

DR. WILFRED T. GRENFELL

Stereopticon Lecture at the Sanitarium Gymnasium, Battle Creek, Mich., Monday,
March 29, 1909, at 8:00 P. M.

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Dr. J. H. Kellogg: Ladies and gentlemen: We have all waited with great expectation and anticipation for Dr. Grenfell's visit. Since he was here two years ago we have all wanted to hear him again, and he has taken the trouble to hurry here from Minneapolis where he lectured last night, speaking four times yesterday, to come here to talk to us. Now, I hope we will all remember, while the Doctor is talking, that he has not come here to talk to us just for our benefit, although I am sure his motives are altruistic and philanthropic toward us as well as toward his own work. He has come here to interest us in his great work. We are all interested here from what we have read in the magazines and the papers, and the whole world is looking on with admiration at the great work which Dr. Grenfell has done in Labrador; and he has come to show us something of this work and to tell us about it; and in the meantime, while he is talking, let us get ready for the intermission which is coming in the middle of this very interesting discourse to give us the opportunity to get our hands down deep in our pockets and get out something to give his work a good life. We will now listen to the Doctor.

(Great applause.)

Dr. Wilfred T. Grenfell: Dr. Kellogg and ladies and gentlemen: I will do my best to make everybody hear, but I have been speaking such a great deal that yesterday I almost fell through in speaking because my voice gave out, but I will do my best, and I will ask you to remember that I have been speaking a great deal and it has been a little difficult of late to make myself heard. However, you

can all hear the pictures, and these pictures I am going to put on here, just some amateur photographs, of course they are culled out of a very great number. I am not sure which pictures I showed here before, and there may be one or two you have seen before, but I don't know about that; anyhow the sole object of this thing is not to give a pictorial display. The idea of pictures is to try to convey some succinct idea as to the way in which we are trying to do our work. I stand in a place where so much definite scientific work is done that I speak with a great deal of diffidence; but you must remember, in looking at our work, the circumstances under which it is done.

First of all, the object of it I don't want to make any mistake about. Though we do set people's legs, and we do operate on people's eyes and so on, we could have done that at home, of course. The object in going there is to try to do more for a man than to cure his leg or heal his eye. I have always thought that the medical profession is the noblest, because otherwise I suppose I would not have gone in for it; but there is something more than the body in the human being. At any rate that is some of our view of it, and when you have seen a man who is debased and has lost his sight of the Sonship of God, perhaps is drunken, perhaps is beyond helping his wife and children, beyond helping himself, we do not feel as though we have finished with him when we have cured a cold in his nose. We want to do something more for him than that and to send him back well able to fall into the same trouble again. We want to try to do what we think is Christ's method of doing things for other men,--making new men from within, giving them new ways, new aspirations. Of course, whether you can do that is quite another problem, but the idea is there.

When I started in, twenty-five years ago nearly, a great many of my college friends said I was an uncomplimentary kind of fool, because they thought that the problem was one that some of them thought was not worth while anyhow.

They thought it was a much bigger problem to stay in London and pile up a lot of dollars, while others thought it was a problem you could not solve. In a place like this where the missionary ideal is so much understood, and where the success of missionary work has really been demonstrated,--you have men here in your midst today, men who have seen the results of their own work; but twenty-five years ago anyhow, I had very little knowledge of missionary fields, at least the vague sort of knowledge that most men have--any one who has got money to spend. I thought that generally was a thing for old ladies, and thought it didn't accomplish much in this world; and, like the gentleman who went to India and never saw a tiger, I had gone through life and I don't know that I had ever seen a mission; but anyhow, I had this faith--that the cure for the disease which is more than that of body was once demonstrated in Galilee, and that if it was good then it is good now, and if not I would heave it over the side. What is the good of carrying a cargo that is no use to anybody? And if the gospel of Christ does not make new men out of old ones, what good is it? We can do the body part ourselves practically.

It was only after I heard Moody preach,--I ought to say after I had gone to the university, that I took any interest whatever in this kind of work. Then I thought that I had grasped a new idea, not only that religion was a sort of insurance ticket by which we escape punishment, but that it was what Christ claimed that it was--a way to make life more abundant, not to cut off and say things we are not to do; but ^{give us} ~~xxxxxx~~ of infinite visions and chances of doing new things. So instead of practicing in London, I was casting about for somewhere it would suit me to go and put my life in. I was bred on the sea and by the sea. I had always lived among those that go down to the sea in ships, and it was somewhat natural I should go down to them, especially as I knew they were in a position I had been in recently,--that they were just living for things that perish. Their idea of suc-

cess in life was bounded by what they could eat and drink and put on. They think the best thing you can do is to have a big social position, or a big bank account, or a big record,--opportunities which no one would wish for one second to depreciate the value of those good things. An athletic record is a very good thing to have; a big bank account is a good thing to have, if I understand the Christ rightly, but of each one unto whom five talents had been committed, he expected five talents back again in addition. I wanted to try to bring into these men's lives that which I could believe would displace the old one. I went down to the seaside where the fishermen are at Yarmouth, started in to see what were the pros and cons of the problem. It was no good going down to a lot of fishermen coming in from sea, to preach to them and ask them to come to prayer meeting right away, because you knew very well they were going straight to a saloon, or if they didn't go into the first one they would come to, they would go into the fiftieth one before they reached home. The influences for evil are out for money of course, and commercialism in that sort of breed does not stoop at anything; it does not matter a bit so long as they get money. They would damn the men's bodies as well as their souls and rob their wives and children; but they got their money, and that is all they were after. There were dozens of these saloons with all attachments, every kind of vice you could imagine for waylaying the sailor; and I don't know as there is any fellow more easy to catch in the end than the sailor is. He is reticent about standing for any ~~his~~ particular ideal, and he is modest and never likes to make himself conspicuous. When he is asked to do things, he does not like to stand on his dignity, and when he was paid off in the saloon, he had just about as much chance of getting out with his money as a fly has of getting out of a bowl of treacle; so he was in a bad condition, and it was easy to see that the women and children were largely going to the poorhouse; the widows and orphans always

went; perhaps the children were badly fed and badly clothed and never went to the schools at all. The police forces were doubled in the fishermen's quarters and the saloons flourished most. One would go down there and think, "It is not worth while preaching the gospel here." Because no man wants to put himself against a problem which is self-evidently impossible, no matter how big it is, and you have to believe that the preaching of Christ in the body certainly could do what it did in him first,--take a man like Simon from his boat and make him into the Peter at whose feet the world has almost sat ever since; take a John and a James mending a fish net and make them into men; ~~who are like~~ ^{whom} most men think of now with a gold crown around their heads. I have always learned to think there is very little difference between men in succeeding ages. We do learn a little bit more, but the fiber of the men is the same; and if a gospel could make the Peter then, why wouldn't it make a Peter out of the evolved man twenty centuries later? My own experience is this, that a missionary has to sit at the feet of his fishermen very often and learn many ~~like~~ lessons; and there are lots of so-called Christians who could go out to see the work among fishermen when they have come back, and find the best sermon they ever heard in their lives at rest up alongside a Christian fisherman, because it does not stand for conventionalities with them. Fishermen at sea especially on the Labrador coast, do not even wear a black coat on Sunday. I have had a good many battles with owners of fishing vessels, who go to church themselves, but if you ask one if his vessel can keep its gear on Sunday, he would say, "Certainly not." So you see there is no conventional reason why fishermen at sea should be Christians. It means standing up for principles; and I can only say so far as the English speaking people go; I have not had much experience among aboriginal people. We have a few Esquimaux and Indians; but the fishermen are one class, and when we do say we are Christians, we are heard,

because everybody on board knows we have said so; and I only wish I could pursue that subject a little further by illustrating it. But this you can make sure of, that the other men in the crowd on a vessel set a very high ideal for any one on board who calls himself a Christian; and that makes men stand out, not for what they can say, not for their oratory, not for their eloquence, but for their careful walk. Now, then, those are some of the pros and cons, and the other thing was, what is the remedy?

Well, the remedy is, if you can get--it seems self-evident to me to say so,--but if you can get Christ to live in those men's hearts, then they will have a new heart, will love new things; and when a man once gives a fisherman a thing he loves, he is not going to count the cost very often as to how he gets it; he is not afraid of anything. The question then is how to do it. I never was much of a preacher, and in those days, I could not stand up and say ten words on a platform. And when you go down, especially among people who do not want to be that sort of thing, you don't find it any easier. Some people think it does not make much difference what you are at home; out among the negroes or other heathen you can say whatever you want to. Suppose you go aboard one of those vessels and you say, "Where are the men?" They are all turned in. Now, you don't know how to begin. You can't say, "Turn them all out; I want to preach to them." They won't turn out; they are more likely to turn you out. So you have got to have some other method than that which appeals to us and than appealed to me when I went to sit in an audience. The kingdom of God, I think, has got to come very largely without observation, although it may be in large meetings men may be stirred and drawn to God; yet, I think myself that it is more by what we are than what we say that fishermen, at any rate, will be won for the Master. I think Emerson put it very well. Perhaps you know his little dictum. He said, "What you are speaks so loud I can not hear what you say." And that is so universally

true that if you want to make the Christ attractive to people like ours you have got to do the best you can to be attractive; you have got to reincarnate, as it were, the message that was incarnate once, that was made flesh and dwelt among us; and I fancy among fishermen it has got to do the same. In other words, it has got to do the way Christ said,--"If you will follow in my footsteps, you shall be made fishers of men"; and as for the rest of it, whether you believe you are going to get the result or not; I always think this is true--men make a great mistake; they think Christ said we have got to subscribe for a creed and know all about everything before they start in. No man is ever going to have knowledge in this way. We are going to act on faith; if we don't we are never going to do anything. When I look for this knowledge among believers, I know it is not knowledge that has brought them unto this faith; and when I look at the stock exchange in New York and see the great crowd there betting their money and buying those stocks and things, it is not because they know; it is because they believe that those things are good. And I don't think, looking back from twenty-five years later, that I am still on the same footing, because I think that we do get knowledge by experience. Knowledge and wisdom come by experience. Put your finger in the candle, and if you never knew anything about heat before, you will soon get knowledge. And if you drop into the polar sea you get knowledge; and the young Christian who goes out to do work, wants a lot of that sort of thing. We all have to pay the price of experience, at least I have had to pay it pretty often.

I will put the pictures on and explain to you the ways in which we are working, now, because I don't wish to keep you too long. I wish the pictures were better, but you can see everything well. I will put the map on first.

Some people say, "Well, why do people live in Labrador? I am an op-

timist myself, and I don't know exactly why people do that, but I know they do; that is one thing that is very important to remember, and the philosophy of it is a secondary matter anyhow. But you see this vast area of land here. Does anybody suppose God created it for no purpose? It has got some use. And when you come to look at the world elsewhere, we have got to understand that was said of almost every portion of the globe. Somebody asked me in Minneapolis why they lived up there. I had a very good reply for that question, because I knew that it was only ninety years ago the United States government said Minnesota would never be settled by humanbeings; it was not fit for habitation. And when they made the school grants on the river there, the federal government gave them twice as much land as anywhere else, because nobody supposed that they could live in such a country. When I was in Winnipeg the other day, people were asking me the same thing. It was not so long ago since no one valued the northern prairies much; they didn't think wheat would grow in the Peace river district; they didn't think the granary of the world was going to be on those plains to rival Egypt. It is not so long ago since the hand of the irrigator was turned to southern Californian sands and turned them into places that blossomed like the rose. I have just been out there and seen land that was a short while ago absolutely valueless, and now it is per acre about the most valuable land in the world. So it is all over the world. If you could get a Luther Burbank, and you could get some one to turn their attention like Jackson did to Alaska to bring in animals there that would flourish, this ~~amazing~~ country would support a vast population. We are turning our attention to all those things because we believe it is not only in the actual spiritual life we should uplift the people. We can uplift the spiritual life of the people oftener by helping them on their physical life. We have got to remember this always,--the only way to get man's soul is through

through a man's body. There is no other way, because when the soul leaves the body you can not get at it at all; so by improving the environment of men you are going to help them to be self-respecting and so on. I know very well the flora of Labrador can be made to support people. We have got berries all over now. Burbank is working on one of our best berries for us, but there is room for any amount more. There is a man in Dakota, Brooking, who is doing magnificent work on fruit trees, and he has got a plum now which will grow at a temperature of 40° below zero. Maybe we will get at conifers and have pumpkins growing on them one day. We never can tell what is going to happen in the next generation. So far as meat supply goes, in Labrador we are introducing these reindeer, partly because we never got any milk and have no vegetables, and we are largely dependent on the meat supply of the country for our food. The Esquimaux people use the seal and the whale and the deer which of course we use too, then we have the fish. The harvest of fish is very abundant and I will speak of that later. Nearly all our people are cod fishers; some are hallibut fishers; some catch mackerel and herrings. It is all frozen up now. The only trouble with Labrador is the polar current which comes down Davis Straits from Baffin's bay, and sweeps along the coast and out into the gulf. There is seal hunting outside, and inside there is fur hunting--sables and so on. Our people are scattered all along the sea coast, I suppose over the whole area of Labrador in winter time we have about 6000 people, and in the summer, we have about 35,000 on that coast. Of course, now we are reaching very much larger numbers than that, because our patients come from inland. Our clinic is improved, and the mail boats bring us about twenty-five or thirty-five patients every time they come in. Briefly this is what we have done.

