction of the peripheral vessels first,and then there would be a reaction.") It would produce a reflex contraction of the vessels of the pleura? ("Yes.") But if, instead of allowing the cold compress to remain, we make a hot application for the analgesic effect,--we want to relieve pain,so,if we would get the maximum effect for the relief of pain after prolonging the cold applications and shortening the hot applications for the purpose of reducing leucocytosis and deeply seated poisons in the lung, we allow the cold compress to warm up and apply the fomentation only at intervals of an hour or two, But when there is intense pain, we want oto get the greatest possible effect so as to relieve it, so we apply a fomentation for five to ten minutes,then a very short cold application ; the most intense effect would be produced by applying a fomentation three to five minutes,then a cold application fifteen to twenty seconds,very cold, and the fomentation may be very hot; then the revulsive compress might be put on first, the hot fomentation next,and the heating compress--why will we use that ? ("I think it would aid in the absorption of exudate .") Yes,--but that is later on; we don't always have exudate in pleurisy; it would be a little later in the disease that we would want the heating compress,--anything else?--How about the alternating compress--wouldn't that be a good thing to stimulate absorption? ("Yes.") The alternating compress followed by the heating-compress is the best thing to

produce absorption,so we will put down the "Alternating compress." This is to be followed by what? ("The heating compress.")

Q. In that case you just apply one heating compress after the alternating compress?

A. Yes; apply a cold compress and have it in place; but th that we could not do if we were still treating pneumonia; that would be only later,after the exudate is relieved; we don't expect to get absorption of exudate in less than two or three days.

We have other complications,--we have Bright's disease,diabetes ,complications in the lungs, etc.; we haven't got through with them; but there is a very common complication in pneumonia,especially in children,--what is it ? ("Capillary bronchitis. ") Yes, that is a serious complication,--I will write that down. What is is the differential point? ("It is bilateral; it occupies the whole lung .") Increased cough and increased dyspnoea, and the temperature would rise ,--what would you do? ("I think hot fomentations would be good, also the alternating compress.") Is capillary bronchitis an extension of the very condition which we always have in pneumonie ? ("Yes.") We simply have an infection here,--the fluids of the lungs become infested . Are there specific bacteria present? ~~("Yes.")~~ ("No.") But the resistance of the parts is lowered to such a degree that germs get in and infections occur,--now what is the important thing to do? ("Use the compress.") Yes,the cold and the hot . Would you apply it to only part of the lung ? ("I would cover the whole lung.") Would you make it go clear around? ("I would make it go as far as possible.") Since the whole lung is involved,is there any reason why we should neglect any portion of it ? ("No.") Then you think you would have the bandage go clear around and come up under the arms? ("Yes.") Yes,it should come up over the shoulder .

It should come clear over the whole top of the lung,--any further suggestions?(" A triangular chest-compress.")- Yes--and I think there is a still better compress which occurred to me a few months ago: it is a little plain strip of cloth long enough to go once and a half around the body; have a flannel arranged like this,only larger; place this bandage under the patient, and this comes up just under the arm- this represents the way it will come (illustrating by diagram.) The bandage is brought across the chest; these points are folded over; bring this up and make a turn,and then it passes over the shoulder beautifully; make a triangular turn on the top and the bandage turns across like a vest; it makes a turn over the top of the shoulder,then the bandage down across the chest,the other bandage crossing this way,and then the lateral flaps go right across,--first one and then the other,and then you pin it up to the top on each side.That is very simple, and your flannel bandage is applied in the same way; that is the way we do it in the Surgical Ward; it is very handy for a feeble patient,and when you want to renew it,it can be easily done,--just unwrap your bandage and leave your flannel cloth in place--turn the patient on one side and roll the bandage under; then turn him back and pull it out. This compress should cover the entire lung;and if you have bronchitis to deal with,you must be sure to influence the entire lung, and the tops of the shoulders are an important reflex area in relation with the lungs--can any one guess why? ("Because they are close to the surface .") They are are near the air and more exposed,--like the palms of the hands and the soles of the feet--having a more powerful reflex surface than other surfaces of the body. Suppose the brain is overheated and want to cool it,--the first thing you do is to cool your face--what part of

do you cool the most? ("The eyes.") Yes ,because they present a very powerful reflex surface, the face is exposed continually and the circulation is developed more,so we cool the face and eyes. It is exactly so with the top of the lungs. The shoulders are most exposed, especially at night,so the circulation of the tops of the shoulders becomes more developed than other parts and they have a much more powerful reflex surface than other parts. Now if the tops of the shoulders are allowed to chill in pneumonia,--that is,if there is a slow evaporation taking place,will that produce pernicious effects ? ("Yes.") That is one way in which hydriatic applications kill patients--by the feathers, pillows, etc.getting wet so that there is evaporation and a reflex effect--a slow evaporation upon the lung will do the patient more harm than the treatment will do good. So it is a matter of great importance that the lungs shall be so thoroughly protected that they will never be chilled.

Q. Would you remove this compress every three to five minutes,exposing the chest? It seems to me it would expose the patient a good deal to take this off as often as that .

A. When you are using the compress very frequently, the best way is to have a compress laid as I showed you the other day--a towel split so that one part will come up on one side and the pother part on the other side; split it enough to go over the arm, and come to the two sides; then the flannel compress will cover it; this slit is drawn up about half the distance of the compress; it should be two or three thicknesses,--this arm is put in the slit,and then one leg is put on one side and the other on the other and the two sides put together,and then the bandage brought round will bring the compress together. Now I will show you how to protect the top of the lungs: As we have no couch we will use those two chairs ,if some one

will get onto them. (Student comes forward.) This is a flannel blanket,and is laid over the pillow; lay the patient's head up over the edge of it,and then bring this right down in this way;let the blanket come down this side, and down on that side,and then bring the sheet around the neck in this way,and then the bed covers come right over it--that covers the shoulders,and that is the only way,because the patient is wriggling around and exposing the shoulders, and there is a gape in there and the heated air comes down here to work out. Then you put it over here,and then bring the cover right over the pillow. This never occurred to me till a few months ago. A flannel blanket is a good thing folded once and bring the edge down into the tops of the shoulders,and then it works up into the neck,then bring it down on each side. Try that when you get hone and see how handsomely it works.

Now for capillary bronchitis, and how to prevent it : By taking care of the patient; take care that there is no exposure of the shoulders, for there are the tips of the lungs;there is much congestion of the lungs from exposure of the tops of the lungs,especially if there is a wrong use of water,--a wrong use of water is worse than it would be to let the patient entirely alone.This is a very grave disease, and the haphazard use of water will do great harm.. Water is a two-edged sword, and may cut off the patient's head if not rightly used . Now what would be a master-stroke for capillary bronchitis. ("A hot bath.") Suppose we have capillary bronchitis in spite of all our treatment thus far,--we must do something more--the patient's life is in our hands. ("Cold would give derivative effect, and leg pack might be given.") Suppose you made the leg-pack come clear up to the patient's neck,and made an arm-

pack too,--what would it be ? ("A hot-blanket pack.") Yes, and the effect would to to fill the skin with blood,--and we can get half or two-thirds of the blood in the body into the skin. We always give a patient with acute congestion of the lungs a hot bath. We must do the same thing with cases of capillary bronchitis that we do for pneumonia--we must relieve the congestion of the lungs,--and how? ("By draining the blood into the skin."). Now the important thing is to get the patient out of the hot-blanket pack without getting him into a worse condition than he was in before. We would put him to bed and let him evaporate. I once heard a doctor tell a nurse that if a patient had pneumonia ,to sponge him off with hot water, and then allow him to evaporate. The nurse put on ice after the sponge and the patient became delirious,--and why?("Internal congestion.") Why would that evaporation do harm? ("Because of the slow cooling.") Yes,the slow cooling of the skin caused contraction of the blood-vessels. Suppose you took a hot bath and got out of the warm air of the bath-room and didn(t get a cold application right away,--how soon would you get a chill? ("As soon as the cool air strikes you.") Yes; that slow cooling of the skin is the most dangerous thing that can happen to any one either sick or well. A strong and healthy man works out of doors and perspires and then sits down on a stone or under a tree and slowly evaporates for a little while,and what is the effect ? He takes cold and gets pneumonia,--he takes cold on a hot summer day; did you ever hear of anybody's taking cold in August ? ("Yes.") That is because of the slow cooling of the skin-and why? Because the cold application thus produced is so slow and gradual that a good reaction is not produced; for a good reaction we must have an intense expression,but the application is so

slow that the system is not excited to make a tremendous effort to set in motion those processes by which we have reaction produced; it is the insidious cooling by which the heat of the skin is gradually stolen away, so that the temperature sense is so gradually lowered the impression necessary to make a reaction is not produced. So we use a graduated bath in our family: it is preferable to the cold bath, because the cold bath does not cause heat production; when the surface is being chilled, it is important that there should be increased heat-production; when there is heat-loss there must be increased heat-production to go with it. Whenever there is increased elimination there must always be increased heat-producetion, otherwise the temperature would fall too fast, so nature has so arranged it that everything that will increases heat elimination increases heat production. What we aim to do is to keep these things balanced,--if there is increased heat-elimination there must be increased heat-production--they must go together,--and the same things that we do to produce heat elimination increase heat-production; what we aim to do, when the patient has too high a temperature, is to balance these processes—heat-production and heat-elimination—so that the heat will be eliminated as fast as it is formed.

But we have not yet decided what we can do with this patient after we get him out of the hot blanket-pack,--and this is a very important matter. ("A cold application.") Yes, after the hot application, even in case of intense internal congestion you can apply ice-water,--and the feebler the patient is, the colder the water should be, the less the amount of water and the shorter the application.--how long would you rub the arm? ("Until it is red.") But wouldn't it be already red after the hot-blanket pack? ("it ~~would~~ should be rubbed until it was a bright arterial red.") How long would

would you continue the rubbing? ("About half a minute .") A half-minute is a good while in such a case, as you can see by testing it with the stop-watch. (Experimenting with class.) A half minute,you see is a long time,--and a minute,in hydrotherapy,is a very long time; that is a very practical point; when, for example, we say the patient must have a prolonged cold douche, that doew not mean more than a minute; and when we say "a short cold douche" that means from two to four seconds, and a moderately short cold douche is ten to fifteen seconds. Now I will show you how to reckon time,-- you can't tell anything about it by guessing at it : Just remember how the old clock tick-ticks; you see the "regulator" in jewellers' stores-- it goes "One- two- three-- " etc.,beating seconds, and you can count seconds in that way. ("I might feel my pulse.") But your pulse might go up, although the heart usually beats once a second; but the best way is to remember the swing of the pendulum and the slow,deliberate ticking of the old clock; practice that a few times and then you can count seconds,and if you want a certain number of seconds you can count them; you can tell your nurses that,--that is a very useful thing to know. When you are carrying on nurses' schools in the center of Africa or some other country, you can show them how to count time in this way. Remember that in hydrotherapy minutes are very long,--so how long would you apply friction to the arm or any other part?("About five seconds.") From three to five seconds.

Now there are two arms,the front-trunk, the back trunk,etc.,six areas--how long will it take for all of them? ("About twenty seconds.") Yes; that is about half a minute, and from forty to sixty seconds should be sufficient for the whole body; you must work fast. And the patient must be covered all the time with a warm woolen blanket. ("That takes time.") Yes, time is taken in moving things around, and the patient is evaporating and getting chilled all the time,

and the most desirable thing in such a case would be,after a hot full-bath, as the patient rises up,to douse a pail of cold water over him on one side and another on the other side(about 60°) and after that wrap him up and you will get a good reaction; the pailfulls of eater would occupy only about five seconds; cool off after a hot-blanket pack with cold friction,--apply it rapidly, The patient would be chilled if the vapor should creep out from the blanket; you must be sure that the blanket is tucked up close, especially around the neck,otherwise the vapor would creep down his spine and chill him--is not that where it usually begins? ("Yes.") He may soon begin to shiver;if this takes place, we produce the very thing we undertook to prevent . If the patient shivers just after the application,the whole thing is undone,--the patient has had no benefit from the application; so the patient must not shiver; he must have a shawl,or something which will take its place pulled down over the pillow and tucked around his face so as to be sure there is no evaporation.

Q. If there should be a chill at this stage of the treatment, would it not be advisable to go over it again?

A. Yes, but not at once,because the patient has been already heated and his temperature is still up,and the probability is that it is best to give him a vigorous friction and warm him up in that way, and wrap him up. A half an hour later,perhaps, you can renew your application; but it wouldn't do to keep a pneumonic patient with a high temperature in a hot blanket pack for too long a time . So we have the hot-blanket pack,--what else can we have ? ("A hot leg-bath.") But the patient would be too much prostrated; the hot-blanket -pack followed by cold friction--the mitten friction. Perhaps we need not say more--except that we ought to take great care

to apply the compress to the whole chest. We will put that down as the "Full-chest Compress."

These are the complications that are most likely to occur with pneumonia, but there are a number more. We will have to take this subject up at another time.

Q. Then you apply the hot blanket-pack, you apply cold friction?)

A. That is to convert the reaction of heat into the reaction of cold; You want to produce arterial congestion of the skin instead of passive congestion.,so there will be a permanent fixation of blood in the skin. Suppose you put a person into a hot sitz-bath with his arms and legs exposed,--will he sweat ? ("Yes.") You see if you heat up a small part of the body,an atonic reaction is produced in all parts of the body by overheating the blood. A hot foot-bath will make a person perspire; and if you put a person in a hot-blanket pack and apply cold to the arm for fifteen seconds, he would be in the same condition--in other words, the reaction to cold will not be made permanent,but you have got the heated condition returned at once, so that would be an objection; it is better to remove the hot blanket,which is the source of the excessive heat, and apply a warm,dry blanket,tucking it in close about the patient everywhere.--

Q. You take off the hot blanket pack before the friction?

A. Yes., and then go over the whole body in a minute; it should be done in thirty or forty seconds. But it is not the friction that you need in this case; all you need is the cold impression,so that I would use a wet mit,or a wet towel friction in this case .,--do you know how to apply the wet towel friction? This is

the way: You take a towel and wring it out of water at a temperature of 60°,--take the patient's arm, for example; have a towel spread out lengthwise: the patient holds up his hand and the towel falls round his arm; now with the two hands rapidly rub outside of the towel; Bring the towel in contact with the surface over here. When that is done dry it quickly; then make the application to the chest and the back and the rest of the body. When you come to the chest,the towel is spread out over the chest: the patient puts one hand here and the other hand over the hypogastric region,holding the towel in place while you have the smooth towel to work with . When it comes to the back, as the patient lies on his face,he puts his hands behind his neck and you rub him with the smooth towel. When you come to the leg, have the towel spread on the leg,while the patient holds the towel, you rub over the towel with both hands.

There are depths far beyond what we have reached in the study of hydrotherapy; you will find something fresh and new in it all the time,and I hope you will make an earnest study of it. You will have the books in your hands in a short time, and to-morrow you will have an examination, and I advise you to look up the subject of typhoid fever quite thoroughly, also fevers in general. You should be especially well posted on pneumonia.

ADDRESS TO MEDICAL-CLASS STUDENTS, Feb.13,1900.

Pneumonia,--Symptoms and Treatment(con.)

J.H.Kellogg,M.D.

---X ---

Pneumonia is a pretty large subject; it is one of the most dangerous of maladies. Until recent times the mortality in pneumonia was about thirty per cent.,--practically one-third,during the last twenty-five years. Hydrotherapy should save nearly every case--if properly managed, the mortality should not be over three per cent.--or scarcely over two per cent.

Now let us consider how many ways we can control the circulation of an internal part,--for instance, the liver. (Place a cold application over the liver.") What will that do? ("Contract the vessels.") Then by reflex action you can control the vessels,--can you make that control continuous? ("Yes.") how? ("By changing;putting on cold again.") Can you use ice ? ("Yes,--and then put on hot.") Anything besides ice to make the effect continuous? ("Friction.") And then the ice-bag about how often? ("Every ten to fifteen minutes.") Yes,--or at least every half hour; then what ? ("Rubbing the patient.") Yes, with warm flannel,--wet or dry ? ("Dry.") How long would you rub? ("Till it is red and warm.") Is there any other means by which we can control internal circulation; ("A hot application.") How will that control internal circulation? ("By producing collateral hyperaemia.") An extremely hot application ought to produce a reflex action like that of cold, but not so continuous,--not so decided; it is once in a while preferable,--how hot should it be ? ("As hot as can be borne.") Hot enough to produce what sensation? ("Pain.")