I came over here in a schooner looking for another field. I had worked through the North Sea so far ~~as~~ as to the north cape of Iceland including all the fishermen and trying to work among them. We had seen liquor banished from the high seas, seen a great many saloons closed along the shore side, seen a great deal of remedial legislation passed preventing the paying off of the men in saloons and many other things. We had seen grow up these places which make Christianity a positive factor in human life rather than a mere negative one. We had seen homes in all the seaports which were more attractive than the saloons were and without its dangers, and we have seen our own vessels increased in number until all the big fleets had a floating hospital and dispensary with a doctor with them. So I borrowed one of the vessels and came over to cruise on the banks, then cruised along on this coast and went back to England, but on the way back to England I called in here and told the merchants of the piteous condition of the people, and asked them if they would not help me to do something. So they said they would, and the next year I built a little hospital there, and another one the following year in another place; and since then another here and another over here. With the Moravians we have got up another one down here, at a place which is especially for the Esquimaux. In summer my boat which is now in winter quarters cruises the entire coast, down Hudson bay and straits. We have had a lot of other things to do, but I want to pass on.

That is the boat I chose to come across in. She is a ketch, and there is no better rig of boat for deep sea work than that. The Gloucester men and the Boston men use schooners as you know. For their kind of work schooners are better because they don't leave the weather sails up; they anchor on the banks and pull the sails down, and only use the sail area for fast passages; but for an all around boat which never takes its sails down from the time it leaves harbor until it gets back or runs its chains in through its hawse pipes and plugs them, there is no rig equal to the ketch. We came across in that half a dozen times.

there is no rig equal to the ketch. We came across in that half a dozen times. It seems a rather Quixotic expedition to set out in a schooner across the Atlantic to preach the gospel. The boat I came over in is just the size of the boat That John Cabot came in, and we came exactly 400 years ~~later~~ later; but we didn't have the same object or the same outfit. We had a little hospital amidships, because you can always do a kind act that way if you know how; so we came on the coast.

Very little has been done on the subject of the physiography of Labrador and I am not going to lecture on it. There is very little knowledge of that section of the North American continent, and I have been collecting for some years information about the various branches of science there, and Macmillan is to publish a book shortly giving the up-to-date knowledge about its rocks and so on. Those are cliffs that are about the middle of the Labrador coast. We call them the Higley Pikes(?) because they are like a dog's tooth; and they come down into the sea. That is a good part of the sea to navigate, but further off along you get miles and miles of shoals, and the navigation is much more dangerous. Here is the first ice which forms in November, and by then we begin to know it is time to go into the winter quarters. I lost my first steamer in winter because I froze her up in a rocky place, and the ice broke up and upset her, took her to sea, and she got lost. But now I leave it in the south generally, and when the ice comes in in November, that is a warning to get out. This man is a Harvard graduate, and one of my colleagues--a medical man. Then spring comes after about six months, and while that time is going on the men are all busy; they are hauling fire wood, stage wood, and building these boats, and they are hunting and trapping and so on. This was launching a boat. We get out a launch sometimes because we see the sails of our southern competitors on the

horizon outside of us. Of course, the Boston and Gloucester men get out ages before we do, and the southern Newfoundland men and the Nova Scotian men do too. I have been driving a Boston man around the harbor with my dogs when it was frozen, and he told me he had strawberries in his garden in Boston before he left. We must not gauge the joys and sorrows of life by its contractions. A great many of our southern friends have found this place very delightful. Indeed, the women especially that have come down, some of them being southerners, I mean the nurses, have always found they like the country.

This is some of the Arctic slough flowing outside. This is late May and June, and it is blowing off by the west winds, and they are seal hunting all the time now, and here are some men who have just hauled up a couple of these seals. You see it is a very risky kind of work. Some people sometimes say, "Aren't they a terribly uneducated lot?" Well, they are uneducated in a way. We are rather too apt to think, I think, these days that if you pump a lot of ready made facts into a child's brain it is an educated child. These men don't know anything about Homer, Virgil and Julius Caesar, but they can catch lots of seals where you would not catch any, and they will come in with an ax and saw and bring out a schooner while you would starve; so you can see they are not altogether uneducated, and they are not altogether lacking in wisdom either, but sometimes it is wisdom that is dearly bought. But they are a class of men you can like, because they are very strong men both body and mind, they are sane and well balanced in mind. We have got to remember this. Some people say, "Why do they live out there?" because we say it is uncomfortable out there, dangerous to live; and we ought to go to some other place to live. All I can say is for myself. I would rather boast of my heritage from a viking than from a South Sea islander. I would rather have a man who had learned to develop his body and his life in the some-

what harder circumstances of life than one who had only to bask in the sun and eat a ready made yam or something like that. The men are very delightful men, educated or not, to my mind. I don't know how I can argue that with you if you take the opposite side, except you come down to see us.

There is one of the schooners just launched. She is getting under way down. She has got men, women and children, because they are very poor. You have got to remember our people are still very poor. When I first went there, very few of them had any money at all, but now they are getting a little better, but still they are very poor, but still they have got quite often the ability to rig out a schooner, if they had it. So they come down as freighters on these boats, and they have to fish on the coast of Labrador generally from the shore or from row boats. These are the temporary huts in which they put in their summers all along the coast. From those they carry on their shore fisheries, catching the fish which come in in very great abundance; then they dry them, salt them and take them all back in a schooner which comes back for them again. You see some of them working at their nets. They have very broad shoulders and can not help attracting those who like what is manly. They are hauling their nets here. That is what we call a trap net. We have all sorts of nets, but this is what we call a trap net. Those are some codfish that have been thrown out from the net into one of the stagings that is waiting to be handled. You see those codfish everywhere, practically, but the high tariff has kept the Labrador fishermen out from this country except the Boston and Gloucestermen; they can bring it in; but we have to send ours to the West Indies, Brazil, and so on. When I was in Seattle the other day I spent a little time with the fishermen there, and I was surprised to see that they send their fish to New York and Boston, and they sell about three times as much Pacific fish in Boston as they do of Atlantic fish, and

about five times as much at New York. It would be all very well dealing in fish as a coin if it had fixed value. We would be satisfied if it had a bimetallic basis or any basis at all, because it never has any. Sometimes it is worth seven dollars a kintal, and sometimes it is worth two dollars a kintal. When a fisherman is buying his outfit in codfish and is dealing again in foodstuffs, he does not know the value of things that vary so much. It was exactly so with the flour, for instance, which used to be the only cereal that was ever brought to the Coast; it was always varying anywhere from six dollars a barrel to ten dollars. I have seen it charged on bills at \$43 a barrel and second grade flour at that. So that a man never knew the value, especially when he could not read and write. That is just where the education comes in. So that you have a vast scope for work there. You had both to teach them to read and write and to introduce some new basis of trade in which they would not be obliged to deal in a tricky system, and you had to teach them the value of other cereals. I never saw them eat oatmeal, tapioca, sago, rice or any other of the relatively less expensive as well as absolutely less expensive cereals, and we have taken a good deal of time in trying to teach them those, because when it comes to a question whether you can give your child enough food or not, it makes all the difference in the world if you know how to make your income go three times as far; and that seems to be part of the gospel. One of my orphan girls now is training in Boston, and she is going back to teach them the values of those foodstuffs along certain sections of the coast like some nurses have been doing. She is going to be a sort of johnnycake missionary out there.

Now, these schooners have landed their settlers, and they are coming on down the coast, as you see, picking their way out along down amongst the floating ice. There they are anchored under these highlands for Sunday. We had been holding prayers here, but the ice was blowing in on the land, and you see here the

forerunning pieces coming in, and about three hours later this next picture was taken, where you see the ice running in there. You see they have shipped their cables and run in to the ~~xxxx~~ shoal water to try to save their hulls from being crushed. There is a very good account in Harper's Monthly last month about one of the vessels crushed last year. We had our adversity like other people, and we had breezes of wind; and this year in July 26, we had a cyclonic storm from the Southeast. Most of the fleets were in shoal water, and before they could get an offing they were blown ashore and a great many of them were wrecked. We lost forty-three vessels in the breeze. I was able to tow a number of them off again, but many of them were smashed to atoms. You could not do anything with a craft like that. That means a good deal of loss to the fishermen, of course, and it is these periodical losses that keep them poor. But these fishermen have a kind of nature that does not sorrow much over spilled milk, and they have great pluck in starting in again. When the vessel is high and dry, their fishing voyage had gone, their work for the year had gone, the vessel had gone; but they take the trouble to pull the thing to pieces to save the iron and so on for another vessel. And some of the trouble on the coast is due to the fact that the survey was bad. This last year I spent over a month surveying because I got the help of another doctor, Dr. Sir William MacGregor.

That is one of the steamers on the coast. She has just discovered this new shoal here that was not known; only it is a rather expensive way to discover shoals. That is just a ~~xxxx~~ piece of ice coming down. You will see these few pieces of ice, because they are illustrative of one aspect of life at sea on the North Atlantic; and while they have disadvantages from the point of view of nets, gears and boats, they have a great advantage from the aesthetic point of view.

If we are ever able to attract the great bulk of tourists who go to Norway every year to see the fiords there, which we hope we shall do in the future, we have got to throw in these beautiful icebergs as well as the attractions of what you are going to look at; because we have got the beautiful fiords which rival the Hardanger(?) and others. I don't say much of the aesthetic aspect of Labrador, but it has thousands of wonderful water falls which are unequaled by any in North America except ~~xxx~~ Niagara, and some that are twice as high as Niagara. If a railway would run through Labrador simply to some of those scenic points, many tourists would go there, and money would be spent there, and the country would be opened up and minerals would be discovered by chance as in other places.

This is an iceberg, and it shows its size as compared with the size of a schooner. You have not go far to go, because you can go to your own room and floating see the ice in a glass of water, and you know it is nearly all under water; so if you see a piece as big as that compared with the ~~xxxxx~~ schooner, you know it is better not to run into it if you can avoid it; and there is about eight times as much under water. This is very hard ice, but that is debris. That is another bergg about 250 feet in height, and it gives you something of an idea of what would be the result of a collision. You know occasionally even as far south as the great circle the ocean liners come over, they sometimes run into one of these icebergs.

This is my own little boat, the "Strathcona", a mission ship. She is steaming close to that berg because we were in an inlet over night and had to get out because the iceberg began coming in. These are contributions from the ice cap of Greenland, and they go where they like and sometimes block the harbor and make it difficult to get out. I nearly lost my boat once because I ran for a harbor and found it was closed by an iceberg choking it up. The colors on the icebergs add very much to their appearance, and the architecture is apt to be

very fantastic. They are all sorts of shapes. I don't know that you can see any more beautiful sight than a big iceberg stranded and see a heavy sea just breaking over it, as you can see it at night with an enormous Atlantic swell making a clean breach over an ice mountain. It is a sight I don't think you will ever forget, and a sound you will never forget, and if you touch it, you will never forget it either.

We have a wonderfully beautiful phenomenon in the Aurora Borealis. It is a very common phenomenon with us. We are able often to steer long distances by the coast by the Aurora; and at any time during this last year I have been able to make harbor because there have been these fantastic lights. I have seen people become quite scared by them. They thought the end of the world was coming on, and I suppose that was the reason to scare some of them. Then you get these beautiful colors in the mornings and the evenings too. You would think sometimes that the ice itself was made of gold. It looks sometimes like congealed blood, almost. That stream goes ceaselessly on all the year round, only it gets frozen up and checked a bit in the winter months.

The work I am doing, of course, is not to icebergs, though it is among them; though sometimes you would think a man's heart was like an iceberg because you failed to touch it. However, that is not the case with fishermen; they are about the most warm hearted people you can ever get among. There are a number of fishermen anchored in an open roadside, and we are just coming in, and they have been saluting us, and their boats are coming off alongside. They come for a thousand different reasons. They come because they want advice, they come because we are a post office, and we are a bureau of information, and sometimes they want you to write their letters, and sometimes they want you to read their letters to them. And we are a moving library. I have got libraries, about one

hundred books in a box or two, distributed along down the coast of Labrador. Of course we are a hospital. Some people have been sick since you were there last, maybe twelve months since they saw a doctor, and some of them are going to be sick before you will see them again, and some are sick really at the time, and so on; so there is generally a motley attendance, and you have to sort out those really sick and those that aren't. However, we are always glad to see them, and that is what we go there for.

That is just a view taken on deck. We have a very small craft. She is only 84 tons gross, pretty nearly 21 tons net, so her deck is very soon filled up. These patients are waiting for us along down the coast. We have a little hospital and dispensary below, and I always have an attendant surgeon with me. So you have to be as quick as you can in order to get through. If anything comes along like an epidemic, it takes you a long while to clear it up. Suppose here is a case of typhoid fever. You can hardly call it an epidemic of typhoid fever, but still if typhoid is spreading, there must be some cause for it, and you have got to hunt that up. It is easily got going in taking away one or two and leaving the source of infection there, so you are apt to be delayed, and while you are doing that, the boat can go on and do another harbor. On the other hand, of course, gross surgical cases we are obliged to take with us, and we are still old fashioned enough to believe that the best way to deal with a broken bone is to set it and not to give it absent treatment; so we take those cases with us when we go to the ~~skixx~~ hospital. Then, of course, we have various troubles that always occur where people are very poor and very ignorant. It is well known now that tuberculosis is largely a house disease, and if you get poor people with small houses, ill-lit, ill-ventilated and with damp, dark corners, you are going to foster the tubercle bacillus. Add to that the ignorance of how to use food and the ignorance of how to prepare it, and the great poverty, and you have got everything to

foster the disease when it comes. It has been terribly fatal amongst our people, and one out of every three of our deaths was due the last census to tuberculosis. There is a boy with tuberculosis who has just begun the treatment, which is to drag out an old sea chest and put the patient on top of it, and give him the best curative agent in the world,--a little sunshine and a little air. Then, of course, we can not take them all with us, for our hospitals are limited in their extent, and sometimes we are unable to take them, but we can always borrow a boat sail and some rope, and run up an open air shelter, and these we use as sort of servants, because we get the people around. When they see you build a little thing over the top of a boat like that on the rocks, it is a seven days' wonder to them. ; but if they see the patient getting better, they are learning the lesson which a great many tracts on tuberculosis would not teach them. We have tried a great many other ways of spreading a knowledge of this. I think the best way without any exception is the nurses. Every year I have quite a lot of nurses, especially in summer, who take various places in summer; and they just go in, and they do not say, "You ought to open the window", but they go in and either break the window or open it. And they either wash the baby or show the mother how it is done. A lesson in practice is worth a great many lessons in theory. That is why I believe so much work is justifiable to the man who wants to spread the gospel and would like to do it quick. That is a problem you may say. Sometimes we find a woman with her husband dead, and herself sick abed. Of course, you can not go off and leave her--that would not be very much help; and if you do you are not very well contented with your own interpretation of the message which you would like to have come to you in quite a different way; and we have to invent some method, and it is easily done, more or less, because you can knock this partition down and make a pretty decent box and put the lady into it and take her up to the next place where there is somebody who

body who can look after her. There is no people like the poor who are so good at helping one another. If I want anybody to take a patient in like that woman and look after her for me, I fully expect a poor man will take her into his house and he and his wife will attend to her,--not because he has got so much room as the rich man has, but because he has got so much room in his heart. They will help with the nursing, and if there is any necessity to pay for the food, we do that.