Now let us finish up,--we were considering heat-production. In discussing heat-production we recalled the fact that it might be the dominant factor in ~~fever~~ pneumonia or fever,or it may be very subordinate; the principal difficulty may be ~~the~~ diminution ~~of~~ heat elimination : that is the condition in which we sometimes find the patient,--in what ~~may~~ conditions may he be found? ("Increased heat-Production and decreased heat elimination.") Suppose we find the patient in the condition of increased heat-production,and a hot skin,--and an increased heat elimination also,--if there was ingcreased heat elimination and the temperature was very high,what would that be a sure indication of? ("Increased heat-production.") That would call for something that would decrease heat production, - we want to know how we ought to apply remedies for increasing heat-production,and also for increasing heat elimination. While we are decreasing heat -production, ve must produce an increase of heat-elimination; we must not forget to redouble our energies to increase the heat elimination and to diminish heat-pooduction. The elevation of temperature is nature's method of destroying toxins or producing anti-toxins. We don't expect to bring the patient's temperature down to normal and keep it there,but simply to prevent prolonged and excessive elevation of temserature,--what would be the great injury that might result ? ("I should think it would cause delirium.") Yes, an overheated brain might cause delirium,--what else? ("Burning up some of the vital parts.") There would be a waste of the nitrogenized tissues. The real living part of the body contains nitrogen; the adipose tissue is not alive. Excessive temperature resultsin oxidid ng these proteid tissues. What constitutes the great mass of proteid tissues? The muscles. About how much

of the bulk of the body do they constitute ? ("About one-half.") There would not be much waste in the bones, but the nerves and nerve-centers are likely to waste,--and they are the living,active machinery of the body. Now suppose a person has pneumonia and has a pretty high temperature,and no very high fever,--what would be his condition when he gets through? ("Great emaciation.") What else? ("Great weakness.") Why? The muscles are wasted, and it will require a long convalescence to build those muscles up again--and perhaps they will be built up; so it is important to keep the temperature down,and it may save his life, though he may be a wreck during life because of neglect to control his temperature; we don't expect to bring it down to normal,--about what point do we consider the proper point to begin active efforts to lower the temperature and to control it ? ("About 102°.") When the temperature is above 102° we must begin vigorous measures; but high temperature is beginning at 101° and when we see that it has a tendency to go higher,if we wait till it gets up to 102°, 103°, 104°,it will then be difficult to control it,--it is like trying to stop the "Lightning Express"--it is easier and better to stop it before it gets up to full speed.; we can control the temperature much easier at the beginning of a fever than afterwards;it is easier to control it during the first two or three days, and also at the period of decline.

Production of toxins,--how can they be decreased? ("Decreasing the metabolism.") Yes,--decreasing the microbic metabolism. We must cool the lung,--can we actually cool the lung by the applications we are making from the outside--does that actually cool the pneumonic lung ? ("Perhaps it does,to a small extent.") Would there be a decided cooling effect? There would,because it decreases

circulation so much. Now if we lessen the circulation of an internal organ,does that have the effect to lower the temperature of that part,or does it raise it ? ("I think it would raise it .") Suppose we slow the movement of the blood what is the effect upon the blood in the periphery? ("It is cooled.") The more blood that passes through the skin,the higher the temperature of the skin will be,and the lower will be the temperature of the body.. If we contract the bloodvessels of the lungs and so lessen the blood-supply,the effect would be to inflame the lungs, so we cannot depend upon that, -- what would we depend upon for lowering the temperature of the lung? ("Lowering the atmospheric temperature.") What else? ("Increase the circulation.") Increase the movement of blood throughout the whole body--what effect would that have ?? ("It would lower the temperature of the whole body.") That is the best way to lower the temperature of the lung,--and that we can do by increasing heat-elimination and diminishing heat-production. There is something else that will have the effect to diminish the production of toxins which will control and lessen the activity of the inflammatory processes,--and whatever will do that will lessen the production of toxins--whatever will control the action of microbes and lessen their activity will lessen the production of toxins to some extent,- but we will pass on and discuss this later.

Nervous irritability,--how can we lessen that? ("By a wet-sheet pack.") How many stages are there in the wet-sheet pack? ("Four.") The first is the cooling stage,--till the sheet is warmed up to the neutral temperature--between what limits is that ? ("Between 92° and 98°.) The heating stage is the period where sweating begins-- this is the fourth stage--the four stages being cooling,neutral, heating and sweating. In which one of these stages do we wish to

relieve the irritated patient? ("Neutral stage.") Can we manage the pack so as to prolong the neutral stage ? ("No.") Because the neutral stage only lasts about fifteen minutes,--how would you prolong it? ("Take off some of the wraps.") How would that maintain neutral temperature? It would prevent the further accumulation of heat, and promotes evaporation,--just enough to keep the temperature from rising., and evaporation will take place through the blanket; after the pack is well started,it becomes a vapor-bath; the blankets become full of vapor, and we open them and let some of the vapor out,--and then there is a movement of circulation of air which keeps the temperature down--and we open the wraps a little to maintain an equable effect. What else could you do for this nervous irritability("Sponge.") What ~~kind of sponge~~ would be the effect? It gives relief by drying the surgace. But the patient might be so sick that you wouldn't want to disturb him,--is there anything else? ("Apply fomentations to the spine .") Hot and cold to the spine is a very good method.--fomentation two or three minutes and then cold for half a minute .,--rather a long fomentation,--how would we relieve an irritated patient ~~in a hospital~~ while absolutely delirious? ("Cool the head,and use ice-collar.") Cool the head,and perhaps apply a hot blanket pack to the legs. We drive the blood away from the head and toward the lower part of the body. Now the umbilicus marks the division line between the upper and lower part of the body,hence applications to draw the blood from the pelvis to the upper part of the body must be made above the unbilicus,and all applications to draw the blood from the head to the lower part of the body must be made below.At what point is the spinal chord the largest? (Ans. not understood.) There is a place where the nerves are given off

to the arms and legs,and those are the points to aim at; we we will make our applications so as to cover these territories. It is the nervous system and the blood and the circulation that we must keep in mind in hydrotherapetic applications. A long neutral bath would be useful,but what would be likely to be of most service to us in pneumonia? A wet-sheet pack. While in Mexico I found a man that was delirious;he had been delirious all night and had been given up to die. His friends were feeling of the bridge of his nose,and wanted to send for the priest. A wet-sheet pack put this young man into a perfect calm and he slept well for half an hour,and was then a little delirious. But after the second wet-sheet pack was applied,he s recovered, and he got well. To those people that seemed like a miracle,--and it was .

Now let us consider the things that can be increased,--the elimination of toxins in the skin,kidneys and liver: All applications to the skin which aid in increasing its activity will help diminish the toxins in the skin, kidneys and liver. Now let us see what will increase the activity of the skin in pneumonia: Will a wet-sheet pack do this ? ("Yes.") What else? ("A general bath.") What else? ("Cold friction.") Anything that will bring the blood into the skin and keep it active helps eliminate toxins,--copious water-drinking ? ("Yes.") What else? ("Enema.") Yes; that produced such activity of the kidneys that the old water-cure doctors thought there were secret channels between the bowels and the kidneys by which the water was carried directly to the kidneys without having to go a long circuit in the circulation;it was so common to see the effects of the immediate action of the kidneys immediately

after the enema,--large quantities of clear urine discharged within a few minutes after the enema--have any of you noticed that ?Hands up! (All hands up.) Then you see what a wonderful effect the enema has upon the kidneys in the elimination of toxins. Now what will help the liver in/ the elimination of toxins? ("Water-drinking and enema.") Anything else? ("Fomentations over the liver,followed by cold.") What kind of cold ? ("Short cold application.") A heating-compress over the liver is excellent; what else? ("A cold douche.") Yes,but the patient has pneumonia,and it may not be convenient to give a cold douche,--what could you use instead? ("Scotch compress.") Yes, an alternate compress--would you use the alternate or revulsive compress? ("Revulsive.") What is the effect of the revulsive? ("Tonic.") The revulsive is derivative and analgesic; but the effect of the alternate is derivative, but what is the special characteristic of the alternate application? It is exciting. If you wanted to excite the liver what would you use ? An Alternate compress over the liver,followed by a heating compress to continue the effect.

What can we do that will increase the destruction of toxines,--how are they destroyed? They are destroyed, to some extent, by the blood itself,--where are toxins poduced in this disease ? ("In the lungs.") Now if we want to increase the destruction of toxins in the lungs what must we do ?("Increase the circulation .") Yes, we must increase the movement of the blood through the lungs,--but we will consider that in a moment . But there is another thing to be done,--toxins are destroyed by what kind of process in the body? ("By oxidation.") Then whatever we can do that will increase this process will aid in the destruction of toxins. Are there certain organs in the body which are devoted especially to the destruction of

toxins? ("Yes.") What are they? ("The liver,kidneys, spleen.") The spleen destroys corpuscles, but I don't know about toxins,--Dr. Stewart, does the spleen destroy toxins?

Dr. Stewart: I have never heard that it did.

Dr. Kellogg: The liver destroys toxins, we know; it not only eliminates but it destroys toxins; it is the most wonderful organ of the body except the brain. The thymus gland, and perhaps the thyroid gland,destroys toxins. Then there is another set of gland which destroy toxins,--what are they? ("The lymphatics.") Yes,the lymphatic glands destroy toxins and possibly the bone-marrow has something to do with it also. It is important to remember that the poison-destroying organs of the body are the liver, the kidneys, the serum,the white cells,the lymphatic glands and the thymus glands-and there is something else--what is it? ("The suprarenal capsules.") Yes; they aid in the destruction of toxins.

Now let us see what we can do to encourage the destruction of toxins: Anything that will increase the activity of the liver will increase the destruction of toxins. Whatever increases the movement of the blood will destroy toxins; whatever will encourage oxidation will destroy toxins, and whatever will stimulate tissue-activity will destroy toxins. Can you think of anything that will increase the movement of the blood--what will increase the poison-destroying activity of the cells? ("A cold application to the skin.") What would be a good thing to apply? ("A cold mitten friction.") When yu you come into practice you will find that the cold mitten friction is one of the most wonderful things that you ever met--it will help you in a most wonderful way; it is the best way to increase the movement of the blood.

Now with reference to cold application to the skin: If you can't make a cold application , will a cold chema have the same effect? ("Yes.") It would have a similar effect, but would not be so effective as a cold application to the skin. Would a general cold-bath be useful for this purpose ? ("No.") It is sometimes used and used successfully in pneumonia, and has reduced mortality; the Brandt bath has been used successfully, but it seems to me better to use some other remedy. We should not forget to use cold friction in pneumonia; suppose the patient's fever is not so high,what would you do? ("Make a cold application.") About how often would you apply it ? ("Once in two hours.") It wouldn't do the patient any harm to have it once every two or three hours, and how many times a day? ("Three times a day.") Yes, he must have that whether his temperature is high or not,or whether he has any bad symptom or not ,he must have cold friction, because we want to keep him wide awake and keep his body at work fighting disease .

Energizing the heart: What should be done for that ? ("A cold application over the heart.") Suppose the heart were very weak? ("Friction to the surface.") Anything else? A very short hot application; that would prepare the skin for cold;and if it were very hot,you would get an exciting effect from the heat,and while the heat excites the heart, at the same time, it prepares the way for the maximum effect of cold to follow the heat. How long should the hot application be? ("Ten minutes.") Just a few minutes,--three to five,or even eight to ten; apply a small hot pack over the heart thre to five minutes--just long enough to get a reflex--followed by a cold application,--how long? ("About ten seconds.") While the effect of the cold is continuous. You don't chill the heart unless you

leave on a cold application for an hour or two; the effect is only on the skin,and if you apply cold over the heart you will get a reflex effect--how long ? Just so long as the nerves retain their sensibility; so you can make the application for ten to fifteen minutes. In making these applications you should always have the cold compress come over the heart;it will generally be sufficient if it covers the heart entirely, except in a later stage of the disease when we have ceased to employ the general cold compress; where we apply the heating compress we don't apply heat to such a high degree where we come in with the cold compress over the heart...

Now what will increase the movement of the blood? ("A hot and cold application over the heart.") Yes; anything that will energize the heart will increase the movement of the blood? ("The cold mitten friction:") Yes,and if possible with a tepid bath,--you would give him the cold mitten friction with the bath ? ("Yes.")

Increasing heat elimination: that is very important,--what method will we adopt for this purpose?--Let's see how many methods we may use for the increase of heat elimination,--energize the heart, increase the movement of the blood,and increase reaction--three ways which will increase heat elimination. Will a cold mitten friction increase heat production? ("No.)" Why not? Because it is so short. Will a cold mitten friction with vigorous rubbing chill the patient ? ("No.") There will be no shivering, --what is shivering the sign of? ("The beginning of heat production.") The cold application should be made so as not to produce any shivering,in order to produce the best effect.

What is the next thing to do in applying cold to the skin,in pneumonia? Avoid concentrating the blood in the interior;if we put

the patient into the cold bath for too long a time,the blood will go to the interior of the body--brain,lungs, liver, etc., and the congestion produced would be most harmful,but we would make an application that would lower the temperature with increased heat elimination,--what kind of bath would you give? ("A short cold bath followed by friction."P That would be almost like a mitten-friction,or a towel friction. If you were going to use a short cold bath would you use the bath proposed by Currie , to be used in fevers--a hot bath? ("Yes.") You could use the bath in which the patient sits in the tub while you rub him with cold water.--What other method could you use? ("Wet-sheet pack.") Anything else? ("A hot foot-bath.") Is pouring water over the patient good? ("Yes.") Affusion,--will some one give us some other bath ? ("The Brandt bath.") That is ten to fifteen minutes long--at what temperature? ("About 60^{0} to 75^{0}.") Brandt uses 68^{0}, and 60^{0} would be very cold; some use 68^{0} to 75^{0} ,and with rubbing; does the patient generally shiver in that bath? ("Yes.") Is there a great concentration of blood in the interior ? ("Yes.") Yes, and his teeth chatter,--can some one think of something better than that ? ("Graduated bath.") How would you give it? ("Lower the temperature gradually.") You would make the bath three or four degrees below the temperature of the body and lower it two or three degrees every five minutes,until you got it down to 85^{0} to 85^{0},--would you rub the patient ? ("Yes.") Would you allow gooseflesh to appear? ("No.") You would keep rubbing the patient vigorously so as to be certain to maintain the surface-circulation and not let the patient get chilly. If you wanted to decrease heat production and increase heat elimination, would you continue the ~~hot bath?~~ graduated bath? You would give a very short hot-bath and

let in cold water and let the temperature run right down; the process would be easy for the patient would be in the same tub,if you employed the graduated bath. ~~abv.~~ What would you put on, to increase heat elimination? ("Wet-sheet pack. ") Yes, or mitten friction. What would you give as a rule,with cold wet friction,as a method of diminishing heat-production? ("Hot spray.") Hot spray or hot friction--three pairs of treatment following each other--the hot-bath and graduated bath;the hot-blanket pack followed by the wet-sheet pack;hot friction ~~or~~ hot sponging. or hot sprinkling followed by wet friction .

What will increase oxidation? Cold application to the surface--how does that increase oxidation in the blood ? ("It increases the consumption of oxygen in the tissues.") It increases the absorption of oxygen also,and that increases the activity of the cells and the destruction of toxins; it increases the vital resistance,and it increases the activity of the nerve-centers.

Vital resistance is to be increased,--how is that to be done ? ("Application of cold .") A cold bath, and cold friction--how many times a day? ("Three times a day.") Suppose the patient is weak and the pulse feeble,--would you put him in a cold bath ? ("No.") What temperature would you have the water,if the patient was very feeble? (60° to 85°.") The ~~colder he was the~~ weaker he was,the colder you would make it? ("I would make it cold and rub hard .") That is right,--the weaker the patient is the colder the water ,and the less water, and the more you would rub him,because you want to rouse the dormant centers.A high temperature would be a less shock to the patient, but the shock is what you want,--but you only want a short shock,a very intense shock, and that will wake up the centers; when the patient is very feeble the ordinary stimuli are ineffectual;he can't respond to them, so we must use more powerful

means: We will use ice-water,and we will use a mit,--there are three kinds of mits--the moist mit, the wet mit and the full mit; that is, we can carry the full mit over the patient, plashing the water over him,or use the wet mit, or simply wash him and get the effect.

What will increase leucocytosis? ("Cold friction.") The movement of the blood will bring more corpuscles in,--but there is another thing which is excellent,--a ~~heating~~ Cold compress to the chest; this contracts the vessels and drives the blood out,and then,as it is warmed up the vessels fill with fresh blood--a new supply comes in,--a brigade of white corpuscles come marching in and running around the lungs--into the bushes, so to speak,hunting up waste matters and then coming back into the blood again; then it is forced on into the lymphatics. Then you may see ,through the glass, another brigade coming down, and then another, and so on,keeping up a continual procession,and all by the use of a cold compress. And what you can do for one internal viscus you can do for another. The cold compress should not be put on often enough to chill the surface, but often enough,and manipulated in such a way that the skin has the power to warm it up. Once an hour apply a hot fomentation,--that is, if there is much pain.

Increase the absorption of the exudate,--how will you do that? ("A cold compress.") Yes,because that will increase the movement of the blood,and the detritus,when it softens down,will be carried off. Then there is another thing which we can do--you may tell what it is . ("Continued heating compress.") When we want to encourage absorption we change the heating compress once in three or four hours,and while nature is at work repairing the damage , we put on the heating compress; so we apply the fomentation three times a day

perhaps, or once in three or four hours,and then put on a cold compress and allow it to remain until the heating compress or fomentation is applied. Another excellent measure is the application of the alternate compress instead of the fomentation; it is wise to use the exciting compress or the alternating compress--hot and cold,for fifteen or twenty minutes,and then the heating compress until the next application, lengthening the time as the pain lessens.

Stimulation of the nerve-centers,--what will do that ? ("Cold application to the surface.") Yes, cold to the skin stimulates the nerve-centers. There is another thing that will do that, ("Extreme heat.") Yes, when the patient is in a very low stage,a very hot application is useful. What will it be? ("A very hot fomentation to the spine.") Yes; that will appeal to every nerve-center of the spine; there are branches from all the spinal nerves,so it is very handy for hydrotherapeutic treatment; the back seems to me to to be a sort of "dry dock" upon which we can ~~play~~ operate,or instrument upon which we can play; we have all the nerves centering there, and the back has not much sensibility, so we can put on the hottest kind of applications and the coldest applications; it can stand hotter and colder applications than almost any other part of the body, so we will make hot and cold applications to the spine . When we talk about the spine we mean the back--the whole back--a space as broad as your two hands; the compress should cover the whole back, so as to reach as many nerves as possible, and makes a stronger impression upon the nerve-centers. Is there anything else in reference to exciting the nerve-centers? How would it be to give the patient a hot blanket pack followed by a cold mitten friction (you see how often that comes in),or a very short cold blanket pack/

for the nerve-centers. Where the patient is weak and irritable, what would be a good thing to do? ["Apply a wet-sheet pack."] Yes; then you get the exciting effect immediately followed by the calming effect; the exciting effect would excite the organic centers, while the calming application would give the cerebral centers rest.

Now we haven't said the last word upon any subject, but simply hurried over it; but I hope we have got the foundation-stone which we can build into a structure which we might consider a life-saving station for ~~many diseases~~ almost any disease . Next time we will consider some methods of treatment, and I would like to have you bring in a list of the different measures suggested, and the different applications indicated. You will be surprised to see how few simple measures will accomplish different things that should be done; it is like "killing two birds with one stone." We don't have to use "shot-gun prescriptions," but one shot kills them all, if you please--some simple remedy that has been tried and found efficient in most far-reaching morbid cases. Then we will take up complications, and Friday following, we will have an examination of students by Dr. Stewart. You will be supposed to know everything we have learned in hydrotherapy, and to write a book, if necessary.

LECTURE TO MEDICAL-CLASS STUDENTS, Feb. 12, 1900.

Symptoms and treatment of Pneumonia (con.)

J.H.Kellogg, M. D.

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Things to be Relieved, (con.)

We are still studying heat-production: What is the cause of rise of temperature in pneumonia? ("Formation of toxins.") What does the toxin do? ("Stimulates heat production.") That causes the temperature to rise. In how many different ways can the temperature be raised? ("Two.".) What are they? ("Increased heat production or decreased heat-elimination.") If we have heat production, we may have the temperature elevated in spite of the heat elimination, and we may have increased heat elimination as well as increased heat-production. Can there be a fever without increase of heat production? ("Yes.") How? ("Heat-elimination may diminish so that heat will accumulate in the body.") In how many different ways can we have a rise of temperature? We can have increased heat-production and increased heat -elimination; that would be a very active fever, altho' the temperature might not be very high; we find that in febrile cases. In that condition we would use cold.

Second, we might have normal heat-production, and heat elimination decreased--we might have normal.

Third, we might have increased heat-production and decreased heat elimination,--what would that produce? ("A high temperature.") The greatest rise of temperature. Would this be the case in febrile patients? ("No.")

In pneumonia we must first find out what is taking place : Suppose we had increased heat-production,what is the result? ("A rise of temperature.") ("A hot skin.") ("A flushed face.") And we would have a very high temperature. Suppose the surface temperature is much above normal,and the temperature resists all our efforts to lower it,--we cool the patient off and his skin keeps hot, and he has a great deal of thirst,and the temperature is very high--what would you conclude? ("Heat production has increased.") And the heat elimination would be decreased. Now if we should apply the same measures to a well man that we will apply to this man,~~and~~ he would ~~have a chill~~ be chilled; but this man is hot,and when a wet-sheet pack is applied, he warms it,--what does that mean? It means decreased heat elimination. We cannot look in and see what is going on in the muscles, but we can see what is going on on the surface, and if we find the skin very hot after cold applications, and the skin remains hot,--what does that prove? ("Increased heat elimination.") Yes, that is the normal effect of increased heat elimination. Suppose heat production remains normal,and there is increased heat ~~production,~~ elimination --it would lower the temperature. But suppose we find the the temperature is not lowered--suppose we find it above normal, we conclude that there must be increased heat production. Suppose we find, by the calorimeter that there is increased heat elimination and the temperature still above normal--what does that prove? ("Increased heat-production.") Under those circumstances how can we diminish this increased heat production? ("With a cold enema or cold-bath.") How will that increase heat-production? ("It will lower internal temperature. ") Will that increase heat production? ("I don't think it would.") It might have a little effect that way;if it lowered the temperature of the blood it

it would do so; the higher the temperature the greater the increase of heat production; but so far, it would lower the heat production, and we must have something more effective. ("Making a cold ice-bag over the heart would lower the blood-temperature.") Yes, but we want something more effective still. ("A cold bath.") How would you give it ? ("We might give a graduated bath.") Suppose we give a bath to a man in health and take his temperature afterwards--say an hour afterwards--what would his temperature be ? ("Above normal.") Then has his heat production increased or diminished? ("Increased.") Wouldn't it produce the same effect if we treated our penumonia patient in the same way? ("I think we would have a reflex action from cold.") What is the effect of reflex action from cold? ("Increased heat production..") Then if we use a cold bath we must use it so as to overcome that--would it be a short or a long bath ? ("A long bath.") Yes, because a short bath would increase heat production. A long bath would gradually suppress the reflex action;but the thermic reflex action is kept up unless we chill the surface so as to destroy sensibility.. We want to find out what will lessen heat production: The most difficult thing to do in hydrotherapy is to control heat production;but it can be done,--now how would you do it ? I see you can't answer that question: A long cold-bath will lessen heat production only when it has been continued so long that the muscles themselves are cooled,--how will the muscles be cooled? The first effect of a cold application to the skin is to produce a hyperaemia of the muscles--a collateral hyperaemia of the muscles--and that would be one thing which would increase heat-production,--the more blood the more heat.. If we apply cold to the patient until he is thoroughly cooled,the heat-producing action will be diminished,and then the temperature will be gin to fall and become

subnormal in the bath,--would that kind of bath be safe in pneumonia? ("No.") No: it would not be safe to lessen heat production in that way,--and why not? ("It would cause congestion of the lungs.") Yes; if we chill the patient till the vessels of the muscles are contracted,we will drive the blood inward and concentrate it in the center of the body and the congestion will be intense; so that a long cold-bath in pneumonia would be an extremely perilous thing to give, and we won't do that. Some one suggest something to lessen heat-production. ("A hot application to the spine .") What would be the effect of that? ("It would decrease heat production.") Yes;that would be the reflex effect,--it is difficult to get the language that will convey the right impression--as some one has said,it seems that "the chief object of language is to conceal thought--and it is difficult to speak so as to convey the right idea here: The first effect of a hot application is to produce stimulation,and the second is a reaction,--an atonic effect. If the application is short the excitement will be but little, but the reaction will be just the same. If you make a hot application you get the first effect immediately; but when you withdraw it,then you get the reactionary effect;and so it is with cold. If you want to get the atonic action of heat and to get that only,what sort of application would you make ? ("A very short hot application.") Now in pneumonia or in any case of fever,would it be desirable to have a hot application? ("No.") No, because you only want simply the atonic reaction of heat. This we can do by a single mit-friction over the skin which we can do in tens seconds. So a very short hot application will lessen heat-production,--how much surface shall we cover? ("The more surface the better.") How long should the bath be continued? ("About a minute;long enough for the patient to get warm .")

Yes,--from one to three minutes; but you wouldn't want to leave it on for an hour nor for fifteen minutes. About what should be the temperature? ("About 104° or 105°.") You might start it at 102° and run it up as high as the patient could endure it,--say as high as 106°, for one to three minutes,and then take him out,--and then what would you do ? Apply cold water? ("No.") Why not? ("Because we want the atonic effect.") You don't want any cold water; it might be well to lift him up in his bed and let the water slowly evaporate from the skin ,--then what? ("Wrap him in a blanket.") That would retain the heat,--and if the water evaporates what effect will that have ? ("It would cause constriction of the vessels of the skin.") What would that do? ("Shut off heat elimination.") But we want the heat elimination active,--what shall we do then? ("Cover him up lightly.") Yes; it would spoil the whole effect of the bath if we allow him to get chilled. You see how important it is to know all the details. Doctors' prescriptions are often spoiled by this cause. So you don't wrap the patient up closely nor leave him exposed, but wrap him in a single blanket so as to cause a slow cooling of the body.

What is another thing to be done ? ("Hot sponging.") How hot should the water be ? ("110° to 112°.") ("As hot as the patient can bear it .") I have known patients to allow themselves to be cooked. ("About 110°.") ~~Yes~~. Try a hot sponge and see how hot you can stand it ,--it might go up to 160°. The temperature should be so high as to be a little painful to the body; it should leave the impression that it burns,--so that the patient says, "Oh! That burns a little;" that leaves a tonic reaction..

What is another thing that you can do? ("Apply a hot blanket pack.") Yes;these are important things; the next thing is, a

hot full bath.

There is another thing which you can do, which is of great value, and which you can do right by the bedside,--and that is sprinkling the body with hot water. It would do no harm if it were as hot as the nurse could take in the hand and sprinkle on the patient. The whole surface should be gone over; the effect would be stronger than sponging, because when the water strikes, you get to the maximum effect everywhere; the temperature falls all the time, so you only get the maximum effect when you start. In sponging, increase the pressure of the sponge --keep increasing it until you squeeze the water all out . In sprinkling, you must sprinkle the water on rapidly and cover the patient up; so in sponging,- -cover the part immediately after sponging.

You are getting hold of the foundation-principles or corner-stones on which you can build your therapeutics in every disease you have to deal with. The different conditions we have to meet with are not very numerous--it is the way in which they are put together and combined. Suppose we apply the law of permutations and combinations to the nine digits,--how many different combinations can we get? A good many thousands. It is precisely so with the different disease-conditions: You learn how to deal with each of these primary conditions in disease, and then you can adapt your therapeutic measures to the conditions. If you have a new disease, and can find out what is going on in the body, you can make a prescription to fit the case the first time. Some of you saw Mrs. Jones the other day,--the lady who had fourteen tumors: She slept six hours last night; her temperature was ~~at~~ 99° and a fraction; her pulse was nearly normal, and the patient feels comfortable and has a good appetite. A few days ago the patient had a pain in the right ovary, and she had

on,so that applications could not be made there; and douches didn't help her any,--what would you think was the best thing to do for the patient? ("A hot application to the spine.") That didn't relieve her. She had hot enema, and when she had that she nearly fainted away,because it was so depressing; it was so depressing that she became so faint that cold had to be applied right off to relieve her. A cold enema increased the pain--and probably that was one thing that caused the pain. ("Hot fomentation to the breast.") That is a sensible suggestion. ("A hot fomentation to the inner thighs.") That is what we did;--is there any innervation on the inner thighs? ("Yes.") You will find this reflex area in your Anatomy. You must know anatomy and physiology well in order to be successful in the practice of hydrotherapy. As I was going over to the helpers' meeting the other day, Mrs. Garrett told me she wished me to see a patient of hers,who she said was delirious--entirely out of her head; she told me her pulse was 90°, temperature 100.2, and respiration normal, and the pulse good and strong ; she also said that her face was flushed. That was all that was necessary to know about the patient. I said, "Apply cold to her head, cold compresses to her face and an ice collar around her neck and a hot blanket pack to the legs from the inner thighs down for fifteen minutes; then a wet sheet pack to each leg separately." A couple of hours afterwards I found the patient calm and comfortable,and as sane as anybody,and Mrs. Garrett was delighted with the result of the treatment . This morning she telephones to me that the patient is all right,and that the treatment worked beautifully during the night. You see we made a flank movement on the disease,--taking it in front, on both sides and behind, so there was no chance for it to escape; we had cold to

the top of the head, cold to the face, and an ice-collar. We wanted to do everything that would diminish cerebral congestion. We don't leave the hot application on the less long,--why didn't we leave it on for an hour? Because it was exciting; we would have excited the skin and we wanted the derivative effect; so the hot application prepared the skin for cold water, and the cold application then produced immediate reaction. Why did we apply the cold pack instead of the hot pack? Because, if we had done so, the congestion in the brain would have been increased to a dangerous degree; but by making a hot application and then producing an instantaneous reaction, we prevented congestion. We must make a hot application first, in order to secure instantaneous reaction,--there will be an inrush of blood, and then, a rush of blood right back again. A young man out here was suffocated with coal-gas, and I suggested a cold application to the breast. I met the doctor afterwards and he said he never saw anything work so beautifully as did that application; he said the moment the cold water was applied to the breast, the patient took a great deep breath and went right on breathing and had no more trouble ; it was the cold that stimulated the respiratory centers. (Describing Pamphlet on "Hydrotherapy.")

ADDRESS TO MEDICAL-CLASS STUDENTS ,Feb.8,1900.

Treatment of Pneumonia,

J.H.Kellogg,M.D.

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Things to be Relieved:

Cough,

Pain,

Dyspnoea,

Pulmonary Congestion,

Cerebral Congestion,

Constipation,

Diarrhoea,

Heat-Production,

Formation of Toxins,

Nervous Irritability.

A moment ago,I met one of our Sanitarium doctors who has had a case of coal-gas poisoning; that patient was almost dying of suffocation,and the question was,What shall be done to relieve it? Can any one make any suggestion? (Q"Give him some fresh air.") He got all he could,this morning. ("A cold application over the chest.") That's a bran new idea; that is good. ("Give him oxygen.") That is good,--if we had it. ("A hot foot-bath.") ("Hot and cold to the spine.") Why? ("Because it would stimulate the reflex action.") Let us first consider what is the matter with the man; always examine your patient and see what is going on,instead of going at it in a miscellaneous way. All these suggestions are good, but there is something better still: What is the matter with the man? Why is he

just gasping for breath, and almost breathing his last. ("Increase the circulation.") ~~("Increase the blood and bring on circulation.")~~ last? ("Bring the blood-cells into circulation.") That is right,--increase the movement of blood in the body,--that is the simple formula--what is the best thing for doing that ? ("Hot and cold applications over the chest and heart--especially the heart.") That is good,--what is better? ("Apply fomentations to parts easily accessible; apply cold also,--anything else? ("Cold trunk-pack.") ("Cold ventral friction.") Yes; suppose we rub him without cold water--would that increase the movement of the blood? ("Yes.") Then if you put the rubbing and the cold water together you have two most powerful means of increasing the movement of the blood; so we would use friction with cold water, with a towel, the mit or the hand. You want to get the blood all over the body as soon as possible, so you dip the towel or the mit in cold water, and go to rubbing,--how would you know when you had rubbed enough? ("Rub until the parts are red.") If you get redness of the skin you are pretty sure you are going to bring him through. There is wonderful power in cold water. I had a case last night in which I removed fourteen tumors, and I received a telegram from the patient in the night. I found the pulse 110, and the respiration 30,--that looked pretty dubious; the temperature was 97°. That was a case in which the pulse was feeble, and the temperature low and the respiration rapid; you would think he needed heat, but I ordered hot enema and cold friction,--cold over the heart; when I left the patient last night I ordered cold over the heart ten minutes, heat over the heart five minutes, repeating every two hours, and the hot enema and the cold friction later. When I left the patient a few moments ago, his temperature was 100.4, his pulse 89, and his respiration 20, so you see everything is going well. We would rather

see the temperature up a little too high than down too low,because it shows that the patient is recovering from the shock and is getting along well.