This picture was taken when we were alongside our own wharf. This is a snapshot of somebody that came down to welcome us. These are some girls doing industrial work there; these are some nurses and teachers, and some students that come every year to help us out. This is looking from the opposite direction at the same wharf, at the Strathcona's deckhouse and deck. This is a boy with multiple neuritis. He is threatened with paralysis of the lower limbs. This is a picture showing another business we perform on the Strathcona, because I act as magistrate for Labrador. There was another magistrate a few years ago, but he sold liquor, so I rounded him up, got him turned out, and now I reign undisputed. Now I don't use any of these things, and nobody else does so; we have gone tee-total on the Coast; but the saloons that were there, I gradually got them all shut up one after another; but we had quite hard work to do it. It was not done by voting; it was done in quite a different way. We had to oust them, which we did. I am glad you applaud, for I have been for a good many years now a doctor, and I have seen a good deal of cold, and a good deal of long hours, but I know it is not a bit necessary. If you only go to that very, very wide basis for saying that alcohol as a liquor is not necessary, you have got a very, very long way. We all know it is not necessary. And then I only go another step and say, well, if it is not necessary it is not advisable. Of

course, fogs are necessary, I suppose; we can not help it; and Ice is necessary; we can not help it. We would not have that contribution from Greenland if we could help it. So these shoals are necessary, I suppose; but you put them all together and they are not half so dangerous to the fishermen as liquor is. That may seem an exaggeration, but a few men get lost every year, of course, on these various snags I have been describing; but a great many get lost every year because of liquor. The reason I have been lecturing on this ever since November has been that these fishermen you see portrayed along the coast there, have to go south from the field, most of them, and their headquarters is in the city of St. Johns, which is the largest seaport, fishing place, in North America. Some 80,000 fishermen went into that port last year. There is absolutely nothing there but liquor. There are 57 saloons around their quarters, and when our men go in with their schooners, there is nowhere to go; and I say there is no use passing a prohibition law when the rich man has his club and there can go in and sit down; and his bath-room, and so on; and the fishermen go in with their schooners, anchor in the harbors, and they simply must go to the saloons; there is no place else to go. If they are teetotlars, they go in and sit down, say they don't want to drink, but it is very difficult not to do so. What we are trying to do is to put a place there that is worthy of the message of twentieth century Christianity, not that the fisherman shall have a place to go into, but that he shall have something better. I believe in prohibition; I am a prohibitionist; but I do believe that prohibition should come from a sentiment from within and not by imposed on them from without when there is no alternative.

That is a Gloucester boat, and here is a Newfoundlander. Here we are trying a legal case. Here is open air service. We steam in there and anchor, and on Sundays we gather the people on the rocks. You see it does not matter

what denomination you are, the rocks aren't any denomination, and you can gather there. It is a wonderful place for forgetting the differences we have of church government and of church affiliation.

That is where we were surveying last year. This is His Excellency, the Governor of Newfoundland. This is the first of our co-operative stores. I found that sort in 1896. We might say, "That is nothing to start that." Well, it wasn't very much, either. But it was a protest against the commercialism which was robbing the sailor either in pandering to his lusts or taking advantage of his ignorance. It was not only by making him drunk and useless, but it was robbing him of capacity to get money. This is a place called Red Bay. When the co-operative store was started here, there was not one family in that whole community that was out of debt. Every single man was head over heels in debt. It was not until eighteen months after we began that we got a capital of \$85, because I didn't want to put the capital up; and then I had to import myself a cargo of salt to give them a start. This will show you the condition in that place now, because it is only thirteen years; and ~~it~~ I was at the annual meeting held last summer of this store. Now, these men have got there now a store keeper; they hire their own co-operative schooner, sell their own fish, and buy their own supplies. Last year they did eleven thousand dollars' worth of business, paid 30% profit on their holdings in the store, to themselves, and they have built a little church and a school; and they have got another little store about twenty miles along, where they are helping out their neighbors; so it has made an absolute difference to every man in the place. That is a saw mill we are using now, partly to afford our people cheaper lumber so that they can build better houses. You go to one of our stations, nearest this one, and you will find every man in the harbor has built a new house since the sawmill went up; and that gives

them better ventilation, better air, and less liability to cause tubercular children; and also it helps us to aid the men, and give them a chance in winter to work so that they can begin the summer out of debt; and we have added to that other means, like schooner building. Here are five men building that schooner last winter. She is 75 ton. She is all built out of our own woods. She was designed by men who could not read and write, and built by them. There she is afloat. Last summer she fetched the bounty of the government, \$4.50 a ton. Those men don't know where Julius Caesar landed in Britain, but they know very well how to build a schooner.

That is the first hospital I built. It has been enlarged again since this picture was taken. It has twenty beds now and is meeting the demand of that little neighborhood. Here is another one. Dr. Hare is in that one. This is his house taken in the spring before the standing ice is gone. This is outside another hospital. This hospital is not nearly big enough; it is only about half big enough. This is where we have got some apparatus given us at Battle Creek, that was given us the last time I was here; but we didn't have any electric power until last summer, because we could not afford it, but last summer a volunteer came down from Pratt Institute, New York,, and we bought a dynamo and power engine, and we were using the light bath last year quite a bit with great advantage. I thought I might mention that because it would interest you. It certainly interested those with rheumatic joints that went into it. This is our open air treatment, you see. I have no doubt you do the same, but we put our patients out very quickly. You see we have our services in the open air, we try our cases in the open air, and so on. We think it helps to keep the head cool too, when we have the law cases. We don't know much about ~~shixixan~~ law, as a matter of fact, but equity is cheap and rapid, so we use that instead. This man fell from a loft and broke his spine. He was picked up on the deck of a Labrador schooner

schooner there and put in the hands of a trained nurse. If anybody in the world can carry a message of love, it surely must be a message of attendance upon a man she can not help conveying it to. That is a little boy with club feet, and this is a ; this is a woman with a tumor for removal. Here is a boy with paralyzed limbs contracted under his body, being straightened out. We are trying to make the blind to see and the lame to walk. This was a man whose arm had to be amputated because he had blown his hand off with a gun. Some guns are very dangerous at the wrong end with us. Here is a little boy with hip disease, and he got better. He is embarrassed because he had to be photographed with the Doctor's trousers on because he didn't own any of his own. Among the poorer class external clothing is in very great demand, especially in winter time if you want to go out; so in that direction we have been able to do quite a little helping people, not only to get more but to get better clothing. The shoddy stuff that used to come contained mighty little wool in it.

This is a service outside of one of our boats, and that is one of the launches brought down by the Harvard boys for us in 1904. These launches run the patients to and fro from the hospitals. Last year five Yale boys brought me down another one. The Harvard boys brought down their boat in ten days. The Yale boys said last year they brought theirs down in nine days. Princeton this year say they are going to bring one down in seven days.

That is my head nurse at that hospital. She is a Virginian, never had been north of Mason and Dixon's line until she came to Labrador; she has not left us yet, and she is going to stand by, and I tell you we would not like to lose her or any one of them. The mail boats bring us a great many patients more every year, because conservatism is being broken down, and when they bring you 35 at a time when you have only got 15 beds, you feel that you have got to send the

the convalescents away again. We have to send our provisions to the hospitals by schooner. We get the most of them at Boston. This schooner was one called the "Lorna Doone", built here some years ago, and she went to Boston this year, and that is Capt. John Wesley Roberts standing there as pilot, with a lot of Harvard students. This picture was taken just as she was going to sail. Capt. Roberts was a keen, straight, Christian man. I don't think I ever knew a man in my life whom you could love and respect better. All those students learned to love the man. Two days after this picture was taken, she was running across the gulf of Fundy and it was blowing very hard and she was washed, and running before it, and a very heavy sea came forward and swept her fore and aft and washed Capt. Roberts overboard and he was never seen again. But if ever a man was ready, I am sure that man was.

There is a little child who came out to meet me one day when the temperature was 20° below zero. Here is a family I went to visit last winter when I came in I found I had to give them some food I was bringing to feed my dogs on, because they were both naked and hungry. You could not give those people absent treatment. You had to go and get clothes and see what you could do for them. This nurse came in and brought some food and clothing and a scrubbing brush, and some soap and other things, and she gave them some treatment all right. And she came away with two of the children. Here is one of them she brought back--a poor, little half starved girl. I am glad to say we started in taking these children, much like our good friend here has done, and we have had a great privilege in taking them. We have built this little house to put them into. We got a lady to come to look after them, but this last year we have had so many that she has gone home to look for a colleague. We have 22 here now. This is Freddie Blake, a little Scotch boy, the first boy we ever took. Most of our people are English,

and Scotch, some are Irish originally, and some French Canadians; but most of them are English speaking people; some of them are half bred. That is one of my boys in the orphanage, and that orphanage is going to be doubled in size this year. Two of the students from Williams' College were working there this summer for me, and they got very keen about it, and they are going to enlarge it for me. Here is a little boy with a little Esquimau puppy in his hand. This is the last contribution I had given to me in that line of work. These are two little maidens born blind, and the mother was a widow. Her husband was shot by mistake and she has four other children. She brought these children with double cataracts. Dr. Stewart operated upon them, and when I saw them last they could see again very fairly well, able to run about. We can not always do what we would like. We can not always make the blind to see. There are forms of blindness come there, ulcers that come in, marasmic patients that come to whom it is almost impossible for any man to give the sight back again, but sometimes you can and you know what a joy it is. There is a bunch of children outside of our orphanage, and very delightful children they are. These are quite old children that I have had for some time. This child had the ribs on one side removed because he had discharging sinuses and collapsed lung. I gave him as a Christmas present to the nurse that nursed him because she got so fond of him, and now she looks after him. She would not sell him again. You could not have given her a fifty dollar present she would like better. It is not so long ago that I saw a lady driving about in a carriage with a Teddy bear with a ~~xxxx~~ gold chain around his neck. She would far better have had that child. This little child has done very well. She was given to me very young. She had been very badly frosted, and her legs had been gangrenous and there was no doctor near; so the father had chopped them off down below the knees with his ax. We put new limbs on her in New York, and

I will warrant there are hardly any girls here of her age who will beat her on a hundred yard race. I don't know why it is except that she has got good knees and she is a lively little girl, and though she is Labrador down to the knees, she is really nothing down to the soles of the feet. These are our little Esquimau children. We are going to have a break, and I don't know that we can make it any better than now, so perhaps ~~xxxx~~ we will have the break made now. Then afterwards I will show you some pictures of reindeer and dogs and the way we drive in winter, and some of the other work we are doing.