Now we will go on with these symptoms,--we will consider things to be relieved, including as many symptoms as we can under one head. We want to decrease the bacterial action and the toxins,and the growth of microbes. It is also very important to relieve nervous irritability that keeps patients awake/ and makes them very nervous and irritable,and is the cause of much distress. (Writing symptoms on blackboard,"cough,pain,"etc.) Now first of all, what do we want to increase? ("Elimination of toxins.") Yes,--and by what means will this be accomplished? ("We want to energize the heart.") That is very important,--anything else? We want to increas the movement of the blood; the heart must have special attention at the commencement. ("We want to increase the heat alimination.") That is right,--what else? How about oxygen in the blood,--is it a good thing to increase that ? ("Yes.") How about vital resistance? ("We want to increase vital resistance.") How about leucocytosis? ("That should be increased. ") How about the exudate? ("We must get that absorbed.") How many things do we want to relieve? ("Ten.") how many things do we want to increase?("Nine.")

It is only in this way that we can get at thoroughgoing treatment; it is only when we take a disease and examine it and thoroughly analyze it and look at it on every side --it is only in this way that we will learn to deal with different cases. We have already studied cough,--what was the best way to relieve cough? ("Water-drinking.") Yes, so as to dilute the sputum,--what else? ("Enemas.") Hot and cold to the chest--alternate hot and cold . That is a revulsive measure; it is good because it brings the blood b

the surface; but a more classical and effective means would be something else. ("Fomentations.") How often? ("Once an hour.") Yes,--according to the mount of cough,--from once an hour to two hours. What else? ("Heating-compress.") Yes,--every ten to fifteen minutes, if the fever is high and the skin is hot, removing the fomentation quickly and putting it on quickly. Do you remove the cold compress when it is cold? ("When it is warm.") Why ~~do you~~ would you wait so long as that? If you had an inflamed knee would you put on a cold compress and take it off before it got warm? "Yes.") Suppose you had erysipelas in the face and you put on cold,--would you change the compress fast enough to keep it cold all the time ? ("Yes.") Would you do the same thing on the lung? ("No.") Why? We are not putting the compress on the lung but on the chest; if we could put a cold compress on the lung, we could keep it there; but we cannot do that, and so we are treating the skin directly and depend upon the reflex action to control the circulation in the lung, and and the thing we want to do first is to get rid of the passive congestion,--but we will consider that later on.

How would you relieve pain? It is always deep-seated, so you will make a very hot application,--would you prefer a hot bag? ("I should prefer a hot cloth--a woolen cloth.") I think I would prefer cheese-cloth, folding it about an inch thick; it fits so nicely about the chest; and it is soft. Still ,if you couldn't get that, you might use a woolen blanket; sheeting is a little too close; when you use a blanket you have a sort of vapor bath for the skin; but for most intense effects you must have water, which is better than vapor, wearing thin flannel next the chest covered with cheese-cloth about wet enough to drip. You must watch the temperature of the water, because the patient cannot report; so when we say "very hot" we do not

mean hot enough to burn the patient,--we must not cook the patient.

Now, in dyspnoea,what would you say is good ? (Cold compress with alternating friction between.)" Yes, and frequently changing the cold compress. How often? ("Once in an hour or two.") And you would rub the skin with warm flannel until it is red,--and why? ("So as to maintain reflex action.") What sort of congestion do we have in pneumonia? ("Active and passive.") You want to overcome the passive congestion,--in what way?--What is the best way? ("Hot application.") What will hot application do? ("Relieve the congestion and produce collateral hyperaemia of the skin.") Yes,, it will produce collateral hyperaemia of the skin over the lung. But that is only temporary; what else would you do,--if we keep on with the fomentation would it have the right effect? ("No".) Why? ("There would be a maintenance of the same condition.") ("The same condition would return.") Yes; if we were by the seashore,and should dig a hole in the wet sand,and the hole fills up with water,--then suppose we dip the water out--it would soon fill again. That is the same situation with the lung in this case: the lungs have too much blood in them; now we dip the blood out by diverting it into the skin, and temporarily the lungs would be relieved, but the blood would gradually work back in there again; when the skin is so full that you can't get any more in it,the lungs gradually fill up again,and then you will have the lungs full and the skin full. How, in order to keep the blood out of the lungs,what must we do? ("Apply a cold compress.") What will that do? ("Cause a contraction of the vessels.") In other words, it fills up the hole so there is no place for the water to run into it --it shuts up the vessels so that the blood cannot work in there, and that is an

very important thing,--it shuts up the vessels so that the blood cannot work in there; and the next time you apply a fomentation you find that the vessels are relaxed again,and the blood works in again; then another hot fomentation and the lungs are drained again; then a cold application causes a contraction of the vessels; so it is like lifting up a stone and putting something under it to hold it up;a fomentation does the same thing,--and the cold application holds what you have gained; that is the beauty of the use of alternate hot and cold. You may use hot and cold to the chest and it does the patient good, but the maximum amount of good will not be obtained by a fomentation of ten to fifteen minutes, then the alternating compress , then fomentation again, and so on, rather than by rapid alternations. So much for pumonary congestion.

Q. How often would you apply cold to the lungs between the fomentations ?

A. It depends upon how rapidly it becomes heated. We have to leave it on till partial reaction takes place; we let the compress tell us how often to put it on; if the patient has a very high fever and a very hot skin,the compress will warm up rapidly,--it also depends upon the thickness of the compress,--the question is, how often shall we change the compress: It will depend upon how hot the patient is, and how cold the compress is , and how wet the compress is,and how thick the compress is . A very thick compress with a lot of water in it would not need to be changed so often as one that is thinner. A very hot ~~compress~~ patient will warm a compress up quicker than one whose temperature is lower; so we will say that we will change the compress as soon as it becomes warm--just as soon as it becomes warm, and so we will watch it; the nurse should frequently raise the compress and see whether it is warm or not. Rubbing helps

the compress and the compress helps the rubbing; change once in an hour or two and applying the compress to get the decided derivative effect. We must use these applications as carefully as an engraver uses his tools.

Now let us consider cerebral congestion,--what shall we do for it ? ("Apply cold to the head face, and scalp.") How would you apply cold to the scalp? ("Wet the hair with cold water.") Yes, rub the water in till every hair is wet and the scalp is wet,--- how will these four things help cerebral congestion?--How will cold to the back of the neck act? ("It will act upon the vertebral arteries and the two arteries in front.") You could influence one pair or both pairs,--and then by application to the face,what effect do you get? ("Contraction of the peripheral vessels .") Yes,--that is another process,working from the other end;there is a gradual cooling down in the brain. This is true of the brain and not of other parts of the body,--and why ? ("The brain is a good conductor.") Yes, and the skin and scalp is thin and the brain lies just underneath,--what else? ("The circulation of the brain is connected with the circulation of the scalp.") How? ("Through the diploe .") What is the dura mater? ("The periosteum of the skull.") And the skin is connected with the periosteum,the outer periosteum and the dura mater,and the skin--how does the skin of the face contract? ("Reflexly.") The skin of the face is the most important reflex area. What is the most important part of the face to cool? The eyes ——————————,; you feel the immediate effect of the application of cold to the eyes and eyelids,--they are the most sensitive parts of the face . You must be sure to use a soft cloth,-soft cheese-cloth is the best,and you can tuck it into the eyelids so that the nose only projects--be careful and not run the water into the

ears,because that increases the tendency to otitis.

Now let us consider heat production : Heat production is not so excessive in pneumonia as in some other diseases,--how do we know that? Because it is quite easy to control the temperature in pneumonia. If you put a pneumonic patient into a ~~bath~~ cold bath ~~and~~ the temperature comes down quickly; so there is danger of going to excess in cold baths. Should we control heat production by means of cold baths? It is hardly safe ,because the internal congestion is so intense, still it is so much better than the original way that the cold bath has been used to a large extent in many hospitals,and gives very good results; but I think it is objectionable because of the intense congestion of the lung; it is a general principle that when we have an inflammation in the body,it is not a prudent thing to use the general cold-bath ,--and that principle applies as well in pneumonia as in pelvic cellulitis. We cannot be too thorough in regard to ~~principles~~ these principles; if you get them fully grounded,they will apply in every inflammatory disease with which you have to deal; so you must get hold of them thoroughly.

A word further about heat production: We can lessen heat-production by lowering the temperature,and also by other means,--mention one. ("A cold sponge-bath.") A short cold application increases heat production; remember that . Anything else? ("A short hot application.") What would you think of a hot blanket pack as a means of lessening heat production?--a short hot blanket pack or a fomentation to the spine,or to the chest,etc.,to lessen heat production. The hot fomentation has a double value here,--a fomentation to the spine--what proportion of the spinal nerves will be influenced by that? ("The whole of them.") Yes, because we reach every spinal center by a large fomentation to the back,so it will ~~in-~~

decrease heat-production,and that would be a good thing to do. We find that the tendency of cold compresses is to make the patient chilly,--would you stop the cold compresses? I have known that to be done--when you find a patient inclined to get chilly,what does that indicate? Increased heat production; it indicates that the patient is going to be hotter: You don't need to be scared when the indication is that the surface is being chilled,because the surface-nerves report the danger of refrigeration,and so the body begins to prepare itself to resist it by increasing the formation of heat , and that chilliness is a symptom by which we ~~know~~ may know that increasdi heat production is beginning, so we wont apply the cold coppress,but what will we do? ("Rub the patient.") With hot or cold cloths? We could use either one,but the best thing to do would be to rub him with dry,warm cloths; a very short cold application would increase the peripheral circulation very quickly,--just enough to produce action of the skin; that would bring the blood to the surface and the chill would cease; the chill is due to the lowering of the temperature of the superficial nerves .

Is there anything else we can do? ("A hot bag to the spine.") ("Fomentations to the spine.") If there is a general blueness of the skin and chilliness what would you do? ("Apply friction.") A hot blanket pack,--and what would you follow that with ?("Cold friction.") A hot blanket pack brings the blood into the skin,and what will a cold friction then do? It fixes the blood in the skin; the cold friction produces a strong reaction in the skin;it comes quickly when the skin is warm,so there is no internal congestion produced. Remember this : A cold application following a hot application fixes the blood in the skin. Now we have gotten nearly through the important points. When the things that need to be

increased are found, we find that the things that will increase the things that need to be increased will ~~diminish~~ decrease the things that need to be decreased.

LECTURE TO MEDICAL-CLASS STUDENTS, Feb.7,1900.

PNEUMONIA (Con.)

J.H.Kellogg, M.D.

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SYMPTOMS.

Lung.	Abdominal	Circulation.	Head.	Miscellaneous.
Cough,	Diarrhoea,	Feeble pulse,	Headache,	Dry skin,
Dyspnoea,	Constipation,	Vasomotor paralysis,	Nose-bleed,	Chill,
Pain,	Gastric duodenitis,	Cyanosis,	Congestion,	Fever,
Congestion,	Tympanitis,	Collapse,	Delirium,	Scanty urine,
Exudate.	Jaundice.	Prune-Juice expectoration.	Insomnia.	Weakness, Herpes.

Let us classify these different symptoms under general indications, for the same thing will relieve several of these different conditions. These different symptoms are associated with each other. Suppose we look at them in a general way first, and then consider the special indications; let us begin with things that we want to relieve. In the application of therapeitic measures, there are some things we want to diminish and some things that we want to increase; suppose we start with things that we want to diminish, control, or relieve: Now what is the first thing the patient wants relieved? ("Cough.") Then we will put that down. There are three things that will relieve cough,--water-drinking, hot and cold compress, enema and fomentations--three things,— and how shall we make cold applications? ("With a cold bag.") How many think we should employ a heating compress when there is a warming up? (Several hands up.) How many would censure it? (Hands up) What is the purpose of this warming up? It is really to keep the tactile sense in working order,--to maintain cutaneous sensibility; so we want to maintain

active circulation of the skin. If chill the skin too much,we will produce a continuous contraction and a dow movement of the blood in the skin,whereas we want to maintain an active movement of blood in the skin,at the same time maintaining the tone of the vessels. What is the object of a fomentation? To produce collateral hyperaemia of the skin,--and what is the effect of that ? ("It relieves congestion of the lung.") Is the healthy portion of the lung disturbed, as well as the diseased portion of the lung? ("Yes.") What is the condition of the healthy lung? ("It is considerably congested.") Would the heart pump with all its force upon this area of the lung?--we will illustrate it by a system of water-pipes: (Illustrating by diagram.) Here is the main pipe,and here are a lot of branches distributing water to a number of different houses--suppose there are a hundred houses drawing water from the same main: supposing the main is of sufficient diameter to maintain such a pressure: Now when all these pipes are open,it is equivalent to the end of the main being open--when they are all open,it is the same as the end of the main being open. Suppose the pressure to be a hundred pounds,--would that pressure be maintained? If all these pipes were open at once,it would lower the pressure--it would bring it down to the lowest point--it would not destroy it entirely ,but there would be a low pressure if they were all open at once; at a hundred pounds the pipe is closed. Now suppose we shut these pipes all up at once,--then we would have a high ppressure on that one pipe. Suppose,on the other hand,the main pipe was sufficient to maintain a twenty-pounds pressure on each pipe all the while ,and we should cut off half the pipes--that is, when they were open and running--there are three closed and three open,--would the pressure be lower

or higher in these three open pipes? ("Higher.") Yes; and in the case of our patient,the high blood-pressure will produce congestion of the lung; as the heart beats, you will see the veins of the head and face become rigid from the increased blood-pressure, and fr from the increased blood-Pressure you would have lung congestion, — the heart is paying all its attention to that portion of the lung, and as a result, we will have a quantity of serum running into the lung; we have this,in addition to the serous sputum; we want to relieve that,as well as to relieve the inflamed part,--we must treat the whole lung.

What is the next thing we want to relieve? ("Pain.") What will relieve pain? ("Heat.") Fomentation relieves pain. When a person has neuralgia,we apply a fomentation and it relieves it by drawing blood out of the nerve into the skin. Heat relieves pain, probably from reflex effect. How hot should we have the fomentation in order to relieve the pain? ("As hot as can be borne.") Generally, for a deep-scated pain,the fomentation should be just as hot as the patient can bear it.--hot enough to produce pain in the skin,--it must be real hot--so that the patient thinks he is going to be burned; you must not burn the patient,but if he feels as though the fomentation were going to burn him,it will be just about hot enough. If the pain is superficial,great heat will increase the pain and act like an irritant;but you want to produce a strong irritation of the skin in order to relieve deep-seated pain--the action is reflex as well as mechanical. Fomentation is one of the best things to relieve pain,--should it be a continuous fomentation?

("No.") If the pain is very severe,about how often should we apply the fomentation? ("About once in fifteen to twenty minutes.") And if the pain were not very severe, how long? ("Every hour.") If there were no pain would you apply fomentations ? ("Yes.") For what purpose? ("To relieve internal congestion. So for cough we apply fomentations, hot and cold compress and water-drinking--how often must the compress be changed? ("About once in twenty or thirty minutes.") It will depend somewhat upon the patient: if he has a high temperature he warms up the compress quickly,and we must change it more frequently,--but we want a reaction; we don't want to remove it until after it has been warmed up; the rule is ten to fifteen minutes at the beginning, and as the temperature of the patient lowers,and as his condition is improved,lengthen the interval between the compresses to perhaps once an hour. When the defervescence occurs once in three or four hours,put on a heating com-press ~~after the~~ for a few minutes; so we can graduate them.

A word about the compress: Suppose one had a pain in the right lung,where would you put on the compress? ("Over the right lung.") What territory of the chest should be covered? ("From the clavicle to the fourth rib.") Yes and a little below,reaching to the liver--would you want to extend the compress over the liver ? ("No.") Then where would you apply it? ("From the clavicle down to the fourth rib.") How about the lateral territory?? ("I would extend the application from the sternum around to the spine .") Yes, because the lung extends there . That is rational as far as it goes,--has any one any further suggestion?--How would you apply it? ("Let it overlap the area a little,being sure you have it all well covered?") How much would you overlap it? ("Three or four inches each way.") Yes; has any one any further suggestion to make ?