Dr. Kellogg: I am glad we have such a large audience tonight, because such a great work as Dr. Grenfell represents, such a needy work needs great help. As I look around this large audience and see ~~ix~~ 1200 or 1500 people who are living in comfort and luxury, it seems to me that our hearts must be touched as we have listened to what the Doctor has been telling us about the needs of this great country so far away to the North with none of the comforts we enjoy. I understand 500 envelopes have been scattered through the audience, and we expect to get at least a dollar in every one of those envelopes. So if anybody has got an envelope and has not got enough money at least to put in one dollar, get your neighbors close by you to help you out. Let every one feel a responsibility. I hope every one will feel a responsibility to at least get a dollar in that envelope. We want Dr. Grenfell to go away from this town with \$500 in his pocket. We don't want to depend entirely upon envelopes or upon the collection at the door. I hope our friends are not going out because we are going to see some of the best things yet. I had a glimpse of these slides in the Doctor's room, and I am sure you have got some of the most interesting things yet to see. It is not time to go yet by any means. I wonder if there isn't some one here

who wants to contribute \$100 to help that seaman's home up in St. Johns. We are now making an effort to cast the saloon out of Battle Creek, and we are going to do it, and we want to help the Doctor in his battle against the saloon away up there toward the north pole. Isn't there somebody here who wants to give \$100? There are plenty of people here who could give \$100 and would not miss it at all. I believe there are at least a hundred people here who would not know the difference if they invested a hundred dollars up there. Dr. Grenfell has given his life. He has sacrificed what a great many would think a great deal of--the opportunity to build up a great practice in London. In England it is a great thing to have the title M. D., and especially the honorary title M. D. Oxford last year conferred this very great title upon Dr. Grenfell because of the great work he has been doing up there in Labrador. There is no other person in the world who has the distinction of that degree from Oxford. Dr. Grenfell has consecrated his life and his work to helping those people. Can't we do something to help him in his work? Is there anybody here who will give \$100? I will wait a moment. The students of Princeton have given a ship, and they are going to sail it up there. This nurse from Virginia is giving her life to that work, has left all her home friends and comfort behind and has gone up into that cold country. She is doing something. Should not we contribute something? I am sure we must be interested. The Doctor has not come here just to entertain us. We haven't any right, my friends, to come into this room tonight, be entertained, and go away without doing something for that work. I don't believe a single soul in this room has any right to come here and listen to this very interesting discourse and go away without contributing something. We haven't any right to enjoy ourselves at the expense of those who have given their lives for the benefit of these people away up there toward the northpole. Is there anybody wants to

give \$100? If there isn't anybody else who will do it, I will do it. I can not afford it any better than some other people, or not quite so well as a good many people I know of, but I will see that Dr. Grenfell gets \$100 anyhow before he leaves here. The Medical Missionary Board will perhaps help me out, but we will do it somehow. Now, will anybody give \$50? Here is Mr. I. L. Stone, says he will give \$100. Mr. Stone was waiting to see what I was going to do, I guess. He always measures me up; so that is \$100. All right, that makes \$200. Now is there not another one? Mr. Stone owes something to the mission field because he went over to India and stole a missionary, and he feels he must do something by way of work of supererogation or compensation. ~~\$2~~ One hundred dollars won't pay the debt either, Mr. Stone. Missionaries are worth a good deal more than that. But we are ~~xxxxx~~ very much obliged. Is there another \$100? Or \$50? Who wants to give \$50 now? That is not a very big sum. It will go a long ways up there in that country. Does anybody want to give \$25? Now we are coming down where almost everybody can participate. Is there anybody who will give \$10? Here are several hands of people who will give \$10. We want something to pay Dr. Grenfell to come around here and spend his time. We don't want him to go away feeling that it is not at least worth while dropping in. Now we have ten who will give \$10 each. That makes \$100. Now, who will give \$5? Now we will see a lot of hands up right away quick, can't we? Can't we get twenty names right off quick and get another \$100? Here is Dr. Dowkontt one. It is harder for Dr. Dowkontt to spare that five dollars than for a lot of other people to spare ten or a hundred dollars. Now, how many are willing to contribute two dollars? I see a number of hands. Now put the rest into the envelopes. We are expecting \$400 or \$500 to give Dr. Grenfell a little lift. If Dr. Grenfell were spending his time making money, he would have had large fortunes to

contribute to this work. Dr. Ussher was talking to us the other night, and he told me how his friends in Kansas City which he had left some years ago, had sent him a promise that they would pay his expenses and give him a very large contribution if he would come back and take up his practice. He wrote them back that he would stay in Kurdistan rather than accept \$20,000 a year; and that is the kind of sacrifice Dr. Grenfell is making here. He stays out there and does not get so much for it as a common laborer, doing his work there just for the love of seeing men helped and blessed. The Doctor has now had a little rest and he will give us the rest of his delightful lecture.

Dr. Grenfell: Dr. Kellogg ought to be an official, I think. When you come to the thought of making sacrifices, I just had a letter the other day from that nurse whose picture you saw. You will appreciate this, because I only got this letter from her about a week ago. She sent back \$150 of her last year's salary that she said she wanted to give toward paying her own salary next year. I would like to say one other thing too, that in this big institute we are building, there are going to be separate rooms for people, and you can name a room for \$35. The outfit and furniture of these rooms costs exactly \$35. If anybody wants to have their name or anybody else's name commemorated in it--that is being done by quite a number already.

Those are two Esquimaux. It is a perfect pleasure to serve them, because they always purr when they are pleased. That is one of our little Indian boys. I have had to cut out a good many pictures of the Indians and the Esquimaux because our work does not really lie among them, but we had got of course, patients, from them at different times. The work one does for Christ is not done necessarily in big ways; it is the little things, as you know,

that tell very often, and if you can not do big ones, by all means do little ones. Nothing is too small to do, and I remember being very much struck by the fact that we found so many children on the coast who had never had any toys, never had any Christmas tree, and I thought it worth while to take down some little toys if I could get any; so I asked the girls in Dr. Lyman Abbott's office in Boston to make me some little dolls, and every girl there said she would make me a doll if they could not do any more. And they made me such a lovely family to take down that I had it photographed; and it was certainly a very great pleasure to all the people down there. These were the dolls they made. You see what an attractive lot they are anyhow. I am afraid they do not look so attractive now, because they have hugged the heads off a lot of them already, and kissed the paint off the rest.

We are teaching our girls a lot of different things, and a lady came down from Providence. She is also a volunteer and gives both her time and her energies. She is a teacher of arts and crafts, and we have got quite a number now who can weave a good homespun and make a good mat, and can spin our wool, and indeed, we are running both goats and sheep now so we can do some of that necessary work. This girl is making a mat, and we have been using those mats as anti-tuberculosis tracts. These mats do not have "Welcome home" or that sort of text in the middle, but we always have worked into them "Spit" in the middle, so the people can see them and learn better.

This is teaching a blind boy raffia work, making baskets. I said we have been trying some experiments in the way of agriculture, and we started in buying some cows. Here they are, you see, looking for grass--quite a search. Some one suggested they thought I was after an ice cream fountain; but some of the students that came last year were really very good,--came from one of the

agricultural colleges, and they did some excellent work. You would hardly believe that is just under where the snow was, but they grew some potatoes and other vegetables,--peas, beets; and next year we are taking a gardener down, and we are having a lot of fruit sent us, some Alaskan hardy plants; we are going to ~~xxx~~ see if we can't really show the people how to grow some vegetable foods. As for getting milk, we found we could do nothing because we could not afford to feed our cattle. They were too expensive. The cows cost only about forty dollars apiece, but the hay costs forty dollars a ton, and they used to eat two tons apiece in a winter; so each cow ate up about two other cows during the winter; so we had to get some beast that could live on the land, and we sent to Lapland for reindeer, and I was doing that I think when I was here last. They landed only last January year in this steamer you see there; but she got crowded in on the shore there, got stove in, and she landed ~~xxxx~~ ~~xxx~~ ~~on the ice~~ her deer on the ice and they ran in every direction. However, we got them all back after three weeks because we had the older stags ~~xxxx~~ pegged out on shore with bells on, and we got them all back, very fortunately. I had to sell fifty out of my 300 in order to pay the expenses of help; but I kept 250, and had 168 fawns in the summer. They get fat and strong on just what they can pick up, and they are admirable for hauling. They each haul as much as four or five dogs. Here are some of the deer doing the hauling this winter, hauling out logs for some buildings, for fire wood, and so on. My colleague, Lieutenant Lindsay, is looking after the deer experiment; he is camping with them now, ~~xxxx~~ winters and summers. They grow their horns in August, and then we daren't put them in the field together, because when we did that, they butted each other and some got killed. In Siberia this same reindeer has been domesticated, and he has got so numerous that some of them own ten thousand of them, and they can sell a deer like that with his beautiful skin for fifty cents, just as he is, so you can get a fur robe; and of

course there is about 250 pounds of venison. This picture shows the feeding of some that we drove last winter. I was driving them some of the time, but they were very, very timid and it was very difficult to get them out; and when you are going fast down hill, --once or twice they stopped when we were going down hill, and we bowled over the top of them, and they and I rolled down the hills together. It takes two or three years to get them confident. But at night the great advantage is you just tether them like that and they dig down to their own food, and they will do that in three or four feet of snow. You would be surprised to see how ~~fast~~ quickly they dig with their paws. They have a very hard surface to the hoof which keeps sharp, like the beaver's tooth, and they dig down with that. We built a big corral and drove them down by dogs to get the milk from them. The Laps used to milk them for us. We had four families of Laps, but we sent two back, and now we have only two; but we have four herders of our own who are learning to do the work. There is quite a lot to learn in herding deer, for they run wild all the time, and are only brought up by the dogs occasionally. We have to feed our dogs on meat principally, --whale meat and seal meat; and we can not get enough for them in summer unless we hunt it. We do from 2000 to 2500 miles with our dogs in winter. This is landing from the mail boat. That is the last visit of the mail boat when you see them landing the winter supplies. You have got to be a good housekeeper there, because if you forget to order anything you have about six or eight months to remember it in, and that is rather hard to put up with sometimes. That picture shows the dress we wear. We travel more on skis than we do on racquets, though we do use racquets quite a bit. We use the simple clothing that we make ourselves out of deer skin. It is very cheap and very easily made, because we only take off the hair and soften the skin, and it makes a sort of chamois leather which keeps

the wind out but is very light. I am a very great believer in having clothing very, very light and very, very supple. Half the trouble with people who can not move about is that they wear too much clothing, and if you get accustomed to wearing light clothing, you can not put up with wearing fur overcoats and things. We hardly ever use fur ~~ix~~ overcoats at all.

These are the dogs. They are beautiful beasts, and you can really learn to love them. Of course, they get excited and ~~ixix~~ fight sometimes, and if you interfere when they are fighting, you ~~ixix~~ are apt to get it from both sides, like interfering with a man and his wife; but you don't do it unless you are very foolish; but a man near Battle Harbor got killed about two months ago doing it; they got him down and tore him all to bits; but as a rule they are great, strong, good natured, hardy dogs, and they will serve you well. Many a time they will save your life when you don't know how to get home by their wonderful instinct. They have a sense like a magnet of going north.

This was last winter in the hospital when the sick one comes in. When ~~ix~~ you have got all the neighborhood to look after, you can't get away sometimes for two or three weeks, perhaps. Here is Dr. Hare with his team of dogs. He was in China for a number of years, and he married a wife out there who was a Chinese missionary, and they left her after the Boxer raids--they had a large family of children, and he had to stay at home because his father was in a bad state; and instead of going back he joined our mission. While he was a married missionary with children, on the borders of Tibet, long before I ever saw the man, he always used to send me \$25 a year out of his salary because he wanted to go to missions to the sailors. He had too big a heart to be confined even to that large field of China.

Those are the roads we travel along. Sometimes we use the rivers

because the glare ice remains there longer, and sometimes we just have cut paths in the big woods, and in these we have built along about every ten miles a little hut so that our sick who are hauled on sleds can get shelter. Of course, in winter they come long distances, and it is generally only when we send for them on our trips. One of the pleasures of dog driving is that you have to be smart and handy. If you are feeble and old you can be put in what we call the "women box" on the sledge. As a rule we just put on our ax, rifle, surgical instruments, tabloids and the things we need, with our sleeping bag, and we run and jump, get on and sit on a little while, and get off again. But the dogs are very clever; they understand what to do. That uncouth looking creature there is myself, climbing up the hill. That is because the dogs are going over the top of the hill which is very steep, and then they think you can not see them, and they all sit down. But that is the way dogs are. You have to treat them almost like human beings. You don't beat them if you can help it.

These are the sort of houses people use. You see they are made out of rough, unfinished lumber, but a man can be very happy in one of those little houses. I have seen those houses miserable and wretched sometimes, but I have seen those same little houses really palaces where God's love dwells, quite as happy, and quite as full of all the best joys life can give because Christ has gone in at the door and dwelt there. It is not always that. Maybe men eat better food. Often they simply eat seal, or some similar crude diet. But there is a different population growing up altogether, and I wish you could see some of them. The children there are brought up handy, resourceful, and strong, and many of them live very happy lives, and they would not care to go away.

That is a house away up in the woods, one of the hunters' traffic houses. You see he has got a large family,--enough to satisfy even the President.

And those boys learn many things, and the girls learn to sew with tendon, to make water tight boots, to cure skins and a lot of other things; and the boys learn to handle traps, to hit with an ax twice in the same place, and to do a thousand and one things. If you don't come to one of these houses at the end of your day, you build a house outside for yourself, and you always carry with you a sleeping bag especially, wherever you are, and when you get in you can be sure to be by yourself, and have a place where you can pull the string up and be alone. You can be quite comfortable on the snow, and many a night I have spent on it. Your dogs are very catholic in their tastes. They don't care wherethey sleep; they will sleep anywhere. That is a lot of dogs snowed under in the night. It looks like a bank of snow, and so it is, but the bottom is full of dogs. If you whistle it gets up and shakes itself, and the dogs come up just as happy as though they had been in feather beds. That is the end of the day. You feed the dogs at the end of the day, not in the morning. I once started my dogs on a fast run in the morning, and suddenly one of them fell down dead. When I examined him, I found he had been on the scaffold over night and eaten too much food. I was sorry for him, because he ran so gamely until he fell in his traces. Here the dogs are waiting to be fed at night, but, as a matter of fact, except when they are eating, they are always waiting to be fed. You have to be careful they do not eat what they are not intended to, because I have left my boots turned inside out at night,--of course, when you run in you want to get your feet good and warm, and the ice is frozen in your stockings and frozen to your boots, so you have got to turn them inside out to get the ice out, and sometimes hang them up. Twice the dogs have eaten my boots in the night so I have had to go in my stockings the next day. ~~LAST EASTER SUNDAY I WAS~~