("I should think it would be a good thing to put it clear around the chest.") Why? ("Because I think the other lung would be involved some,and there would be œdema.") Yes, the whole lung is ~~inv.bred~~ the congestion infected,--there is one point of the lung, however,where ~~it~~ is usually concentrated,--and there is the failure of drug-treatment in pneumonia--a failure to effect an application to the whole chest. Now if a man has a boil on his knee,would you make an application just big enough to cover the boil and overlap it a little ? ("No.") Suppose a person has a pain in the sciatic nerve,--and that nerve is not big as the finger--how big would you make the fomentation?--You would foment the whole thigh. So we may have a little inflammation in the thumb--a sliver in the thumb,perhaps--and the whole hand is swelled--the whole hand sympathizes with the sore part--the whole hand is involved--so you would treat the whole hand. Now should we not apply the same principle to the lung? We We should, because the whole lung is involved,and we apply our compress to the whole chest; and we will see another reason for that as we go along.

But we must consider the pain in a more general sense: We often consider pain in the lung in pneumonia, but is there any other pain? ("Yes.") I want to say another word about the application of fomentations for the relief of pain in pneumonia,--it is not so essential ~~about~~ that the fomentation ~~being~~ be applied to the entire chest as it is to cover ~~all~~ the painful area--where is the seat of pain in the chest generally?--It is in the pleura,--there is where the pain is, because the pleura is a very sensitive structure; the pain superficial and circumscribed. The fomentation must be applied over the seat of the pain; the effect will be more intense if we localize it, because we want to produce

COLLATERAL HYPERAEMIA. I want to impress that upon your memories. The pain is circumscribed and we apply a hot fomentation over the seat of the pain, but not entirely over the chest,--what harm would be done if we did so,keeping it up for twenty minutes? ("Increase the congestion.")There would be an enormous increase of cerebral congestion; all the blood in the body circulates in the chest, and so we might increase the temperature of the patient considerably, overexciting the heart and thus increasing cerebral congestion tremendously; besides ,there would be danger of suffocation. So much for pain in the chest.

The fomentation, as has been said, is allowed to overlap,covering the affected side thoroughly,and we must be careful to keep the fomentation away from the heart as much as we can.

Now let us consider dyspnea: What is the cause of dyspnoea? Filling up the alveoli with exudates,--and what does that interfere with? It interferes with the oxygenation of the blood. In dyspnoea there is an interruption of the breathing,--a jerky respiration and a rapid breathing--that is a sign of dyspnoea; the rapid breathing is produced by the pain in the part; the patient controls his breathing as much as he can--can any one give us another ~~cause~~ indication? ("He cannot take a deep breath ,and he breathes as short as he can.") Yes, and he gets out of oxygen in that way,--anything else? ("A diminution in the movement of the blood.") Yes, because the heart's energy is diminished--but we will take this up later. The real cause of dyspnoea is lack of oxygen in the blood; there are organic formations in the breath and CO_2. Carbonic acid gas is by no means the only factor in producing dyspnoea--in fact I think it is not the most important; the whole organ is involved in these formations, and that is another cause for ~~dyspnoea. (1)~~ diminished oxygenation of the blood.

I am trying to teach you how to study every disease, and if you can get through pneumonia and master it and apply the right principles it will be an introduction to the study of all other diseases, because you can study other diseases in the same way. I want every one of you to learn how to make your own prescriptions to suit each individual case, and this kind of study will enable you to do it.-- ("If there is plenty of oxygen in the body, it burns up poisons etc.?") It not only burns up the poisons but the fat; there is increased heat production; the vital fires burn more rapidly and the tissues are being more rapidly consumed, so the blood would become more rapidly charged with CO_2. So there are several reasons why a person may have dyspnoea, and in doing something for the relief of the patient we must strike at the cause of the trouble every time.

We must do something for the relief of dyspnoea: One cause of dyspnoa is pain and fomentations will help that. Another cause is congestion of the lungs,--now what is going to help that ? ("A cold compress.") What else? ("Fomentation.") Apply a cold compress to the chest,--is there any other relief except the relief of pulmonary congestion and the relief of pain? ("Increase elimination.") That is a small way, but there is a large way. ("Cold application increases ~~deep respiration~~ depth of respiration.") Why? ("It stimulates the respiratory centers.") Yes; every time a cold compress is being put on the center is being narcotized and the cold application increases the supply of blood. If you put a cold compress on and allow it to remain in place until the skin becomes benumbed, would it stimulate the respiratory center ? ("No.") It would cease to stimulate it because the cutaneous sensibility would be lost, the nerves chilled and the reflexes destroyed; the stimulation of the respiratory center is a reflex act; that is the reason we should

frequently change the compress. Suppose a person's face and lips are blue,--you would say that he needs oxygen very much--would you prolong the interval between the application of the compress ,or shorten it ? ("Shorten it .") Yes, you would apply the compress more frequently so as to get the reflex effect of the stimulating center. There is another cause of dyspnoea,--what is it ? ("Slowed movement of blood.") How would a cold compress help that? It energizes the heart; we must be sure that the cold compress covers the heart,if it is not applied to the whole chest, --and it is very rare that the condition of the patient is such that the compress cannot be applied to the whole chest; but if that should occur,you must be sure and make the application cover the heart any way. Is there any other way in which the movement of the blood will be facilitated by a cold compress applied to the chest? (Remember,this is reflex also.) When cold is applied continuously over the heart it diminishes the action of the heart--it depresses the heart when applied continuously; it must be frequently taken off and changed and the skin must be allowed to warm up,in order that the heart's action shall be maintained. When you take the compress off,take a piece of warm dry flannel and rub the skin over the whole area of the heart- how long? ("Till it gets red.") Yes, that wakes it up. The fomentation over the heart is not so good as the rubbing over the heart; the rubbing is better than the fomentation as a means of warming up the skin.

What is the cause of slowed circulation? ("Exudate.") Let us see what we have in circulation: (Diagram.) Here is the heart;here are the four cavities; here is the left side,and here is the ~~left~~ right side,--suppose this represents the system of circulation. Now in order that the blood that left the left side of the heart chall get

to the right side of the heart,where must it go? ("Through the lungs.") Now suppose that in going through the lungs,a quarter or a third or half the channels were blocked up and obstructed,--will that diminish the flow of blood and obstruct the circulation? ("Yes? Yes, because the pulmonary circulation is a part of the whole circulation. The real cause of the slowing of the blood is the obstruction of circulation in the lungs. What is the natural tendency of an obstruction of the circulation,--in the first place it produces an accumulation of blood,where ? ("In the lungs.") Yes,in that portion of the lungs which is outside of the exudate;and if the blood is dammed back,where is it congested? It goes back to the right ventricle,--and where next? ("Into the right auricle.") Where next? ("Into the veins of the body.") Is the supply of blood in the left heart increased or diminished? ("Diminished.") What happens to the arteries themselves? ("They contract.") If there is heart-contraction what will be the effect upon the arteries? It lessens the amount of blood in the arteries and increases the amount of blood in all the veins of the body. Would that include the motor veins 2 ("Yes.") So there would be venous congestion throughout the body. The slowed movement of the blood,then, is partly due to congestion of the lung,and if you relieve that condition by a cold compress,will that relieve the dyspnoea? ("Yes.")

The point that I want to make clear to you is, that one simple remedy will do so much,--that the cold compress relieves congestion--it relieves the congestion, the cough, and the pain and the dyspnoea, and energizes the heart; by relieving the congestion the ~~dyspnoea th~~ congestion the dyspnoea is relieved.

Let us see if we can think of anything more that can be re-

lieved,--we will put down "Pulmonary Congestion," can any one tell us why we repeat that here? Do we have cases of pneumonia without cough ? ("Yes.") And without pain? ("Yes.") And without marked dyspnoea ? ("Yes.") Yes, in old people and debilitated people. We have learned how to relieve pulmonary congestion with cough,pain and dyspnoea,--now what measures will we employ to relieve pulmonary congestion alone? ("The cold compress.") The continuous cold compress? ("No.") How frequently should a heating-compress be renewed? (("Form one to four hours.") What next do we have? ("Cerebral congestion.") Would a cold compress on the chest relieve cerebral congestion? ("Yes.") Yes, because it will relieve pulmonary congestion and that will help the cerebral congestion. Suppose a child has a cough--whooping-cough, for example--in whooping-cough does the child's head get congested,so that it cannot breathe without great difficulty? ("Yes.") Yes, in such cases the brain becomes congested, and if we relieve the pulmonary congestion we will relieve the cerebral congestion--and we will do something else as well— what will it be? ("An ice-cravat.") Yes, an ice-collar;—~~and~~ if the face is very much congested--can you think of anything else? ("A hot foot-bath.") What else? ("A cold compress on the face.") What else could you use? ("An ice-bag to the back of the neck.") Yes, these four things may be used for cerebral congestion.

What else must be relieved? ("Diarrhoea.") What is the condition in which you first find the patient? ("Constipated.") What is the first thing to be given? ("Enema.") Hot or cold ? ("Cold.") It might be either; it must be a copious enema,in order to relieve constipation,--shall we employ it every day during the disease ? ("Yes.") Yes,because the patient would not eat enough to cause his bowels to evacuate every day,--would it be a good thing for him to

have the enema frequently ? ("Yes.") Yes, because the residue includes not only excrement but matters excreted by the liver. In case of diarrhoea,what would you say was the best remedy? ("Enema.") Yes; so hydrotherapy "blows hot and cold,--" it is good for opposite conditions--and why? Because it establishes normal conditions. The origin of the diarrhoea is due to what? ("Poisons.") Yes,it is due to the presence of irritating substances and poisons in the alimentary canal.

Now there are some things that need to be diminished,--and what is one ? ("Heat -production.") Yes; the fever may be due to increased heat -production or to diminished heat elimination,and we must either diminish the one or increase the other,--how will we diminish heat-production? ("By increasing heat elimination.") Heat-production is the primal cause of an elevation of temperature in the body,--and how will we reduce it ? ("By keeping quiet and eating less.") I am pleased to see the interest which you show in these studies; it makes it a pleasure to me to give you these principles which will aid you in saving human lives. These principles will be of great assistance to you in the adoption of measures which will meet a great variety of pathological conditions, and when you get through with pneumonia you will be prepared to deal with almost any disease that comes along.

ADDRESS TO MEDICAL-CLASS STUDENTS, Feb.6,1900.

Treatment of Pneumonia.

J.H.Kellogg,M.D.

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S Y M P T O M S .

Relating to the Lungs	Rel'tng to Digestive Organs.	Rel'tng to the Circulation.	Rel'tng to Cerebral Congestion.	Miscellaneous.
Cough,	Constipation,	Feeble Pulse,	Headache,	Dry skin,
Pain,	Diarrhoea,	Vasomotor Paralysis,	Nose-bleed,	Scanty Urine,
Dyspepsia,	Tympanitis,	Cyanosis,	Cerebral Congestion,	Chill,
Congestion,	Peritonitis,	Prune Juice Expectoration,	Delirium,	Fever,
Exudate.	Jaundice.	Collapse.	Insomnia.	Weakness.

DR. KELLOGG,(Writing symptoms on blackboard): There is one symptom which I have not yet given you,which you have to elicit,as the patient does not present it otherwise: The treatment is this,--dip a small towel or napkin in cold water,or ice-water and lay it on the skin for a minute and a half, and then notice the effect on taking it off: The normal effect would be a redness; but if the circulation is getting low,instead of a redness ,you will get a purple color, a mottled appearance,or an area of cyanosis; that would indicate vasomotor paralysis. That is a very important symptom, because it notifies you as much as twenty-four hours in advance,of the collapse that is coming,--the vasomotor-centers fail to respond, and that is the reason you get this mottled appearance or area of cyanosis; so we will put this down as vasomotor paralysis.(Writing symptoms on blackboard.) General weakness,--that is a very import-

ant symptom. Now we have twenty-five symptoms which present cases for treatment,--five groups with five symptoms in each group: Five symptoms relating to the lungs, five relating to the digestive organs, five relating to the circulation,, five relating to cerebral congestion, and five miscellaneous symptoms.You can use your five fingers as an aid to remembering them.

As soon as you find a feeble pulse,test the skin and see if you have vasomotor paralysis. If the nerve-centers have become affected by poison,then your patient is getting into a bad condition.--

Q. Will you please repeat the treatment given?

A. Wet a small towel or napkin in cold water or ice-water,and put it on the skin and leave it there for a minute and a half. On taking it off,if the surface is red,you have a good power of reaction (you must not rub the surface) and the centers are all right; that is a method of testing them. If,on the other hand,you have a mottled or blue appearance,the vasomotor centers are paralyzed,and the next thing will be a general collapse..

Let us now consider these different groups of symptoms and see what their indications are,--for instance, cough--what is the cause of cough? The first cause is congestion in the lung, and,as a result,a pouring out into the ~~tubes~~ small tubes, a serum or exudate,and the whole lung is involved ; there is a fibrous exudate also in that portion of the lung which is the seat of the inflammayion,and this fibrous exudate becomes solidified in the lung by exposure to the air and obstructs the lung producing an irritation there,and there is a coughing set up for the purpose of removing this obstruction.. The cough isthe means by which nature expels from the lungs for-

~~eign bodies~~

eign substances; and when these foreign matters which are not naturally in the lungs,such as serum and exudate are formed in the lungs, thgy excite the coughing center in the medulla oblongata to make an expulsive effort to rid the lungs of these foreign matters which don't belong there . Now as the disease progresses the cough is aggravated so that the patient cannot expel anything at first; many times he feels as though if he could only free his lungs he would be much better. Then there is much matter of a catarrhal character thrown out into the whole lung,--the exudate comes from the whole lung--there is a congested state of the whole lung; and while we have to distinguish,in pneumonia the chronic from the acute congestion of the lung,we must remember that the whole lungs are congested,and the cough and the expectoration come largely from the lung as a whole,and not altogether from the diseased portion of the lung. So there is a congested condition of the lungs which interferes with the patient's breathing,and with the oxygenation of the blood,so it is very important to encourage expectoration and by this means get rid of the irritating cough. The patient will continue to cough until the matters which are adherent to the mucous surface of the lung have been expelled; so it is important to encourage that expulsion,-- and how can we do that? What would be the best way to aid expectoration? ("Water-drinking.") Yes,--and why? ("Because it increases the quantity of fluid in the blood.") Yes,--and it dilutes the secretions,rendering them thinner and less adhesive. The patient should drink from half a glass to a glass of water every hour--from six to eight ounces of water every hour ; and if he can't drink or does not drink, we must give him an enemata so that he will

absorb water through the bowels if he can't take it through the stomach,--the colon is a better absorbing organ than the stomach,any way.--there is very little absorption from the stomach; it is chiefly from the intestine,especially the large intestine,so the patient can take a larger quantity of water through the ~~intestine~~ colon than through the stomach.

The next thing to do is to cleanse the ~~stomach~~ colon. As soon as the fecal matters dissolve,you will have a lot of ptomaines in solution, and these when taken into the system produce exhaustion. Many people are always exhausted and prostrated after taking the enema,--they feel weak after it; this is because of putting such a large quantity of ptomaines in solution. So it is important to remember that if we are going to make the patient drink through the colon,we must be sure and cleanse it thoroughly. If the fluid is colored, repeat the enema until it is clear, and then introduce a small quantity of water at a neutral temperature,95° to 100°--such a temperature as the patient will not feel, and it should be introduced very slowly,the patient lying on his right side with his right elbow drawn back under him,and the knees drawn up, turning a little upon the face, remembering that the ascending colon runs up the right side,and that the descending colon runs down the left side,the colon terminating on the left side. We have,then, the ascending colon and the transverse colon as a sort of reservoir in which to store the water. (Illustrating by diagram.) So it is important that the patient should lie upon his right side.

There is something further to be done for the relief of the cough: it is important that the cough should be relieved, for whatever will relieve the cough will relieve the congestion. A very

cold compress will relieve it by lessening the blood-supply of the ~~pe~~ lung by contraction of the bloodvessels. (Illustrating by diagram.) We may have some healthy tissues in the center of the lobe of the lung,or in the inner portion of the lobe,--now can we make our cold penetrate so far down as that ? Suppose I have here a hot stove and a little tin vessel ; I put that on the top of the stove with a stream of ice-water running into the vessel,--I could hold my hand on it indefinitely,because the water is continually carrying off the heat of the vessel. So if we make a cold application to the skin,,the blood is continually carrying the cold away and is continually warming that part up,so that the cold cannot penetrate instantly; but there is a radiation which does penetrate,and gradually the vessels are constricted and there is a cooling taking place, but it is rather slow,and we cannot rely upon it, but there is something better than that--what is it? (The reflex influence by which the ~~nerves~~ vessels in the lungs are constricted.) How is that? ("Because,when the cold application is made,an impulse is sent to the center for more heat to come up to relieve the cold,and the vaso-constricted fibers acting upon the capillary vessels constricts them and causes a less supply of blood.) What is the purpose of increasing this impression? It is to save heat,--the two things are connected together,and that is the anatomical foundation of this application. We must get down to the roots of things,and by doing so, we will get hold of some principles that will help us in the treatment of pneumonia, and if we can deal successfully with pneumonia we bring into use many principles which apply to other diseases.

How does a cold application relieve a cough?--What is the anatomical foundation for it.? ("By lessening the blood-supply of the

parts.") That is the physiological reason,--what is the anatomical foundation for the cold application? There is a center in the skin-spinal chord which sends out one set of branches to the lung and another set of branches to the skin overlying the lung,--that is the anatomical foundation of the cold application--and that is true of al applications to the surface which are intended to affect the internal organs; we must make make our application to the external area which is in connection with the part which we desire to affect. The skin covering the lungs has an anatomical relation with all the vasomotor nerves of the lungs themselves; so when you make a cold application to the skin overlying the lungs,what happens to the vessels of the lungs? ("They contract at the same time that the vessels of the skin contract.") Does that contraction remain permanent? ("No.") Suppose we make an application of cold to the chest and make it continuous for a long time ,--what would happen? ("The skin would be overpowered by the cold after a while, and there would be a reaction.") There might be a little reaction, but that would last only a few seconds; it is only an attempt at reaction when the cold is continuous; you notice that the skin gets red in a short time when cold is applied,and then it becomes blanched again,and there is a slight reaction,--but we are talking about a permanent effect: If you leave cold on for two hours will it keep the vessels of the lungs contracted all the time .? ("No.") How many think they would? It would be a beautiful thing if it were true,--and it might not be--I am not quite sure about that . Let us see what this contraction depends upon: It depends upon a sensory impulse or stimulation of the peripheral nerves,and they translate the impulse and cause a contrac-

tion,--it depends upon the sensory impulse--the contraction of the pulmonary vessels depends upon a ~~pulmonary impulse~~ sensory impulse: Suppose we should apply cocaine to the whole surface of the lung before making a cold application,--do you think we would get a good effect? ("No.") Suppose the patient had been blistered and burned,so that the sensory nerves of this part were all destroyed,and the skin was gone and there were no terminal filaments there,-do you think we would get any reflex effect? ("Not much.") No,not any to speak of . Suppose we freeze the skin,--would we get any effect? ("No.") You see we will get no effect upon the lungs,except so long as the skin is active--so long as sensation is active. If we should apply ice to the skin so long that the nerves of the skin become numb,what would be the effect? ("The sensory impulse would cease.") We only get a reaction so long as these sensations are active; they are continual warning voices to "save the heat." But after a while,if the cold application is continued for a long time,the nerves are benumbed by the cold so there are no longer any sensory impulses then the reflex would cease; so there might be too much cold, and you might apply cold too long, and when we reach the point that the skin is benumbed,then the contractions in the lung would cease and dilatation would take place and we would get the very opposite effect to that which we wish to produce,and the patient would be worse off than if he had had no application,--and why? Because there is always a little reflex of the skin any way,which keeps up the tone of the internal vessels, and this reflex of the skin being shut off entirely by benumbing the skin of the lung,would be more congested than before. So there is a possible injury from a too pro-

longed cold application.

Another thing: When we apply cold to the surface,for instance suppose we have (illustrating upon blackboard.) Suppose here is a large nerve-trunk sending out branches of nerves,each being subdivided,--suppose this goes to a muscle,and that goes to the skin covering it: Now the main branch has a capacity sufficient to supply the small branches. Now suppose we make an application of hot or cold in such a way as to dilate the cutaneous vessels of the skin so they become filled with blood,--what would be the effect upon the vessels of this branch? ("The same as upon the other.") Suppose we make an application which affects the peripheral vessels,contracting them,--what would happen to the branches down in the muscles? ("They would contract.") ("It would take blood away from the internal organs.") How many think there would be less blood in the artery? (Several hands up.) How many think there would be less? (Several hands up.) You are about equally divided. Supposing this were an irrigating ditch,instead of an artery,and suppose we have two fields side by side,and the water flows into both fields from these ditches which are fed by the irrigating ditch. Now suppose we deepened and broadened the ditched of one field, would any more water run into the adjoining field ? ("No;there would be less water in the other ditch.") . That is precisely the situation here. By this application the effect would be general,because the vasomotor nerves which run along this artery runto all the branches; but if we make an application to the distil branches then we only influence the nerves which go to those arteries and not the others; it is through the vasomotor centers that these influences are produced. That is a principle relating to fluxion .

Here we have collateral hyperaemia of the skin; and here we have collateral anaemia of the muscle. This principle applies to applications to the chest: If we make a cold application to the chest we cause contraction of the vessels of the skin. Now suppose we make the cold application continuous, so that there is no reaction in the skin,--or, suppose we make an application of cold to the skin and the vessels contract, what is the condition of the ~~skin and~~ Vessels of the pleura? ("They are dilated.") This is because the cutaneous branches are contracted when the internal branches will be dilated. Now if we make an application of cold long enough, the effect propagates itself little by little, and works in deeper and deeper, and a larger portion of the chest-wall comes under the influence of cold and the vessels are contracted and we have less and less collateral hyperaemia in the chest-wall. But we have another thing :

Now there is a strong probability at least, that this particular collateral hyperaemia and collateral anaemia of which I have just spoken to you operates between the chest-wall and the lung itself, to some extent, through the vessels which spring from the root of the lungs, and on that account, we may have, if we continue the cold application ~~long enough~~ for a long time and allow the skin to become thoroughly anaemic, we may increase visceral congestion; so on that account we don't want continuous contraction of the vessels of the skin in cold applications. We must maintain an active skin for two reasons, one of which is, to maintain nervous activity--nervous sensibility; we must not allow the cold to be applied so long that the skin remains cold and loses its sensibility. This principle applies in every case in which you want to get a reflex action: You must keep the skin sensitive; the skin must be

kept sensitive,otherwise it becomes deaf and blind, so to speak--it does not bear our appeal to it; it is paralyzed so that we can get no reflex effects ,--we can get no reflex effects unless we have an active, wide-awake skin. Then a second reason why it would be unwise to make a continuous cold application, especially if the application is very cold--and that is, that we might increase internal congestion by excessive anaemia of the skin. So we conclude that if we make a cold application to the chest for the relief of a cough, we must not make a long continued application,--we must not make an application of continuous cold in such a case .

to be done for the relief of
What is ~~the cause of~~ a cough? One reason for a cough is the condition of the sputa which is tough and viscid and hard to expectorate because it is adhesive,--it is adherent to the mucous surface-a and the patient must drink water to dilute it . Another means of relieving a cough is to make a cold application to the chest to relieve the internal congestion, thus lessening the amount of exudate and so relieving the cough. Is there any other way to relieve a cough? ("The circulation should be increased .") Yes. (" A sedative should be used to relieve the irritation.") Yes; a sedative is a thing which benumbs. Now if we could relieve the irritation by removing the cause,that would be the more effective plan. Cold is an excellent sedative, but this irritation is inside, so wecan't make a direct application,--but the best thing thing to do is to remove the cause of the irritation--what would you suggest as a sedative? ("Application of cold.") Yes, but we can't make a direct application of cold; but we have several kinds of sedatives--what would you recommend ? ("Heat.") There is nothing that will so

quickly and readily and beautifully relieve a cough that comes from irritation in the lungs as a fomentation to the chest,--and how does it relieve the pain? ("It dilates the bloodvessels.") Producing what ? ("Collateral hyperaemia of the skin.") Yes. Now suppose you kept up this fomentation for a couple of hours,--what would be the effect of that ? ("Relaxation of the vessels.") We might say that the system will adjust itself to that condition; filling the ~~lungs~~ skin with blood will empty the lungs to some degree,and that will lessen the congestion of the lungs and give the patient great relief. Now suppose we keep on with the fomentation,--by degrees nature will adapt herself to that condition and the lung-vessels will fill up again,and then we will have the skin and the lungs full,--and then what ? ("Apply cold.") Yes, but it would be better to stop before we get to that condition,--at any rate we will get all the benefit we can from the fomentation,which will be only while the effect lasts,and while the application is draining the blood from the chest.; but as soon as the vessels of the lungs are no longer drained into the skin and the blood-supply is no longer diminished by this hyperaemia of the skin,the pain will return; then we will come in with the cold application,--and if we put on a cold application what will be the effect? ("A reflex contraction of the vessels .") Yes. Now we apply hot fomentations to stop pain; that empties the bloodvessels and they contract mechanically,because the emissaria are collapsed to some degree;then when we get the bloodvessels of the skin fully dilated,and have gotten all the blood we can out of the lungs,and before the bloodvessels have time to fill again, we apply a cold application and the skin is thus made sensitive and the zero temperature is raised as high as it can be

and the nerves are all full of blood and wide awake,and then we make a cold application and we get a tremendous vasomotor effect. Now we get not simply a mechanical contraction but a spasmodic shutting up of the vessels,so that what we got by fomentation we now hold by the cold application; so we come in with our cold application, but we don't make it continuous,--if we do, the reflex action ceases.

Next time, we will take up methods. But see how beautifully you can apply the principles of hydrotherapy to different pathological conditions,provided you know how to bring them to bear upon those conditions; but you see how important it is to know how just how long to keep your fomentations on, and how hot or cold the application should be. People sometimes use the methods of hydrotherapy in a most haphazard way.

C L I N I C .

THE TREATMENT OF PNEUMONIA.

February 4, 1900

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Let us have a consideration of the practical treatment of pneumonia Will some one volunteer to give a little outline of the treatment of this disease from the very beginning, and then we can take it up and discuss it in detail.

Dr. Rossiter: I have had five cases of pneumonia this fall and winter, and will give the treatment I have employed, which is , of course, modified to suit the individual cases. I have never been called until the patient was in a chill, or usually following that. The treatment I have employed is this: The hot enema to thoroughly irrigate the bowel, temperature 108°, and if we had a nurse so that the treatment could be properly applied, I have recommended the hot wet pack,--not the dry pack-- and with this, or at the same time the patient has cold applications or an ice compress to the head. The next day the patient has cold compress or ice to the chest alternating every two hours with the fomentation for twenty minutes. After the first day the cold enema is administered once or twice a day, usually only once, which is very effectual in bringing down the temperature. After the second day the cold compresses are diminished and the fomentations or the hot treatment is increased. The third day I give very little cold treatment unless the patient can endure it very well, and I give fomentations for about twenty minutes every two hours and possibly fomentations to the spine once a day. However I have usually recommended cold applications, or even ice applications. About every three hours so long as the temperature is from 101-3° I apply cold water with a friction mitt or what would correspond to that, or with a cloth simply. This

treatment is kept up until the crises come. In one case the crisis came on the fifth day. Following the crisis in a few cases the temperature was 96°. In such cases I have given the hot foot bath, the warm bath fomentations to the spine, the warm wet pack, and then unless the temperature became normal giving hot and cold stimulating treatment to the lungs to hasten resolution and absorption. That has been the chief treatment for restoring normal temperature. After that, so long as the patient was confined to the bed, I have given hot and cold applications to the chest. I continued the cold and hot treatment for about half or three quarters of an hour, twice a day.

Ques: What treatment did you give between?

Ans. I have given no treatment between. In none of these cases have I used the cotton pack, that is the model recommended. The recoveries were complete in each of the five cases.

Ques. What was the length of time before convalescence?

In one case the crisis came on the fifth day; in the others between the seventh and tenth days, and after the second and third dat when the temperature became norma, the convalescence was very rapid. One case was that of a man who worked upon the pavement of the street. He had pneumonia, and in a day's time after treatment he was out working again. He was the sickest man I think I ever saw. At first he called in Dr. Haughey, who gave him some medicine, but his stomach was in such an irritable condition that he coul not retain anything, so he sent for a Sanitarium physician. He wanted a Sanitarium physician and his wife wanted Dr. Haughey. I went down there and found them talking about the advisability of getting Dr. Haughey, and I told them that Dr. Haughey was a good physician, and I would rather not take the case. But the man insisted that I should, and I told him I should have to see Dr. Haughey about it. So his wife telephoned for him to come up, and the next morning we met. We had

a private conference, together, and Dr. Haughey very courteously resigned the case to me. He had not made a diagnosis. As he was leaving he as a parting shot said "You people up there think we are 'calomel doctors;' but if you people at the Sanitarium knew what was best for you you would use calomel too." But I am confident the man would never have lived if he had taken only drugs, and no hydriatic treatment. Dr. Haughey is very much opposed to external applications.

Ques. What was the purpose of the hot enema?

Ans. I gave it to relieve the congested condition of the lungs and draw as much blood away from the lungs as possible, also to thoroughly irrigate the bowels. I have always preferred the hot enema as much on account of its action upon the circulation as in cleansing the bowel. We know it has a localized influence confined to the mucous membranes of the lungs and interstitial tissue. It may be that some other treatment would be better and more effective, but constipation is very characteristic in pneumonia as a rule. So I have given that first, at the beginning of the treatment. I think it is a good plan where people have been hearty eaters to give them a good saline purge to cleanse out the bowel.

Dr. Kellogg: It seems to me that Dr. Rossiter's outline is an expellent plan of treatment for pneumonia and it is verified by his success. There is a point I would like to speak of, about the temperature. What effect did you find the cold compress had on the temperature? Did it have any very decided effect?

Dr. Rossiter: Not a great deal.

What had the patient's temperature usually been?

Dr. Rossiter: It varied from 103 to 104-5°. In the last case I mentioned where Dr Haughey was called in, the temperature remained about 104 --104 1/2 with but little fluctuation even after the enema. The cold friction sponge seemed to effect the temperature more than anything

else. It came up very rapidly. There was very little variation in the morning until the seventh day, when the crisis came and it went down to 96, and a nurse had to work over the man twelve hours to get the temperature up again.

Ques. Did you put hot things around him, giving him the dry pack?

No, I applied moist heat, giving him a hot foot bath and hot enema and a large warm pack, and then fomentations to the spine and also to the side, and instead of any cold sponging I had hot sponging follow the pack.

I should think there would be a chance for evaporation with the moist pack.

I think there is this advantage in the dry pack, that it is much easier to give and can be given more conveniently by people at home then the moist pack.

What was the temperature of the compresses, and how frequently were they renewed?

Dr. R. We had ice water. It was the last of August and the first of September, so we used ice water, and the compresses were renewed as frequently as they became warm, or every five or ten minutes and then about every hour or hour and a half according to the condition of the patient, we alternated with heat; the patient was not chilly, nor was the skin cooled, at any time until after the crisis.

Ques. How large was the compress?

It was sufficient to cover the entire left side, from the spine around to the heart.

Ques. Did all your patients have this compress on the left side?

All except in this one case. The compress passed back to the spine behind around to the sternum in front and up to the axilla, so as to cover the the whole left lung, or one-half the affected side. That will bring up another interesting point that was suggested the other day in relation to the condition of the other lung. Possibly it was more or less oede-

matous. So we would have to treat both lungs instead of one.

Ques. What sort of compress did you employ?

In nearly al l cases I have used towels, such as would be found in the home. There was one line of treatment that the Doctor suggested soon after he came back from Europe which was a new modification of the chest compress. It is difficult to give it conveniently at the home,--that is, by putting several yards of gauze around the chest.

Dr. Kellogg: I have been following this modified form for about twenty-five years and I know it is satisfactory. A few years ago I gathered up some statistics of my practice with these cases, and I found that I had had over 100 cases with only 6 deaths in the entire number, which is a very good record, and Dr. Rossiter, it seems, has had five cases, with no deaths at all.