Last Easter Sunday I was ~~at~~ the hospital, and about mid-day a big team of dogs came in, and they said there was a boy ~~xxxxx~~ at a settlement about sixty

miles away, who was dying with a large tumor in his thigh that needed operating upon at once, and wanted to know would I go to the settlement at once. It was a pretty good afternoon, so I got out the dogs and harnessed them in, and about three o'clock in the afternoon I got away, and by dark at night I had got about twenty miles, and I came to the edge of a very big bay, and it was blowing very hard, so instead of trying to cross the bay which was about eight miles across, I turned aside and went down to a village, and it was Easter Sunday, and we gathered together and spoke about the value of life, and about what future there was after death, and it seemed a suitable subject; so the next morning at daylight I was away, and we got down the cliffs, and I found the sea had broken the ice up along the shore, but the main body of ice looked all right, so we skipped across from piece to piece until we got to the main body, and I started gaily across. The wind was coming off shore, and when I was about six miles out at sea, the ice was moving up and down so much I could not see anything, but I got suspicious and I tried it with my whip handle, and I found ~~xxx~~ ^I ~~xxx~~ was not on the ice travelling at all; it was only what had been pounded to mush and the surface was frozen over; so I knew I must speed on as hard as I could go. I just hurried the dogs along, and they came on the surface for about another mile, but all of a sudden we all went through. We were all struggling about in this mush, and there was nothing to climb onto to get out; so I thought there was nothing to do but be drowned or freeze to death, so I got out my clasp knife, cut the dogs adrift from the sled, and I thought perhaps one of the dogs would work his way ashore and people would know what had happened, but instead of that, this leading dog climbed out on a piece of ice. It was small, but it was something that would bear, and I got hold of his line and pulled and pulled and pulled until I got near him, and then I crawled out and lay down on the piece; then I stood up on it

to see whether I could see any more, and about fifty yards away I could see another piece which I thought looked wider and stronger than the rest, and would bear me; so I called all the dogs, pulled them out, and I cut all their traces and cut them off, and made a long line, then I told this leading dog to take it and get on that other piece, and showed him where I wanted him to go. I had lost a lot of my clothing and thrown away my hat and coat and gloves. This dog fell through, and then came back. I tried him again and he did the same thing again and came back again. I thought it was all up and we should be drowned as soon as that piece turned over because the wind was blowing us off the land, and it was getting lesser all the time. I had a little cocker spaniel that weighed about five or six pounds, and he was feeling around and got out on the ice all right, and I thought perhaps he might do it; so I tried him and I got a piece of ice and I threw it across for him to get, and he made a run and got over; it bore him all the way across. When he got on the other piece, he felt it firm, and he stayed there. Then I sent the big dog again and he made another trial and fell through again, but at last he got upon the ice and he crawled out on it. Then I had this skin line, made of sealskin. So I took off my big moccasins, turned the ice out, tied them on two dogs, got the knife back--of course I had my knife because I tied it on the dog's back before, in the water; so I jumped in then and fought my way through the ice again. At last I got to where the dog was by pulling on the line, and he held on, and I climbed out again, with my other dogs with me. In fact they were so close they kept putting their paws on my shoulders. I could not face any more water because I was nearly played out, so the only chance we had was to stay where we were, to go to sea on the ice. If anybody saw you you would be saved; if no one saw you you would be drowned. That was all. We drifted for a little bit and we suddenly rose on a big sea and the ice broke, and I jumped onto a small piece of it, and the dogs came over again.

It was midnight then, or near morning, and it looked as though we would all die, and I was dying of cold, so I stabbed this dog and killed another dog and another, and when I had three killed and skinned, I made a coat by ~~making~~ boring holes with my knife and reeling it up with lacing, and it was getting dark then; so I put the bodies of the dogs into a little pile so as to make a wall, on top of one another, and cut the harnesses off the living dogs, split the covers off, got out the inside which was made of hemp rope, pulled that to pieces and made a lot of hemp of it, and lashed it all around my feet; then pulled on my frozen stockings, got the dogs all up around me, and went to sleep. This big dog you see was my sort of hot bottle all night. In the morning we were away off and I could just see the land, and I thought some one might still see me, and while there was life there was hope; so I took the dogs' legs, cut them all off at the shoulders, of the dead dogs, put them together and lashed them into a stick with the traces, until I had a stick about as tall as myself; then I took off my shirt--the only garment I had left,--split it up and made a flag of it and tied it on by its arms to the other stick, and I stood and waved it, but it didn't seem as though anybody could ever see it. I tried to make a smoke, but my matches were wet, and I tried to make a burning glass, but there wasn't sun enough, so I could not do that; and at last to my immense surprise, I thought I saw a boat coming, and it turned out only to be some ice; and I saw several more, and they were all ice too; but at last I did really see a boat coming, but I could not imagine how they could be there. But it so happened some men had been travelling the day before, and they were climbing a hill going home, and when they saw something black on the ice--this was the young chap,--he said, "I think there is a man alive on that ice", and the others said, "No, there is no one alive on that; that is only an old stump, or possibly seaweed or something," but he wasn't satisfied, and though

it was getting late, he was going home, and the wind was blowing, he ran off down to the village, got an old telescopt, climbed up the hill again, and there he lay, and all the time while he was doing that, I was blowing off to sea, and there was that young man watching through that telescopt to see if he could see anybody, and at last, he told me, he ~~xxx~~ saw the black speck again afterward, and he was sure it moved, so, though it was seven o'clock at night, he ran off to the nearest village, and he roused all the people, and they were out the whole night long trying to launch the boat, but they could not get it out through the ice, but had to wait until morning; but then they went up to look at it again with a telescope, but the black speck was gone. They thought it was not worth while going out, but five of the men said it didn't matter whether it was worth while, they would pack the boat with food and go out and stay until they found something. So they started out and at last saw my flag; and when they ran alongside the piece of ice, it wasn't very big and was all stained with the blood of my dogs, all covered with debris of the stuff I had been cutting up. But all those men got off one after another, came up, took my two hands, shook hands, looked me in the face, and not a single man said a single word; every man had tears running down his face. They were fishermen and are not men given to sentiment, but every man's heart was running over with the joy of having the opportunity of saving another man's life. I know it was a doctor's life, but that was not what made it so great; it was the joy of saving a human life. That is what God puts into our hearts. Dr. Kellogg said rightly,--I did give up living in London to come to live out here. I have had plenty of offers to go back again, but any man who has tasted the joy of opportunity and sees that opportunity still opened, must be a strange man who wants to go back and taste a life of idleness. I don't say one need to be idle at home, but there are many that would have to be idle at

home; but if I were a doctor in London, there were twenty doctors who could do the work better than I; but where I am there is a gap to fill, and I have the opportunity of filling it; but what we are out there for is the joy--I believe Christ's joy,--it is not the joy of ease or praise, but the joy of service; and when the Master says, "Enter into the joy of thy Lord", it is not the joy of having made a success of money; it is the joy of having been the means in God's hands, of saving other men. May God give it to every one of you. (Loud applause).

Dr. Kellogg: Before you go I am sure all that have contributed and that have not contributed will want to give Dr. Grenfell a hearty vote of thanks for this inspiring address to which we have listened.

(Motion made and seconded and carried unanimously to extend to Dr. Grenfell a hearty vote of thanks for his talk.)

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ABSTRACT OF BOOK ENTITLED "HIGH BLOOD PRESSURE"

By

Dr. I. Harris,

Liverpool Heart Hospital, Oxford University Press, London, 1937

I N T R O D U C T I O N

The author maintains that the test for blood urea is not, as is generally held, a reliable test for the efficiency of the kidney unless blood volume is taken into consideration.

P. XV

"For hundreds of years clinicians have occupied themselves with unravelling the symptomatology of disease. Although the results obtained made it possible to apply labels to a large number of affections, a real insight into the aetiological factors of disease has not been gained by this procedure. In order to deal adequately with disease it is necessary to disentangle an abnormal function and trace its origin through a whole maze of changes to the chemical and physical reactions which are the primary causal factors of the altered function.

"A revision of our methods in regard to the advancement of medicine is long overdue. I confess my predominant individual reaction to present-day medicine is a sense of futility-- futility in the practice of our craft, futility in our efforts at progress. Only rarely am I quite sure of my ground when I prescribe for a patient, and in spite of the enormous output of world literature, the practice of medicine is in many respects as unsatisfactory now as it was a hundred years ago."

P. XVI

"So far as this volume is concerned, I should like to focus attention upon two central facts. A very low protein intake compared with a less low one doubtless effects a lowering of the arterial pressure. In established cases of hypertony, no matter what type, there is an impairment of renal function in particular for the elimination of substances such as urea which entails a great deal of work on the part of the kidney. The blood urea in these cases does not usually show abnormal values, but it takes a longer time than normal to eliminate protein end-products. This feature may be difficult to demonstrate in the early stages of the disease, but in fully established cases of hypertony the delay in elimination of nitrogen end-products is definite. It is well known of course that impaired function of the kidney only manifests itself where there is gross structural damage, and there can be no shadow of doubt that the kidney becomes early affected in all cases of hypertony, no matter of what origin, and that the renal damage becomes gradually accentuated until, if the patient does not die from intercurrent disease, it ends in renal failure-- uraemia."

It is an error to suppose that the body does not store protein. Protein is stored in the blood corpuscles and in the tissue cells.

P. XVII

"We have definitely established that under high protein feeding the latter is stored in the blood-cells and presumably also in the tissue-cells as protein. However, evidence of a conclusive nature has not been brought forward which establishes a direct connection between this type of nitrogen retention and hypertony. Circumstantial evidence, however, suggests that this type of retention may be an aetiological factor in high blood-pressure. Clinically, the type of person suffering from essential hypertony is a type which retains protein: an over-fed, under-exercised individual inclined to adiposis, of a florid appearance.

"The kidney does about nine or ten times more work if it has to eliminate the end-product of protein metabolism of a heavy protein intake than when the protein-content in the food is just sufficient for individual needs. It is clear that a heavy protein meal must strain the kidney unduly.

"The kidney in all types of fully established hypertony is damaged, and its function for nitrogen elimination is impaired. I ask: Should a kidney of this type continue to do nine or ten times more work than is absolutely necessary?"

P. XVIII

"Are there any experiments which show that a kidney already damaged can continue to do ten times more work than necessary for ten, twenty, or thirty years without suffering additional injury from the excess of work? I do not know whether the laws of optimal work apply in the same way as to the kidney as to a muscle; but I do know that a middle-aged heart does not respond to increased demands made on it to a full extent by increased hypertrophy because the heart-muscle is not normal. I also know that myocarditis is a contra-indication for treating such heart conditions by graduated exercises: I know, too, that a hypertrophied organ is not as good as a normal one."

P. XVII

"Even those who maintain that the kidney is not primarily damaged in essential hypertony admit that high blood-pressure adversely affects this organ. A kidney which is damaged and increasingly becoming so, and ultimately fails completely, is permitted, year in year out, to do nine or ten times more work than necessary. This is another illustration of the harm done by viewing a problem from one angle only.

"The only possible conclusion to arrive at is that protein taken in these cases should be limited to the requirements for replenishing tissue wastage.

"We have found that a hard and fast rule of so much protein per kilo weight is not a sufficiently accurate procedure for our purpose. Two individuals of the same weight vary considerably in their protein need for tissue replacement. Seeing that a small excess in protein affects appreciably the arterial pressure, this is a consideration which cannot be disregarded. The only satisfactory method of dealing with these cases is to determine the requirements for replacement of tissue wastage for each individual."

The author prefers animal protein to vegetable because many vegetable proteins are incomplete. Incomplete protein can be utilized only in part. The excess must be eliminated as waste nitrogen in the form of urea. Of course meat is not necessary as a source of complete protein. The protein of milk and of egg yolks is better than that of meat.

Unfortunately the author overlooks the fact that most vegetable proteins are practically equal to animal proteins for tissue building, that is, are practically complete. This is true of the protein of nuts, fruits, green vegetables, and certain legumes, in fact, of nearly all vegetables with the exception of peas, beans and cereals. Cereal proteins are the poorest. Even these, however, are so easily made complete, as shown by Sherman, by the addition of one-tenth their weight of complete protein, which may be added in the form of milk or egg protein, or the protein of peanuts or soybeans.

Dr. Harris and his collaborators conducted a very elaborate research for testing the effect of high and low protein diets in high blood pressure cases. The work contains a large number of tables showing the exact effects of different levels of protein feeding. The tables prove in the most conclusive manner possible the truth of his contention that high protein feeding (15.7 to 28.6 grams of nitrogen) causes elevation of blood pressure while low protein feeding (1.5 to 4 grams of nitrogen) lowers blood pressure.

The N. P. N. may be high or low with high blood pressure. It is most likely to be high with low blood pressure because the efficiency of the kidney increases with high blood pressure and lessens with lowered blood pressure.

In feeding experiments the chemical determinations were made daily and blood pressure taken five times a week and blood analysis twice a week. In a new period of observations the first two days were not counted as specimens were not taken, time being allowed for clearance of the effects of the previous regimen.

The blood pressure observations related to systolic pressure only as it was found that the effects upon the systolic pressure varied at the same rate as upon the diastolic.

P. 4

"At the outset I would like to emphasize that a clear demonstration of the action of protein on blood-pressure readings can only be obtainable if, in comparing the effect of low and high protein, the former is very low indeed. A protein diet which is not very low may show quite as high a systolic reading as a very high one. It will be found that those who deny the protein effect on arterial pressure have not taken care in arranging for a low diet, that the latter is sufficiently low."

Pp. 4-5

"During the stay in the hospital the patient received no treatment of any kind apart from a little gentian. It frequently happens that when a patient with high blood-pressure is put to bed the pressure gradually becomes lower, apart from any other treatment. We therefore varied the periods in which the patient received the high protein diet. In some instances the high protein diet was given at the commencement of the patient's stay in the hospital, at others towards the end. In a good many instances the patient received a period of treatment of high protein followed by one in which low protein was given, and again followed by a period of high and low protein. Invariably the result was the same. All types of cases were included in the observation. The great majority did not exhibit any evidences of heart failure. Generally they were cases which go under the name of essential hypertony."