Now without criticising the plan of procedure or the method, let us pass to the different points of the case which are of interest from a therapeutical standpoint, and see what measures will accomplish the most that could be done . The Doctor said he began with the hot enema, at 108°, and I suppose he would not object to increasing the temperature to 112-5°. That is a excellent procedure, because it helps, in the first place, in getting the blood into the skin, because it increases the action of the heart. Experiments have been made which show conclusively that the hot enema will increase the blood pressure, and increasing the blood pressure will increase the movement of the blood through the skin, and it raises the temperature of the blood at the same time that it induces perspiration. It introduces water into the circulation and that encourages the action of the skin as well as of the kidneys, so it combines several feasures which are useful. The hot pack raises the temperature of the body and congests the skin, but it does not introduce water into the circulation, and it does not act so powerfully upon the heart as does the hot enema, in raising

arterial tension. The hot enema raises arterial tension, supplies water to the blood, raises the temperature of the body, and by all these means together, intense congestion of the skin is induced. If you give hot water drinking, hot enema and the ice bag to the head you have done all you can to induce activity of the skin. That makes a good combination. But it will be necessary to be careful to avoid continuing the application too long, because we can cause the temperature to go up to 106-7°.. So if the patient does not begin to perspire within fif ten or fifteen minutes you should withdraw your wrappings and your dry pack and conclude that you must accomplish the desired result in some other way, for it will not do to continue that procedure. I have known of harm being done by sweating a patient and then putting him in a Turkish bath and keeping him there an hour or two--that will not do.

In pneumonia as well as in any other febrile condition, the power to regulate the temperature is diminished, and so all things which cause elevation of temperature will have a greater effect upon the patient than under ordinary circumstances The thermotaxic functions are disturbed and the tendency to a rise of temperature is increased. The prolonged application of heat, especially, causes a rapid rise of temperature. We know by experimentation that the hot blanket pack will cause an elevation of temperature of two to three or even four degrees within fifteen minutes, and we know that the electric light batj in twenty minutes will raise the temperature two or three degrees. So if we put a patient in a hot bath we must remember that his temperature is raised. We may antagonize the elevation of temperature by cold to the head if applied very thoroughly. In a case of this nature there is already a tendency to cerebral congestion due to venous obstruction, so we must apply cold, as the ice bag to the head and the cold compress about the

about the face during the dry pack. I have often noticed in the ordinary dry pack that the face would be flushed when the cold application was made to the head, and the patient was suffering from the heat. When perspiration begins this difficulty no longer exists, because the skin is active and the brain is relieved of the congestion.

Now it is a question as to whether patients are benefited by perspiration. Niemeyer (?) noticed that patients who were kept perspiring freely during the course of the disease did not do so well as those who did not perspire; that the disease is protracted and the convalescence slow; that the cases are very severe; that patients generally do not do so well when they perspire freely during the attack as those who do not, hence he is opposed to perspiration. But we see his conclusions are too hasty. The perspiration which occurs during the disease is not due to recuperative effort, but doubtless to the gravity of the case. A case of typhoid fever is generally a case in which the patient is in a very low state and perspires freely, so that perspiration need ~~mmk~~ induced therapeutically, would not be beneficial. I believe that perspiration is beneficial, and that the only question in my mind is, what is the best way in which it may be produced? In my own personal experience I have determined that the best thing would be to treat the patient in this way: Administer a hot enema followed by a dry pack at night until the skin is thoroughly heated, or about ten to fifteen minutes. Then put the patient in an ordinary wet sheet pack for two to three hours. If perspiration begins in the pack allow him to remain there ~~as~~ long as the perspiration continues, taking care to keep the head cool for the reason that the long continued application of heat is always depressing to the heart, and the heart is really weak,--while cold is a tonic to the heart; so the cold enema will stimulate the heart temporarily and it will be followed by a depressing effect. This kind of stimulation is like a whip,--it does not produce a permanent increase of vital resistance.

So if we apply a hot blanket pack for 10 to 15 minutes until the perspiration begins, then put the patient in a cold pack with a sheet wrung out very dry, wrapping him up carefully, keeping the head cool until the perspiration appears, I think this would be beneficial. A German physician has reported a large number of cases treated by the wet sheet pack given every other day and continued for several hours at each application, and he has reported good results. I have never tried the application exactly in that way, but I have found the wet sheet pack a most excellent thing for this purpose, and have generally cooled the patient by a pack as a means of lowering the temperature. Now the fact that the wet sheet pack increases that vital resistance is evidence that it is one of the specific results of cold. So that would certainly be a rational method of treating pneumonia. Then for a routine treatment, what would be the best kind of an application to make? A very common application with many physicians is the linseed poultice. (Dr. Rossiter: Dr. Sands says the poultice ought to be relegated to the past.) The aim should be to relieve the internal congestion so as to prevent as far as possible the formation of exudate, and to lessen the intensity of the process while it is at its onset. Of course the thing we have to do in pneumonia is, after the first onset, to combat the mischief which has already been done and to aid nature in getting rid of that mischief and to repair it. The great injury is accomplished during the first twenty-four or fourty-eight hours, as a rule. When the exudate has occurred the mischief is done. Now the thing to do is to carry the patient along through the remedial process until it can be completed. So we have to oppose as far as we can at the outset this congestion and the inflammatory process.

The first thing to do is to congest the skin. Now you cannot continue the hot application, baths, etc., until you can get the skin congested, so you must make very short applications of heat to the skin. In a short time after we find the bloodvessels are contracted more than they were be-

fore. If your hands are warm and you dip them into hot water the reaction taking place causes the contraction of the bloodvessels more firmly than before. So if we make a very short hot application to the skin the effect will be to relax the skin vessels temporarily, but in a short time they will be contracted more than ever. So in order to relax the bloodvessels well we must have the prolonged application of heat. Now heat makes a temporary relaxation, while cold produces permanent dilatation and lasts many times longer, and the cold pack has that advantage over the hot. We may apply heat to the surface by the hot enema or hot blanket pack or dry pack, which is still better, waking the skin up thoroughlu, and then get the reaction of heat and the dilatation of the skin vessels, and then by the cold wet sheet pack we get the reaction to cold, and the dilatation of the vessels of the skin, showsan active dilatation, and that will be continued for a long time. So it seems that a combination of the dry pack with the wet sheet pack is of advantage in the treatment of the skin.

Ques. Will cold friction take the place of the wet sheet pack?

Ans. The e is a disadvantage that will come in but what we want now is to produce the most intense congestion. Suppose you rub the surface of the skin and you get a reaction, and you allow evaporation to take place and it cools; we do not get so complete a reaction as if we had the parts covered with flannels, so that all the heat thrown out is retained, and that secures more complete and thorough reaction than you could get from cold friction.

Now for a routine treatment. The doctor mentions the compress. I think there is virtue in the poultice. Sister Rosa was telling me about her experiences in Africa a few days since, and she says that one of the gravest diseases in Johannesburg is pneumonia. She said she met a man

coming into the yard one day who had been well a few minutes before. He said "I feel bad," and she brought him into the house and had him lie down. This was in the morning and in the afternoon the man was buried. His first attack was in the forenoon, and before night he was dead and buried. She said she had sometimes seen twenty-four funerals in a single day. Patients would come into the hospital and die there. She told me that on one occasion she had 15 pneumonia patients all at once to take care of. They were all lying on the ground, for they did not have any bed. They were very poor people, and lay on the ground in the mud. I asked her what she did for them, and she said "I put tow on them. I did not have anything to make poultices of, so I took a big oil can and filled that with tow and put it on the stove and heated it hot, and wrapped the tow all around them and covered them up , and every single one of them recovered." She just kept them sweating by that means. Now that was rational treatment, but it ought to have been followed right up. If they had not been wrapped up with tow and covered up so that they would not chill, it would have done them much harm, because the inrush of blood would have done them much damage But they could withstand the depression of heat, so that they all got through

But I think that there is virtue in the poultice , and I think there is something still better than the poultice, and the Doctor has suggested it,--the compress. Now the question comes, Shall we use the compress or the poultice? Strumpell (?) says the compress should be changed every half hour to an hour. Niemeyer (?) changes the compress every five to ten minutes. I think we shall have to determine the frequency of the changing of the compress by the temperature of the patient, his ability to react, and the frequency with which they become heated. I think we should not keep the chest cold all the time, but allow reaction to occur or it may have a tendency to collateral hyperaemia of the pleura , the other side of the chest wall, and also of the lung itself, to chill and intensify the disease.

While on the other hand by applying hot applications and keeping the skin congested all the while there will be a tendendy to anaemia of the pleura; xth that is, when an organ is fed by a single trunk, and this trunk divides, one branch to the inside and the other to the outside, and you render this organ anaemic, there will be a greater rush of blood there than to the outside, on the same principle that is manifested in the big irrigating ditches out West. Now if we increase the size of certain branches of the artery, dilating them by heat or otherwise, we will decrease the size of the other arteries and lessen the amount of blood flowing into them. So we have collat eral hyperaemia. Heat applied to the chest will produce collateral hyperaemi a. But there is a disadvantage in the continuous hyperaemia and continuous ~~hyperaemia~~ anaemia. Continuous hyperaemia of the skin has a tendency to simply produce a stable condition of the bloodvessels of the lungs; they become inactive and remain in that way.

Now if we apply cold the cold will produce a reflex action. We get a reflex action through the nerve centers. But cold applied to the skin will cause a contraction of the vessels of the skin, and at the same time a contraction of the vessels of the lungs which are associated with the skin area. Then if we allow the reaction to take place in the skin of the chest as the intensity of the cold is lessened and the temperature of the skin rises, at the same time the vessels of the lungs will dilate. Then when we renew the application of cold to thechest wall, there will be a renewed contraction. Not only the skin but the lung vessels will be temporarily rendered anaemic, but reaction will soon take place and cause a contraction. Then another reaction will cause a contractio n, and in this way we will have a continuous movement of the blood through, and a sonstant renewal of the blood in the lung.

The thing we aim at is not to produce an anaemic condition of the lung, but simply to increase the movement of blood through the lung. Now we used to think that the thing to be done if inflammation took place was to cut off the blood supply. But if you do that sloughing will take place. Just as soon as the blood supply is cut off you get sloughing or death of the parts. Now the thing that is wanted is not to cut off the blood supply,, but we want a diminution of the blood supply when it is excessive, and then a continued flow of pure blood through the parts suffering from the inflammation: The part that is suffering from the inflammation does not begin to suffer very seriously until after passive congestion begins. It is when the bloodvessels become permanently dilated and passive congestion comes in as the result of the development of toxins in the part. The toxic effect of these germ-poisons upon the bloodvessels causes a permanent dilatation, and then there is a stasis of blood and the leucocytes which are brought into the parts soon lose their fighting ability Their activity is soon destroyed and then they have no further curative power. But by causing an increase of fluxion through the parts, by contraction of the bloodvessels, passing the blood that has been stagnating the out and letting fresh blood in, and by a continued movement of fresh white corpuscles brought in, there is a continuation of the remedial process. Now this is the theory suggested by those who recommend that procedure. Strumble recommends that the compress should be continued until the reactic takes place, and I think that that applies to the other parts of the body as well.

Dr. Rossiter: Besides, the patient would not be so tired.

Then instead of taking off the compress we allow it to remain in place until a good reaction takes place. If the temperature is very high and the skin is very hot let it remain in place ten to fifteen minutes or even thirty minutes. Change the compress only when it gets warm,

not allowing it to dry.

Ques. What kind of a compress do you put on?

A cold compress, at 60°. Results have been produced by the icebag. Mays used the icebag and there is no doubt but that it produces good results, but he is at fault, I think. If the patient moves about he keeps the icebags moving around also, so that one part reactswwhile the other part is being chilled.

Another point which I think is important, and that is, whenever the compress is changed, always take a dry flannel cloth and rub the chest until it is red, and that will promote the effect of the compress by increasing circulatory reaction. It will increase the skin effect of the compress by bringing the blood to the surface to be cooled. That is one advantage. It will increase the reflex effect of the compress by restoring the condition of the cutaneous nerves. That is a point of very great importance. But in that way we will continually renew the effect of the compress, and intensify its effect.

Now how much surface should be covered? It is wise, it seems to me, to make the compress cover a large area of the chest, even the entire chest, or as much of the chest as we can conveniently cover without disturbing the patient too much, and it is always important that the heart should be covered. The compress should always cover the heart because the heart as well as the lungs are seriously involved in these diseases. These are the two organs chiefly involved, and we need the tonic effect of the cold and the reflex effect also upon the lung itself. There is a point which I have not appreciated until the last year or two,--by making a more minute study of some points, as the necessity for attending to the upper chest, the apices of the lungs, the tops as well as the sides etc. In applications to the chest the skin covering the apices of the lungs is the most important portion of the area connected with the lungs. The very tops of the chest are apparently more fully supplied with nerves and the reflex activities are

greater than in other parts of the chest, for the reason that the space at th upper part of the chest is more exposed, and so the skin is better developed. For the same reason the skin of the hands has a larger number of reflex vasomotor centers and the reflexes are stronger, so the hands, the face and the back of the neck would give the most pronounced effects from applications to those areas.

Now in giving typhoid fever patients baths, it has long ago been observed that it is necessary that the shoulders should be completely submerged in the bath so that slow chilling by evaporation should not occur. I think this is important in pneumonia . I think this is a thing that is sometimes neglected, and it is not always easy to accomplish this unless some special pains are taken to do it.

A word further in reference to the area to be covered. If one wants to cover only one lung, I have found a simple way of doing it. The compress should be laid upon the chest,--which is always in moving about. Split the end of the towel and bring the two ends over the top here, fastening them there, thus covering the whole lung--the top of the lung, and the lung itself and the shoulder and the side of the chest . Now if you want to cover the other side in the same way you can do that. You may use a towel or a sheet. You can make the towel double if you want it thicker. You can have it as thick as you want it.

This is for a heating compress. For a cooling compress you want something thicker than a towel. It must be thick. We will take a quantity of cheesecloth and we can apply that in such a way as to cover the whole lung. People get colds in the lungs more by exposure of the tops of the shoulders than in any other way, and it is because of the lack of protection of the tops of the shoulders that low-necked dresses are so dangerous. The most dangerous parts of the chest to be exposed are the tops of the shoulders, and especially in pneumonia we should take particular

care of this region.

Another point of value is to put a blanket on the patient's bed, making it long enough to just pull down ocer the shoulders. We will put this under the chin and the shoulder will be well protected. The blanket comes up under the patient's ear. It laps under the shoulders. In this way it will not get out of place. (Illustrating.) Now in taking off the compress or during the suspension of the compress once in a couple of hours we apply the hot fomentation, which is very comfortable to the patient. Cold applications will generally afford more relief than heat, but a very short hot appliction once an hour or ten to fifteen minutes(?) , very hot, is of great advantagem because it gives almost immediate relief by producing very strong peripheral hyperaemia, drawing a large quantity of blood to the surface. Now by the applic tion of cold the blood can be fixed in the suffface. There is just a temporary contraction of the bloodvessels by the cold application, and this is directly followed by reaction. But when we keep the ~~xxtnx~~ cold on all the time the tissues are chilled deeper and deeper until the contraction extends deeper and deeper until the applic tion begins to lose its effect; but by the hot applic tion we restore the parts to their normal state again and awaken all the nervous activities and fill the tissues full of blood and so relieve the internal congestion and relieve the pain. Now it seems to me that these hot applications will always be recognized as very essential, not only to relieve the pain, but to assist in accomplishing the effect desired upon the circulation itself.

Now the question is, how long shall the compresses be continued? It seems to me that they should be kept up all the way through the disease, but they simply need to be modified to suit the different conditions of the patient during the onset. The applications would naturally need to be frequently renewed. The cold compress would be applied and changed, per-

haps, every ten or fifteen minutes, as soon as they become decidedly warm. When the temperature of the patient is lowered, if it is lowered, and the intensity of the symptoms is diminished, then we should allow the compresses to remain in place a longer time, and perhaps changed once in thirty to forty minutes. Then when the stage of defervescence arrives and the crisis is past and there is no longer an elevation of temperature, we may leave the compresses in place two or three hours. I think a good plan is a hot fomentation to be followed by a cold compress to be left in position. It then becomes a heating compress. Then apply a fomentation three times a day and allow the compress, put on after each fomentation, to remain until the next fomentatio is applied. The effect of this compress is just that of a poultice, and the poultice does encourage absorption, there is no doubt about that . It encou ages exudate.