P. 10

"The NPN stands in inverse ratio to the arterial pressure value. The higher the blood-pressure under high protein diet the lower the NPN readings, and vice versa. The higher the pressure the more effective the elimination. . . . During the period of low pressure while the patient is under high protein diet, there is not a complete elimination of nitrogenous end-products. . . . If the elimination of nitrogenous end-products were to be more effective, the arterial pressure would have to be higher still."

P. 11

"After lowering the pressure by means of drugs it was found that the kidney function became depressed, blood NPN increased, and the urinary nitrogen diminished, and the alkali reserve fell (12). The cardiac output was also diminished as a result of the artificial lowering of the blood-pressure.

"A high protein diet either effects an increase of blood-pressure or an abnormal increase of blood NPN. Because the maximum rise in pressure which the circulatory apparatus is at the moment capable of attaining has already been reached by the intake of a small quantity of protein, a greater quantity of protein intake can only lead to abnormal accumulation of NPN in the blood.

"High blood-pressures which become strikingly low are not usually, as some people seem to think, a matter for congratulation. In my experience it is an ominous sign. Clinically I have often observed a cardiac asthma and heart failure following upon a pronounced fall of pressure in cases of hypertony.

"The reason why the pressure is not maintained in cases which are under the high protein diet on a constant high level is to be found in the inability of the heart to sustain for a long period a high arterial pressure."

In such cases the electrocardiograph shows that the heart is damaged on a high protein diet. The heart not being able to increase the pressure, the N. P. N. level increases. In some cases the retention of nitrogen is not shown by increase of N. P. N. but "merely in slowing of the blood urea clearance after a protein meal."

THE EFFECT OF HIGH PROTEIN FEEDING ON THE BLOOD

The blood is thickened. The viscosity is increased in most cases of hypertension. Increased urea in the blood may cause a decrease of chloride. The opposite is also true. The blood volume also increases on high protein. The total protein in the blood may increase while the N. P. N. findings may not increase because of increased volume of the blood. It may even be less than in cases on a low protein diet.

Cases of hyperthyroidism do not show retention of protein. The blood may increase in volume and in viscosity also. The pH remains the same except under conditions which cause temporary change. When protein is fully metabolized, the nitrogen excretion or urinary nitrogen is proportionate to the intake.

P. 23

"It is important to keep in mind that NPN blood values do not depend on a single protein meal, and not even on one day's nitrogen ration, but protein intake extending over four or five days or longer influences NPN blood values.

"In spite of considerable variation of blood NPN values there seem to be factors at work which tend to keep the NPN and urea values, within narrow limits of fluctuation, on a certain level."

Harris's tables show under high protein feeding the average systolic pressure for heart cases was 176 (A 24.) For the normals the average under high protein was 115 (C 25. The average N. P. N. in high blood pressure cases under high protein feeding was 41.1 (E 24.) The average blood N. P. N. under low protein feeding was 29.65 (F 25.) The normals' average N. P. N. under high protein was 50.9 (G 24.) Low protein feeding 31.6 (H 25.)

It is interesting to note that while under high protein feeding cases of high blood pressure were nearly all above normal, under low protein feeding all, numbering 23 in all, with one or two exceptions, promptly fell to normal levels.

P. 29

"Blood urea clearance at a slower rate is a characteristic feature of advanced cases of hypertony. The waste products of metabolism are not found on an unusually high level, but they remain in the circulation for a longer period than is normally the case."

P. 29-30-31

"The so-called malignant hypertony is simply an end stage of the ordinary type of hypertony. Clinical symptoms are completely in agreement with the laboratory findings. It is usual to have frequent micturition from the very commencement of the disease. In the more advanced cases there is a nycturia. The patient has to get up in the middle of the night to pass water. Nycturia is invariably a sign, in my experience, that the condition is advanced. The prognosis is usually bad in these cases."

P. 51-52

"In many instances, under low protein we find urea volume values which are definitely higher than that of normal cases. The impression gained from this Table is that under a high protein intake the strain on the kidney owing to demands made on it by urea excretion is such that it fails to perform its task effectively. On the other hand, under a low protein intake, even where there is a small volume of urine, it is able to deal satisfactorily with urea. Under low protein intake the work it is called upon to perform is within its capacity, limited as the latter is."

The kidney of high blood pressure "is unable to pass urine of a highly concentrated urea content." In these cases clearance of urea from the blood takes place at a slower rate. Acidity is higher under high than under low protein (P. 54). Acidity and pH do not run parallel. The two methods do not measure the same values. That the pH does not show lower figures under high protein diet than it does is perhaps due to retention of sulphur and phosphorus along with nitrogen.

P. 68

Practical Low Protein Standard

"Too low protein intake extending over a considerable period favours the formation of oedema, and it is quite impossible to work out a diet of sufficient calorie values which the patient is likely to adopt containing only protein minima of the lowest order. For all practical purposes equilibrium obtained by us on a low protein is sufficient. This consists in the following: The average of a week or the last three days under a very low protein intake was taken when the urinary nitrogen shows a considerably higher value than the nitrogen intake. The actual urinary nitrogen yielded is accepted as the minimum nitrogen required to obtain a balance, taking also into consideration the nitrogen output just previous to this. It is, however, necessary to ascertain by actual experiments that the two values really balance."

P. 76

"Nitrogen is retained in considerable quantities under high protein diet" and diminishes under a low protein diet. Potassium is also increased along with the protein, which probably accounts for the fact that the acidity is not increased in proportion.

The generally held opinion that the dog retains protein while man does not is shown to be an error. It is possible that with the protein may be stored a certain proportion of fat and carbohydrate.

P. 81

Increased arterial pressure is necessary when the kidney is damaged in order to enable it to properly perform its task.

The only time "we may expect an abnormal accumulation of NPN products in the blood is when the arterial pressure becomes lower than usual."

P. 81

"The fact also that the administration of large quantities of water in these cases, which facilitates urea excretion, lowers the pressure also, suggests that high blood pressure is an adaptation in the interests of more efficient excretion on the part of the kidney. But under low protein, when blood NPN and urea are very low, although the arterial pressure falls, a case of high blood-pressure still

remains a case of high blood-pressure. It must be a permanent alteration in the structure of the kidneys or the blood-vessels which in the main is responsible for the condition of hypertony. At any rate, there must be another factor responsible for high blood-pressure apart from the normal waste products in the body. It is conceivable that with a high protein intake continued over long periods, owing to the tremendous work thrown on the kidney in eliminating the waste products of protein metabolism, this organ may get damaged and a vicious circle would be established, a damaged kidney having increasing difficulty in performing its function, and getting more involved and the pressure becoming higher in order to overcome this difficulty. It is certainly a factor in high blood-pressure, but it is not likely to be a sole cause. The clinical picture of essential hypertony is definite enough:-- A florid appearance, an individual who overfeeds and under-exercises, an individual inclined to corpulence. This symptomatology contains features which the retention of nitrogen in a form which has not been catabolized to urea can bring about."

P. 84

Retention of nitrogen in the blood means increase of serum protein and of hemoglobin. This increase of protein in the blood increases its viscosity. This may cause arteriosclerosis and decreased permeability of the capillaries. These conditions may be sufficient to cause high blood pressure.

P. 85

"Whatever the explanation of high blood pressure is, we must keep in mind the central facts that the kidney is damaged and becomes increasingly so, ultimately setting up uraemia in the patient, if he does not die from intercurrent disease, and that high protein intake must have an increasingly adverse effect on the kidney."

P. 85

PROTEIN INTAKE OR NITROGEN BALANCE

"Our endeavour must be to provide the organism with a supply of protein just sufficient to replace the wastage owing to the normal wear and tear of the tissue-- no more and no less. For fuel purposes carbohydrate and fat can be used exclusively. It is generally believed that an equilibrium between the intake and output of nitrogen, even if this takes place on a very low level, is a sufficient protein supply to meet all the requirements for this type of food. The minimal nitrogen intake which balances the urinary nitrogen equals the wear and tear protein nitrogen."

Of course the total number of calories must be sufficient so that protein is not needed for fuel, and the protein must be of high quality.

METHODS TO DETERMINE MINIMUM PROTEIN INTAKE

After a few days the stored up nitrogen is cleared, as shown by the gradual decreasing total nitrogen eliminated and the arrival of the time when the daily output remains practically uniform with an intake in the neighborhood of $3\frac{1}{2}$ grams of nitrogen for a person of average weight. If the amount is greater than the intake, the intake should be increased to equal the urinary output, and this may be considered the proper daily intake.

P. 90

In the observations by Harris the total calorie intake was 3,000. In cases of hyperthyroidism a higher level of protein intake was needed to establish equilibrium. A little more protein should be given than the actual minimum requirement.

P. 91

"We must, however, keep in mind that a slight difference between nitrogen intake and output will in time balance itself, and provided there is not a great difference between the intake and output nitrogen balance takes place in the long run (See Figs. 21 and 22)."

The excretion of potassium is greater under low protein than under high.

"The osmotic pressure of the blood is within narrow limits invariably maintained on a constant level. Any pronounced fluctuation would make life impossible."

The blood urea value may increase four times, but the number of molecules in the blood which determine its osmotic pressure will remain the same. Osmotic pressure is regulated by renal excretion. In the rabbit removal of the kidneys causes rapid rise of the osmotic pressure within a few hours. In man a rise occurs only after four or five days. Increased osmotic pressure of blood causes pronounced rise in arterial pressure. In a case observed by Bresch the pressure rose from 111 to 210 and the heart became hypertrophied within three days. The breath contains ammonia, diarrhea and vomiting are often present and the patient refuses food but not water, the temperature falls and the patient feels weak and the metabolism falls. These symptoms are identical with those of the terminal stage of hypertony or uremia. In essential hypertony the blood urea was within normal limits, much lower than is found in cases of renal hypertension.

It is to be remembered, however, that in many cases of advanced cases of high blood pressure the blood urea remains after a test meal longer on a high level than it should. The blood pressure rises to prevent accumulation of urea.

(The blood pressure is never any higher than it needs to be. J. H. K.)

GENESIS OF HIGH BLOOD PRESSURE

P. 112

"We may imagine that essential hypertony starts in the following way: The individual may be quite normal. Overfeeding leads to retention of protein and as yet the kidney is undamaged. Retention of protein threatens a disturbance of the colloidal osmotic pressure in consequence of which the arterial pressure rises. The raised pressure may affect the blood-vessels, including those of the kidney. At the same time the type of individual who retains protein, of course, consumes large quantities of this type of food. The kidney gets overworked in its attempt to remove the end-products of protein metabolism. A vicious circle develops. An impaired renal function makes it still more difficult to keep the osmotic pressure at a normal level. This results in a further increase of arterial pressure. Cause and effect are interacting with each other. Ultimately the high arterial pressure

is no longer able to compensate the impaired renal function and the osmotic pressure threatens to become disturbed, particularly as the kidney is involved. The patient dies in a uraemic syndrome. He may die before this stage is reached from apoplexy or from heart failure. In this way an individual with normal kidneys and normal vessels to commence with may, by excessive protein intake, develop an essential hypertony. But once it reaches a certain stage of development it changes the anatomical structure of the vessels and the kidney, which still more makes for hypertony.

"My belief that essential hypertony is fundamentally brought about by disturbance of the osmotic pressure is based on two facts. First, osmotic pressure is one of the few constancies which the organism guards most jealously; and secondly, the symptomatology of uraemia, as well as the other clinical features of hypertony, are essentially the same, as they appear whenever constancy of osmotic pressure is threatened. I am also convinced that the kidney plays a vital part in the disease from the consideration, that whilst the systemic vessels are contracted, those of the kidney are dilated in hypertony. This is an arrangement which favours a more effective excretion on the part of the kidney, and this suggests that the adaptation is in the interest of kidney excretion."

P. 113

"Whenever the osmotic pressure is unduly high the metabolic rate sinks to a low level. In this way excessive osmotic pressure is prevented from rising still higher. We have seen that a low metabolic rate favours retention of protein. On the other hand, it has been experienced that exercise has a favourable influence in lowering the arterial pressure permanently."

P. 114

"There is no justification whatever for dividing the ordinary type of hypertony into two categories-- benign and malignant. It is obvious that the latter is merely an advanced stage of the former.

"On the other hand, it is always the aim of medical science to remove the cause of a disease, and to lessen protein intake, under the circumstances, means removing, partially, the cause."

P. 115

"The work under high protein diet in some cases amounts to nine times that under low protein. A simple calculation will show the enormous work the kidney performs in 10, 20, 30, or 50 years under a high protein intake in comparison to low. It has also been shown that under high protein the excretion rate of urea is higher than under low, and that the work the kidney performs in removing 1 gram of urea under high protein is higher than under low. And this only refers to the kidney and not to the strain on the circulation in general owing to excessive protein intake. The rational treatment of an impaired cardiac condition is to live within the means of the cardiac reserve and to give it rest.

"The excessive work put on the kidney is obviously quite unnecessary. To replace wear and tear of the tissue the protein content under low protein intake is sufficient, for fuel purposes fat and carbohydrate answer the same purposes as protein. The end-products of metabolism of the former are CO₂ and water, which put little or no strain on the kidney or any other organ. One is able to estimate the

strain thrown on the kidney by excessive protein intake which is catabolized to urea; but what of the extra strain on the organism by protein which is retained and not catabolized to urea? This strain may easily be more important than the extra work performed by the kidney by an increasing protein intake which is catabolized to urea."

P. 116

"The urgent necessity at present is for science which shall teach us how the food intake shall bear a more definite relation to the requirements of the organism. The individual should consume exactly the amount and type of food he requires-- no more and no less. I predict that as soon as the public regulate their mode of living on such a principle the incidence of hypertony and other allied diseases will be materially reduced.

"Apart, however, from the type of case under consideration in this investigation, my experience-- and no doubt other medical men share the same experience-- is that degenerative change of important organs, particularly the kidney, are extremely prevalent in middle age. These changes are usually regarded as normal, because signs and symptoms in the early stages of the condition are few and usually remain unnoticed. Frequency of micturition is a cardinal sign in these cases, but so prevalent is this feature that I know several medical men who consider it to be a normal characteristic of middle age. Even nycturia I have found is often considered a normal condition associated with late middle age. The specific gravity of the urine is low in these cases, but as it is rarely correlated to the food intake it does not necessarily mean anything."

P. 117

"Judging by my experience, there are hundreds of thousands of these individuals in these islands alone who hasten their death by years owing to over-feeding.

"I am quite sure alcoholism claims far fewer victims than those due to excessive proteinism."

THE TREATMENT OF HYPERTONY

"Two facts emerge from this inquiry. High protein intake, no matter what type, increases arterial pressure. On a lower range of protein intake even a small quantity of substance affects the level of the systolic pressure. The difference in arterial pressure under high and low protein diet might not probably be very great; but if we take into account the cumulative effects, even of a moderate rise of pressure extending over a course of many years, it must affect considerably the longevity of the patient. For a rise in pressure invariably means increased proneness to apoplexy and increased strain on the heart; and, as I have already stated, it cannot be a matter of indifference to the organism to retain nitrogen.

"The other fact is that the kidney is invariably damaged in all cases of established hypertony, and this, too, is a fact which cannot be gainsaid. And it is particularly the renal faculty of passing concentrated urine which is impaired-- the faculty which is largely concerned with the removal of the end-products of protein metabolism from the circulation. Damage to the kidney progresses pari passu with the progress of high blood-pressure, till it ends in

complete renal failure. Surely measures to prevent as much as possible the increasing danger to the kidney ought to be taken at the earliest possible stage of the disease.

P. 118

"If we should be inclined to disregard all these facts, surely the amount of extra work which the kidney is called upon to perform under a high protein diet ought to be sufficient reason for restricting protein intake. As we have seen, in some cases the kidney performs nine times as much work under high protein as under low protein diet. Consider the cumulative effects of such extra work for a period extending over 10, 20, 30 years.

"We found by experience that a fortnight under a low nitrogen intake is sufficient to find a point where the output and intake of nitrogen balance each other. If the patient is kept on a very low protein intake for a considerable time, it is possible to establish a nitrogen equilibrium, even on a lower level; but owing to practical considerations we found it is not desirable to aim at such a low level.

"This brings me to the concluding paragraph of this volume. If restriction of protein is of benefit in cases where the disease is already developed, such restriction in a potential case of hypertony may possibly prevent the disease altogether. It is undesirable to advocate protein restriction in the young individual, but the matter is quite different in the case of adults of 35 years of age and over whose occupation does not entail manual labour. There is no doubt that in the average type of this individual protein intake is greatly in excess of requirements.

P. 119

"It is not suggested that the same procedure should be adopted in the normal as in the case of hypertony; but protein intake which would yield 8 grams of nitrogen, a part of which consists of animal protein, is ample for the requirements of such an individual. This ought to be at the same time the maximum and minimum protein intake of this type of person. A great deal of physical exercise does not really increase to a great extent the protein requirements, but only the calorie needs.

CONCLUSIONS

- "1. A low protein intake reduces arterial pressure.
- "2. For a protein intake on lower scale values the law holds good: the lower the protein intake, the lower the arterial pressure.
- "3. The type of protein does not affect arterial pressure. Milk protein is as harmful as that contained in beef; it is the quantity of protein which matters.
- "4. Under the same protein intake the higher the arterial pressure, the lower the blood NPN, and the more effective is the elimination of nitrogenous end-products of metabolism.
- "5. With increased protein intake the exchange ratio between nitrogen intake, blood NPN, and urinary nitrogen takes place at an accelerated rate.

"6. Everything being equal, the excretion rate for urea depends on the rate at which protein is catabolized and not on the magnitude of blood urea values.

"7. In high blood-pressure cases the NPN blood values, apart from very advanced cases, fall within normal ranges.

"8. Urea clearance takes place at a slower rate in fully established cases of hypertony than is normally the case.

"9. The total whole blood nitrogen is increased where there is retention of nitrogen.

"10. Serum protein is increased under high protein diet (all cases under observation for this purpose retained nitrogen).

"11. Blood calcium is increased under high protein.

"12. Blood potassium is also increased under high protein.

"13. The kidney performs under high protein feeding many times more work than it does under low.

"14. Urea is the main factor in this increase.

"15. With increase of urea excretion the work of the kidney increases in progressive ratio.

"16. On a standard diet of high protein under resting conditions the urine in normal cases shows a gradual increase of specific gravity. Early cases of hypertony on the same standard diet show an increase of urinary output; the specific gravity does not rise to the same extent as in normal cases.

"17. In advanced cases of hypertony on the same standard diet of high protein there is neither an increase of urinary specific gravity to the same extent as in normal cases, nor is the urinary volume increased to the same degree as in early cases of hypertony.

"18. The specific gravity of the urine does not run parallel with urea concentration in some cases of hypertony, and is evidently conditioned by other constituents of the urine apart from urea.

"19. Inability to pass concentrated urine is broadly a feature of fully established cases of hypertony.

"20. In the two normal cases the output of nitrogen balanced the intake. In all abnormal cases under the same standard diet the output of nitrogen was less than the intake.

"21. Under a lower calorie value in the same standard high protein intake less nitrogen is retained.

"22. Protein intake of a certain value is necessary to establish a minimum nitrogen balance as well as a maximum nitrogen balance. Below the first there is a negative nitrogen balance, above the second there is a positive nitrogen balance.

"23. The bulk of the nitrogen retained is not in the form of NPN. In all likelihood the bulk of nitrogen retained is in the form of protein in the blood-corpuscles, and presumably also in the tissue cells. Serum protein is also raised where there is retention of protein.

"24. If not required protein is stored in the same way as carbohydrate and fat.

"25. The minimum required for nitrogen balance varies considerably from one individual to another, evidently depending on the rate of metabolism.

"26. Potassium metabolism runs parallel with nitrogen. Broadly, there is an equilibrium between intake and output where there is a nitrogen equilibrium and a positive or negative balance where there is a positive or negative balance in nitrogen exchange."

JHKb

Hay, T. (Philadelphia): The Long Tube in Intestinal Obstructions.

Med. & Surg. Report. (Phila.), 1869: 21, 274.

States that the use of the long tube in intestinal affections was recommended more than 30 years before (O'Beirne) and that it was then shown that the tube could be passed upward into the colon and that the views relating to its danger were erroneous.

The different opinions since then urged against its practical and harmless employment have tended to keep its advantages in obscurity and account for the neglect which it has received. It seems that the principal objection is a supposed impossibility of safely passing the tube upward into the colon.

The author described the tube and force pump apparatus which he uses for intussusception, impacted feces, concretions, torsion and other conditions.

The tube is 20 inches long, exclusive of brass mountings, three-eighths of an inch in diameter and of such a degree of flexibility that it will conform to the course of the intestine by the heat of the body. The force pump is of brass.

Describes the mode of passing the tube. Usually about 6 pints of water or medicated fluid (according to the case) are forced in slowly. 2 cases of obstruction are described as examples.

Batley, R.: Intestinal Obstructions.
Atlanta Med. & Surg. J., 12: 129, (June), 1874.

In reporting some cases of intestinal obstruction in which he obtained a satisfactory result following the intestinal introduction of large quantities of tepid water, he refers to the statement in a recent German journal that "Gustav Simon has recently demonstrated the possibility of making fluids penetrate the whole length of the large intestine thereby causing no injury to the part by means of forced injections per anum". By the device of Alfred Hegar, consisting of an elevated funnel and elastic tube, as much as five to nine pints of water could be easily introduced.

The writer asserts that injections can be made to pass beyond the ileocecal valve; in fact in the cadaver along the whole length of the intestines and into the stomach.

Further, he states: "It seems indeed astounding that the profession should so long hold to the fallacious idea that liquids, and especially so bland and unirritating a liquid as tepid water, can be carried to a higher point in the intestinal canal by means of O'Burne's (Sic! O'Beirne, Abstractor) elastic tube passed into the colon, to any extent, however high up. It would appear that a little reflection would make it clear, 1st, that a liquid, perfectly mobile in all its parts, pressing equally in every direction, tending to insinuate itself into every crevice.....must insinuate itself readily anywhere in the alimentary canal, that O'Burnes tube could possibly pass and indeed far beyond the attainable reach of that instrument.

Barghoorn, E.S. (Dayton, O.), ? not a M.D.: Colonic Therapy: Its Relation to Medical Practice. Am. J. Phys. Therap., 8: 304, (Feb.), 1932.

Says: "My own experience in the treatment of neurasthenic cases, which goes back 23 or 24 years to the Battle Creek Sanitarium, some form of colon flushing or irrigation has always given satisfactory results."

"I have given over 4000 high colonic irrigations in Dayton in the last 3 years... Many cases have had very remarkable results and I believe all have been benefited."

Says that O.B. Schellberg (Book: "Colonic Therapy in the Treatment of Disease", New York, 1923) is the inventor of the 54 inch cecal tube which marked a great advance over the old Lockwood tube of from 24 to 36 inches. Dr. Lockwood's first attempt to irrigate the colon was made in 1899 with a long stomach tube introduced through the rectum.

Schellberg is not an M. D. He is a technician who treats cases referred to him or, perhaps, independently.

Rendall, Violet M.: Treatment of Constipation by Colonic Irrigation Plus Diathermy.
Brit. J. Physic. Med., 7: 5, (Apr.), 1932.

Same as in extract already given.

Hales, H.W.: Two Cases of Acute Septicemia Treated by Colonic Lavage.
British J. Physic. Med., 7: 165, (Dec.), 1932.

Both patients recovered; elimination of toxins by aspirin administration and other methods, in addition to repeated colonic irrigations, were applied. Potassium permanganate was used in the colonic injections.

Russell, W. Kerr: A New Method of Colonic Lavage (The Borosini Method).
Brit. Jour. Actin. and Physiother., 3: 219, (Feb.), 1929.

The Borosini method which is used in Europe is described as follows: An india-rubber tube attached to one end of a specially designed apparatus (hypotome^{nic} salt solution in a high pressure container) is introduced for a short distance into the rectum. The tube is securely fixed by tapes to the body and it remains firmly in position when evacuation occurs so that the outcoming water and fecal matter can be readily voided without pressing the tube out of place. During the treatment the patient lies comfortably on a special couch which may be placed over a slop pail or a water closet.

Yates, H.W.: Am. J. Obstet., 62: 761, 1910.

Says, seldom if ever are soft rubber tubes admitted into the normal colon. Submits many skiagraphs in proof of this. The tube coils upon itself and does positive harm, and in most cases it is impossible to tell when it is coiling upon itself.

Water or fluid injected 4 or 5 inches into the rectum is carried upward into the colon and may be found at the cecum in 10 minutes.

Machell, H.T.: Colon Irrigation: The Short versus the Long Tube.
Arch. Pediat., 28, 837, 1911.

He thinks that the use of the long tube is unnecessary. Fluid penetrates as far as the cecum using the short nozzle. Has so used it for 15 years.

Morse, F.H. (Boston): Colonic Irrigation
Combined with Wave Current Therapy

Am. Med., 24: 752, (Nov.) 1929

Writes of the benefits to be derived from this form of therapy and gives his technic.

In a paper on "Colonic Irrigation" in Physical Therapeutics, 49: 249, June, 1929 this author remarks that the colon proper, extending from the ileocecal valve to the sigmoid rectal sphincter, has no part in the digestive process. In outlining colonic irrigation it is very essential that one determine whether the ileocecal valve is or is not competent, as a very unpleasant result would ensue if the cecum bacteria were forced into the ileum where the absorbing power is greater.

"My conclusions are that colonic irrigation has a place in therapeutics which is too often underrated in its importance. Possibly it is too often overdone by manipulation with unnecessarily large tubes in the unskilled hands of those not familiar with a possibly existing pathology, or the distorted anatomy of the colon itself. Wherever possible a radiograph by barium enema should precede any colon treatment, when there is sufficient evidence of infection."

Uses a small tube with a rectal speculum arrangement.... it is efficient in causing the solution to pass readily into the cecum.

*had great
success
at what he
considered*

et

X

Etheridge, I.H. (Chicago): Flushing of the Colon.
West. Med. Report (Chicago), xi, 175, (Aug.), 1889.

Says that flushing of the colon is a very simple and effective remedy (for constipation). Remarks on this common affection and the occurrence of loculi in the bowel which become receptacles for retained feces.

Technique

The use of a long rectal tube is unnecessary. The patient should be placed in a genu-pectoral position. The water will be made to descend while anatomically ascending the intestines. Patients can be made to receive from 1 to 6 pints of water in this position without the slightest trouble. One of the effects of the water is to distend the colon and in that way pressing away the walls of the loculi from the accumulations they fall into the current of water and are passed out while the water is leaving the intestine. The patient will often complain of severe tormina.

The presence of such a strange foreign body in the intestine as hot water in many cases excites prodigious peristaltic activity, thus producing tormina. The water should be hot; cold water or tepid water will not do. The use of hot water is not followed by cramps. Its use also is often a vigorous diuretic and is good in renal insufficiency.

The author reports 8 cases. In some, flushings were continued for 3 months, usually daily.

(Note by abstractor: The author does not refer to any history of this method, or to anyone else having used it. He does not say how far the tube penetrates.)