Now the hot and cold application that Dr. Rossiter employs is a most excellent application in these cases. Then if you were going to apply the alternating compress, that would need to be modified according to the patient's condition. If the patient has considerable pain and there has been a considerable pleuritic pain, the hot and cold in alternation at equal times would have the effect to increase the pain. So we apply the fomentations for three minutes , then the cold application for half a minute then another fomentation for three minutes again, then a cold application for half a minute, etc., continuing for four or five times,-keeping it up eight to ten times would do no harm . That is a revulsive compress, and it will relieve pain, and at the same time produce revulsion in that way you do not remove enough blood from the skin to cause retrostasis; you only take out what heat you put in, and so revive the nervous activit of the parts without the production of retrostasis of the blood toward the interior, and give a considerable circulatory reaction without getting any thermic reaction.

That is not the most desirable procedure, however, for the production of absorption. In order to produce absorption we want to get a decided increase of tissue activity, and so if there is a little pain, or there is no pain at all, youwill increase the length of the applications until the hot and cold applications are of ~~xtkxx~~ equal length. The hot application should be long enough to heat the parts, and the cold application just long enough to take out of the tissues the heat that has been put in, and fifteen seconds is long enough to accomplish that, and get the most powerful excitant effects,--that is, you need to apply the fomentation just long enough to heat the tissues up to the temperature of the fomentation--that is, the superficial tissues--so as to get the tissues up to the maximum temperature, and the cold application is applied for just a sufficient length of time to cool them down to the minimum temperature; to cool the tissues down until ~~axxt~~they are as cool as they will become,--or rather, to take the heat out that has been put in by the application. That is the standard of the alternating applications, and fifteen seconds will accomplish this.

Now if there is some pain you will increase the length of the hot application, renewing ~~it~~ the cold a plication for fifteen seconds, but increasing the length of the hot application just according to the amount of pain, then ending up your application with a cold application, so as to have the heating compress and the beneficial effects which you get from the poultice-action of the compress.

Ques. Suppose the pain was intense, and was not alleviated by this treatment?

Ans. We are speaking of the earliest stages of the disease. I have found the best effect from putting on a dry bandage about the chest and drawing it tight so as to stop the movement of the lung and restrict the action of the lung; I have found that this was very comforting

to the patient. This bandage of cheesecloth or an old piece of sheet easily absorbs the water. Then make your hot and cold application right over it, and allow it to become wet, as that will not do it any harm

Question: When would you use the hot for three or four minutes, and the cold for fifteen seconds?

Ans. Where you use the revulsive compress. Where you use the alternating compress it will increase the pain. Dr. Hinter has a case in which the action of the alternating compress produced most wonderful effects after other measures had been resisted.

Ques. Would you give the patient treatment all night long, provided he was awake?

Ans. Yes. But when the patient gets to sleep he should not be disturbed. I would simply make the cold compress a little wetter and a little thicker, and then allow it to remain in place a longer time. It will take a little longer time for the reaction. Change it once an hour, or once in an hour and fifteen minutes, and so prolong the action. Now when Sister Rosa used tow, you can see that she had a sort of a wet compress instead of a dry one, and the patients soon began to sweat. So when dry cotton is used and packed about the chest before it is covered with rubber cloth, you have a moist compress soon, and you get the action of a heating compress after it has been in place long enough for the reaction to occur.

Now the best way of applying the compress: With this kind of a compress it seems to me it would be a very good way to have a cheesecloth of eight to ten thicknesses, and have it split in the way I described a few minutes ago. If you cannot get a blanket get two or three towels. Bring it under the arm, and cover it as I have shown you. Then have a blanket lying on the bed, so as to be always ready for use. This should be split at the ends. (Illustrating.) Put this blanket, where it is split,

down upon the sides, and right down under the patient. Then when the compresses have been changed,--the cold compresses, these two lower sides can be brought over so as to cover it thoroughly, and then these other points can br brought over the top of the shoulders and fastened down. It is better to bring the split portion over the top of the shoulder first, and th the other, and then it is easily put in place and held back. Now the patie rolls back. Now carry this over to this other side in the same way. That covers it all up perfectly. That is not a complicated bandage at all. It is intended for use in cases which are not very acute. The blanket remains in position all the time. It will have to be fitted to the patient a little at first. When it is wet it will hold its own. If you want to apply it to the lungs, put it under the arms. This is brought up over the top. It must cover the heart. I believe it is just as well to have two half-compresses instead of one. This comes up over the the top and brings this down tight. (Illustrating.) It makes everything tight. The application of the cold compress to the whole chest will have a more permanent effect upon the temperature In applying the half-compress, the lung must be sure to be covered.

Ques. Would there be any advantage in covering with oiled silk?

Ans. Yes, we must have the oiled silk outside of it. I think it is a good plan to do that, especially when we come to the latter stages of the disease, when we want the heating effect.

Just a word about hot sponging, or rather the application of heat. When the person has a tendency to be cooled, should we use the wet pack or the dry pack? Now the dry pack favors the accumulation of heat rather more than the wet pack. What we want is not so much to get heat to the patient, as to shut off heat elimibation. It is also wise, I think, to encourage his heat production in these cases, and the hot fomentation has a tendency to produce atonic reaction, and to diminish the heat production, so the cold friction is an excellent combination in

hich is unfavorable. It would be better to give the patient a partial cold riction to one arm, and then go on, taking small areas, until the whole bo y is gone over, and then covering up the patient. In this way I think we would get the quickest return to the normal temperature.

Ques. Suppose the patient's temperature is 96° and he is chilly, would you apply the cold ~~fxmmm~~ friction?

Ans. In such a case I think that either hot or cold water should be avoided, especially hot water, because the evaporation taking place will make a chill in small areas which will be propagated over the patient. You take the patients feet out of the bath for instance and there will be an evaporation from the parts close by which will set up an atonic reaction without giving any heat. It seems to me that the cold friction is the best thing for warming the patient up, because that increases the heat production,--that increases the forces by which the heat is pro dduced and so we are removing the cause of the difficulty.

C L I N I C , Feb.2, 1900.

J. H. Kellogg, M. D.

---X---

PNEUMONIA,--Symptoms, etc .

A foul tongue appears in the second stage. In the third stage the prune-juice expectoration appears. The patient who has that symptom is likely to die; this is among the most fatal symptoms. It is sometimes taken for rusty expectoration,but it is not.

Q. What does it indicate?

A. It indicates a complete stasis in the lungs,and complete engorgement. Ultimately the whole strusture of the lungs participates in the inflammation,leucocytes being found all though the lung structure,and there is parenchyma; germs are in the tissues.

There is another thing that I wish to call your attention to,-and that is, where there is an oedematous condition of the lung,so that there is more or less stasis all through the lung; perhaps a quarter of the lung is involved in disease, and the same amount of labor is required of the healthy portion of the lung as had been required of the lung when in its normal condition. At the same time ptomaines are being formed which have a paralyzing effect upon the heart. Furthermore,because of obstructions in the pulmonary circulation,the left side of the heart is not properly supplied with blood,and the ventricle is not properly filled,hence it does not contract with vigor, so the systemic circulation is weakened at the same time that the pulmonary circulation is interfered with.

~~culation is interfered with;~~ so the heart has more work to do, and at the same time it has less power to work; its power to work is interfered with by toxins. The aeration of the heart is also interfered with so it is weakened by the poisons of CO_0,--partial asphyziation. These are important factors which interfere with the circulation in pneumonia, in consequence of which every pneumonia patient is in danger of death from the interference with the heart'ts action. Hydrotherapy has very close relation to the action of the heart,and this fact should be constantly kept in mind in every case of pneumonia. The most important thing to be done in cases of pneumonia is to keep the heart going; if you can keep the heart going long enough,you can pull the patient through.

Suppose we consider for a moment some of the different clinical types of this disease :— what are they ?--just one point further: In consideration of the fact that we have oedema extending all through the lung,it shows that we must not only treat the small area involved but the entire lungs must be helped in pneumonia. The heart also is seriously involved and must receive attention as well as the lungs. We must consider not only the diseased portion of the lung but the entire lung must be considered.

Now,the clinical types of pneumonia: There are several of these,and then the disease is so often associated with other diseases,that it is difficult to tell which it is,-sometimes it is associated with typhoid,and sometimes with meningitis,etc. There are five diseases with which it is frequently associated,--smallpox, measles, typhoid fever,malatial fever and scarlet fever.

Q. Would you also mention pleurisy as accompanying it ?

A. That is a complication. As I have said, there are five

chronic conditions which are very likely to occut in pneumonia. Diabetes is also very common in pneumonia, - also a deteriorated condition--these are some of the predisposing causes. Among these we might also mention a deteriorated constitution and locomotor ataxia in consequence of the atrophic changes which are taking place,--also Bright's disease or albuminuria. Another predisposing cause of pneumonia is chronic alcoholism,which is a very common and a very bad complication. Ophthalmic goiter may also be mentioned as another of these causes. Pneumonia is common in mointainous regi-ons . Tubercular patients who are subject to pneumonia are not sent to mountainous regions. Pneumonia is one of the most fatal diseases in the mountainous regions of Mexico. This fatality may be due to the diminution of the lung area and the rarefied air,which is not able to support life.

Now what are some of the complications which arise,in relation to the lungs? ("Tuberculosis.") I ought to mention tuberculosis as one of the associate diseases in pneumonia,and as a disease which frequently occurs in connection with pneumonia--that is one of the infections,however. Pleurisy is also a complication of this disease, also bronchitis; it is important to remember that. Capillary bronchitis is a thing that is most likely to occur.

Beginning at the heart, we have pericarditis, endocarditis, and myocarditis or paralysis of the heart. Dr.---will you mention some of the disorders of the stomach ? ("Gastritis and duodenitis.") Now,hepatic complications,--will some one mention some of these ? ("Tympanitis, jaundice .") There is a little jaundice --

"bilious pneumonia," as it is called in the old textbooks, and a little icterus condition which might come from obstruction, as in catarrhal jaundice. Niemyer claims that about the most common cause of icterus comes from hepatic congestion which arises from venous stasis. The liver is sometimes much congested; the lungs are also congested; the veins are congested; the accumulation of blood in the veins of the systemic circulation leads to congestion of the liver, and congestion in the hepatic capillaries, by pressure upon the biliary capillaries would obstruct the flow of blood, and there might be a reabsorption, which might also cause icterus. We may also have nephritis, and there may be peritonitis. We have different kinds of germs, and then we also have otitis, arthritis and peritonitis.

These are complications, and we should examine them. It seems to me that when we have a case of pneumonia, we should examine every-disease, because, as we all know, muct of the difficulty in treating pneumonia comes from the difficulty of particularizing the disease, and difficultics occur that might have been foreseen, if we had been on the lookout for them. Some time ago, a doctor in the surgical ward asked us what we would do in case of peritonitis. We told him we didn't have it, because when we had a patient that was likely to have peritonitis we treated him for it, and then he didn't have it--we treat the patient for the disease before he gets it, and then he don't have it. Suppose a man is just beginning to take cold: If you can at that moment begin treating that man for the cold, he won't have the cold, because you have antidoted the cold.. This ca be done within certain limits, however.

Now, for the treatment of this disease, we will give a little outline which we will fill up a little later. Will some one give us a little outline of the proper treatment of pneumonia, and let us pick it to pieces as hard as we can. We are all studying here together, and I will take it for granted that we don't know anything about the subject. I don't claim to know anything about it, and I expect to learn something ~~from it~~ about it from this conference,--and that is why I have the conference. Before I publish anything about pneumonia, I want to know that I have got the last word, and I expect to get some information here. Now will some one give us a little outline for the treatment of pneumonia?

Let us suppose a case: Suppose we have a child who has pneumonia--a child who had been healthy previous to his attack of pneumonia. We find the child immediately after a chill,--he has had a chill. We have made an examination and found evidences of pneumonia with a very rapid onset. Now what is the best thing to be done right away? Let some one volunteer a suggestion. ("Sweating-pack.") Your recommendation would be a hot blanket pack? ("Yes.") But we don't know yet whether the child had pneumonia or not, for the child has a convulsion instead of a chill. It is possible that after we have found that there is a lesion that we can localize it. Before you know that the child has pneumonia,would it not be a good plan to do something while there is only a suspicion that the child has pneumonia, and not wait until the child isso far gone in that disease that we know that he has it, so that it may be possible to prevent pneumonia. We will first consider the matter of a chill: Suppose we find the child with a chill,--what is the best thing to be done for him? ("A dry pack.") Why is that better than a wet pack or even better than a hot bath,to prevent a chill? ("Because there is no moisture and rapid evaporation.

("I don't see why there is no evaporation in a dry pack.") We will suppose the patient has the migratory form of the disease: with a chill at an early day. U have found that many nurses are giving a wet blanket pack for a chill; so many are doing this that I thought it might be worth while to consid r for a moment as to whether the dry pack is not better. It is true that evaporation chills the patient. Now let me call your attention to this fact,--that it is only necessary to chill a small area to cause a chill all over; chill is a thing that propagates itself. What is the cause of a chill? A chill comes through the constriction of the peripheral vessels, so that the sensory nerves are supplied with only a small supply of blood, and they transmit ~~the results~~ an impulse to the vasomotor nerves, and this results in a chill ; the muscular apparatus and the thermogenetic apparatus are involved,--there is an anaemia of the skin in consequence of the chill--it is not necessarily coldness of the skin, but anaemia of the skin. But a spasm may be produced by cold or by heat, or by toxaemia of the blood, as in a case of ague which we have. Toxins in the blood, in malarial fever makes a chill causing a spasm. Some one has shown that a spasm in the vessels in malarial fever begins two hours before the chill begins, and the spasm gradually increases until it reaches the point where anaemia of the skin is so great that there is a spasm induced in the bloodvessels, and that is the cause of the chill. Suppose some one drops a little ice-water on your neck letting it trivkle down ~~your~~ the back of your neck--it makes an impression--a chill all over. Why? Because the impression sent into that small area is generalized through the nerve-centers. If you put the hands of your patient into cold water, he will feel a chill all over. Let a person chill the bottoms of his feet and he will feel a chill all over. So it is only necessary, especially if a person is already pre-

disposed to to chill, that the chill should be induced in a small area--it is only necessary that a spasm should be induced in a small area, in order that a chill may be produced in the whole ~~body~~ surface of the body. Here is a Person in a hot bath: Every time he takes a breath in the hot-bath, his head is pushed out of the bath, his cheat is raised, and is exposed to evaporation, and right round the neck there is a little portion that is exposed to evaporation, the cheat being continually thrown out, and there is a little chill there; so you will sometimes find a person in a hot bath who keeps getting down further and further into the water, and the reason he does this is, that he feels a chill round the neck, and if he could submerge himself entirely it would be a good thing for him. Now in a hot -blanket pack--in a wet-pack--the same thing exists to a certain degree. It is possible to close up too tightly about the neck, at the top; but in a hot blanket pack there is still ~~still~~ a little space left around the neck, and this seems to be an especially sensitive area , and there is room enough for evaporation to chill that part, although the rest of the body is wrapped up tight and the blankets are wrapped under closely; but there are certain movements of the chest in breathing which loosens the blanket, and then evaporation will take place, because there will be some perspiration. I once had occasion to put my hand in a pack, and there was a crack in the rubber about an inch long, and in the morning the pack was perfectly dry; all the moisture had passed through that little opening, so there will a considerable evaporation take place through a small opening; the water in the blanket is evaporated, and the whole woolen cloth is filled with the vapor of the water; it is really a vapor-bath, and the evaporation passes up the sides of the neck, and chills those parts.

Now we can imagine that a person in a vapor-bath is like a tea-kettle which is converting water into steam, some of which escapes about

the neck, and the moisture which passes about the neck produces an evaporation and a chill. Now if you have a patient in a dry pack, you dont have this water to evaporate; you get rid of the moisture, and you are much more successful in controlling the chill--although you can't exactly get control of it--you will mitigage it . ("We often have trouble in cooling patients.") The cloth should be an inch wider than the linen and the rubber cloth not wider than that---but let us take that up and discuss it another day. You want it covered with rubber cloth for a cold or for the throat. The reason of this is, that as a rule, you want to produce hyperaemia of the skin to relieve the congestion which is being formed; that is the reason we cover some places, and some places we don't cover. But we will perhaps take this up at another time; it is a very interesting subject.

Now suppose, between this and the next meeting, having these facts of pneumonia before us,--having the complications and the pathological conditions, and the conditions to be met--suppose each one prepares a practical form of treating pneumonia and all its complications,--write it down and bring it into the next meeting .