Bush, I.F. (Boston): Cases of Intestinal Obstruction
Treated by Means of the Rectal Tube.
Bost. M. & S. Jour., 108: 97, (Feb. 1), 1883.

Regarding 3 cases treated by the rectal tube, remarks: No one who has not tried this means can form any idea of the ease with which the tube is introduced, the patient not feeling its introduction. In 2 cases (of 3) the patients did not feel it beyond the sphincter ani.

Exactly how far an injection may be made to penetrate has been for a long time under discussion... It was shown that water could be made to pass beyond the ileocecal valve. Others claim that though in death the fluid may be made to penetrate beyond this point, yet in the living subject under normal conditions the tonicity of the valves prevents the passage beyond to the small intestine.

The author does not give any history of the method. He says: "Distention from below is not a new method and other means than fluids have been employed. Air for instance has been forced in by means of a pump."

Author used a red-rubber stomach tube 20 inches long; it was introduced its full length, the patient lying upon the left side, and it threw into the colon a large injection which when it came out was found to contain fecal matter. Glycerine and water was used later.

Hurd, A. (Findlay, Ohio): Obstipation of the Bowels from Impacted Feces in the Cecum.

"The Clinic", (Cincinnati), VII, 289, (Dec. 19), 1874.

"In the case (of obstinate obstipation) which prompts this paper, I determined to resort to Prof. Mosler's method of irrigating the bowels with fluids. Which, as you no doubt will remember, consists in taking a piece of soft rubber tubing of about one-eighth to one-fourth inch bore and from six to ten feet in length, attach a funnel to one end and an olive-shaped tip to the other, which is to be inserted at the anus beyond the sphincter; water is then poured into the funnel and by raising or lowering the funnel the pressure of the column of water in the tube can be regulated as desired; using such quantity of water as necessary to produce the desired effect; modifying and regulating the force of the stream by pressure with the fingers on the elastic tube. By such means (as has been demonstrated by Simon, Prof. Mosler, and others as the result of a series of most carefully conducted observations and experiments) we can force a continuous stream of water--in a very few minutes--through the whole length of the colon up to the ileocecal valve, irrigating and washing its whole tract."

.....It is a modified application in medicine of the hydrostatic paradox, in the use of Prof. Mosler's plan of irrigating the bowels.

Gives the details of the filling of the bowel with about one gallon of warm water which quickly softened the indurated fecal mass. The obstipation was of about 9 days standing.

Geiger, A.: Case of Intussusception of the Bowels
Relieved by the Injection of Cold Water.
Med. & Surg. Report (Phila.), 1881; 45, 388.

"I concluded to try the injection of cold water, as a last resort.

"I ordered cold water brought from the well. I laid the patient upon her right side, with the hips elevated and the body and head inclining downward. With a large sized Mattson Syringe,* after introducing the long tube as far as I could, and having an assistant with a cloth applied to the anus to maintain pressure and prevent the return of the water, I pumped, with considerable force, about 3 pints into the bowels. The patient retained her position about ten minutes, the compress being maintained, when she expressed a desire to get upon the chamber; she was assisted up; the water passed away with a small quantity of fecal matter. She again resumed the same position and in fifteen minutes had another passage....."

(*The Mattson Syringe is merely a modification of O'Beirne's rectal tube and force pump; it is described in Mattson's monograph mentioned elsewhere.) Abstractor.

Chicago Examiner and American, Aug. 15, 1906. Sunday.

THE BEST THINGS ARE LEAST EXPENSIVE.

by The Rev. Newell Dwight Hillis.

It is often said that our generation is more avaricious, pleasure-loving and immoderate than any of its predecessors. But he who reads the history of the eighteenth century will be cured of depression over the excesses of the nineteenth and twentieth. In medicine it is a proverb that like cures like, and that a little drop that causes a disease will also prevent it. And certainly one page out of the history of Walpole makes the history of the "fast set" of to-day seem tame.

What! Our generation a race of speculators? In the days when the stock-waterers in London were promoting the Mississippi Bubble the tradesmen and citizens of London lined up on Saturday night so as to be the first in place on Monday morning ready for the Stock Exchange to open. Faithful wives carried these men warm drinks of tea and whiskey during the two nights. Some men fainted in their places, others were trampled to death, and all that the citizen might be the first to exchange his gold guinea for a piece of paper that represented nothing.

The worst stock-jobbing operation ever floated in Wall street was as solid as an ear of corn or a bushel of wheat in contrast with a chunk of fog bank when that Wall street operation is put over against the Mississippi Bubble. The simple fact is that the moral climate and the intellectual climate has passed from January into March and that June is approaching. For society the last days are the best days.

SIMPLICITY IS ANTIDOTE.

But the best antidote to the evils of our times is the love

of simplicity and the emphasis of the life that is more than meat or raiment. This wise King, who prayed, "Give me neither poverty nor riches" understood the importance of the golden mean. He knew that too much rain of wealth and too much drought of poverty were alike injurious to the fruits of the soul. He knew that God had ordained that the sweetest pleasures should be within easy reach of the shortest hand.

In architecture we have all learned to eschew ornament. The Corinthian capital had just enough leaves, the Ionic column has very simple lines. In literature we know that nothing destroys the oration or the book like verbosity. Every June bride knows enough to wear one color-white- and one spray of blossoms on the bosom. The physicians tell us that walking is far more healthful than riding, and we need no physician to tell us that it is less expensive. As to health and mental fertility, every scholar and distinguished author knows that if he wants to do really great work he must confine himself to wheaten bread, a glass of milk and simple food.

When the poor boy is making his fortune he does not realize that his strength, his energy and his happiness are largely due to his plain living. Grown rich, he eats eight or ten courses, with two or three kinds of wine. That is, he eats the courses for a short time -- then the courses carry him into the graveyard: The achievements of Wordsworth, the old German Emperor, or Leo XIII., of Gladstone and Tennyson, are the achievements of extreme abstinence in old age. A little fruit, a little cereal and wheaten bread, a glass of milk--
the
these are within reach of all, even the poorest laborer; anything more is at the peril of the eater. The express companies mark certain

packages "at the owner's risk." In life's feast Nature stamps the last eight courses of the rich man's dinner with these words, "At the owner's risk. All responsibility disclaimed."

The people in this country who are disturbed by the price of meat and the revelations of the stock yards had better read the story of Belshazzar's feast and ponder the fact that Alexander died of red meat and apoplexy.

That the highest happiness is inexpensive is seen also in the fact that man's chief pleasure comes from mental culture. Upon reflection, we all discover that our happiness moments, day by day, are those when we are conscious that we have grown in manhood or womanhood through the companionship of great books and conversation with wise friends. Nothing exhilarates like a golden hour of personal growth. What a glow pervades the mind when one approaches the last pages of an inspiring story, poem, or oration! The pleasure is not fiery, nor consuming. It is a gentle pleasure, like that experienced when we listen to high music, or look at a rich sunset, or behold a mountain side golden with autumnal splendor. It need not be college culture, for the time is gone forever when culture is limited to colleges.

The aerial highway is for all, poor and weak, bond and free, high and low, alike. All that is asked is the hunger for the feast of beauty that Nature and God hath prepared. For the fountain that bubbles on the mountain side is free to lark and eagle alike, and to the wild deer. And the fountain of happiness is a spring that will bubble in every human heart. What a word is that, "the well of water that I will open up is a well of eternal life and happiness."

LOVE AND SERVICE.

A higher form of happiness is the least expensive—the happiness of love and service. The keenest delight that ever ravished the soul of man is the delight of serving the poor and weak. That wealthy Englishman who took his art treasures to Sheffield was a wise man. He had marbles that had come from Greece, pictures from the galleries of Italy, examples of the French and Dutch schools. He did not take them to a gallery that would spread his name and fame. He founded a school of art for the working people who made knives and forks and spoons. He taught them how to spread beauty over the walls of the dining-room and parlor, and gave them models for beautiful chairs, — beautiful carpets, beautiful rugs. His gallery is empty, but his heart holds something that it has never held before—happiness—that the world could not give and could never take away.

This is the joy of knowledge that the wise man can teach. The artist's joy is in giving beauty to ugly lives. After one has had his food and raiment, life's feast begins when we help and serve and do good work.. That is why we so often see people who have lived arid, desert lives in prosperity, but whose career of happiness, peace, and influence began when reverses began. Not many can be rich. All can be happy. The food of simplicity, the raiment that is quiet, can be enjoyed by all.

Extracted and translated
from the German by
Dr. S. Jespersen.

NUTRITIONAL INQUIRIES

AT THE FRUIT CULTURE SETTLEMENT AT
EDEN, NEAR BERLIN, GERMANY.

By. M. Hindhede and Dr. F. Landmann.

Introduction by Dr. F. Landmann.

In the year 1893 eighteen vegetarians in Berlin united to form a colony enterprize, which already came into existence the same year and known as the Vegetarian Fruitculture Colony Eden.

While at that time there were only 18 members with an area of 160 acres of land, today there are 400 acres with 180 households and about 500 persons, and because of its peculiarity the settlement has become an object of study for settlement professionals, political economists, sociologists, and life-reformers. The physician and hygienist, and not less the nutritional researcher can here learn many things.

While this writing treats in details only a limited number of families at Eden it represents in reality the rest of the population also. The use of food of animal origin is very limited in the whole Eden. The main substance, the milk is mostly used by the children. But experiments have not been lacking in trying to nourish the children with purely vegetable food, and nothing harmful has been reported. As about one third of the settlers have hens, eggs play a certain role, but where the eggs have to be bought, they are used very sparingly. Butter is almost entirely crowded out by oils and fats of vegetable origin. The use of cheese is very moderate. Meat and meat preparations as well as fish must be mentioned last of all. If it appears at all on the table it is more an exception than the rule, and more as an addition to a dish than as the main course. Of the vegetable foods the whole rye or wheat bread occupies the first place. In particular families, chiefly by persons with weak digestion, white bread, and rolls and buns are also customary.

Almost equally important to the bread is the cultivation and use of potatoes. They form the basis of most of the meals, and in the greatest variety of preparations on the table. Very considerably is also the use of fruits and vegetables, either fresh or conserved. Fruit is at harvest time and when plentiful also indulged in between meals, especially by the youth who temporary live almost more on fruit than any other food.

As to the beverages the alcoholic drinks do not enter into consideration. At breakfast and supper the domestic substitutes for coffee and tea are customary, or a soup prepared from cereals and the like is consumed. Whoever wants to save time and expense of preparing warm drinks satisfies himself with fruit juice or fresh fruit.

The number of meals daily is generally limited to three. Those living alone do not bind themselves to a certain fixed meal time, but eat when they are hungry, or they arrange themselves according to their work, in which case it is nothing of importance to him if he now and then leaves out a meal.

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As to the preparation of their foods, especially the noon day meal, this differs from the useful recipes. As the Eden ladies of the house mostly keep house without help and because of her many different duties in the house and home has no time for complicated cooking, the meal is very simple, generally one single course--in the most simple form, the so-called one kettle dish--the preparation of which causes the least possible work and of which one eats oneself fully satisfied. The height of the simplifying is found in the so-called raw food, which are brought for consumption just as nature presents them. They are partly liked in summer, especially noteworthy is also the very scarce usage of condiments in the eating kitchen. One experience especially taught me that the more you abstain from alcohol and tobacco and in this way increase the sense of taste and the more you strive to conserve the natural taste and aroma which otherwise gets lost through cooking the more artificially spices and condiments appear to be superficial even the otherwise indispensable salt becomes seemingly unnecessary. This manner is also brought about that in the kitchen household their raw material otherwise reach the kitchen in fresh condition. Furthermore since alcohol and tobacco are banished from Eden so that one does not need to deal with the blunt taste which is otherwise caused by the stronger condiments, the youth from childhood are accustomed to non-stimulating diet, which can only be of benefit to their prosperity.

If we now turn to the answer to the question "Which special advantage does the Eden population have from their vegetarian diet?" If the rough albumin poor food is sufficient, nourishing for the hard working population in this respect I have only my many years of experience and observation as an answer but also the condition of the population of Eden which is able to perform daily hard work. Many have come to Eden in weak physical condition, but are now able to make a good show compared with the country people and especially with the city public. Obesity is not known in Eden, but that this is just as good as I as the absence of diseases, such as can generally be traced back to a too great amount of albuminous food. As to the durability of their physical endurance we might here mention that they work very faithfully in Eden, far beyond the eight hour day. One frequently hears the saying, "In Eden the men have it very hard, it is not easy for the women, but it is on the better for the children." The health condition of the people in Eden is comparatively very good. And if we are to know the tree by the fruit we only have to point to the fact that the school in Eden through which three hundred thirty children have passed during the last twenty five years, has not lost one single child by death, and that out of the one hundred sixty five children born in Eden only six have died in the first year of life. This makes a death rate of only 3.6%. The lowest figure that has ever been observed in a modern land of culture.

Besides the health condition the economic advantages should not be lost sight of. The present conditions as to money and price makes it impossible to obtain certain figures as to the economic advantages, but it is clear that the present prices of animal food makes great economizing possible by abstaining mostly from animal food. It is long since known that the cultivated ground is the surest way ^{guaranteed} ~~guaranteed~~ for life's existence-- we Eden people have had this experience since the war!--our existence in times of famine and can even be a life saving for a country. Not to have comprehended or followed this truth is the greatest tragedy of the Germany of today, which so long paid out enormous sums for imported foods, really in the midst of an abundance of home produced products, which were so long not made proper use of that the country finally succumbed to the war. It is a sad truth which Hindhede expresses in his last great work: "If Germany and Austria during the war had only half way taken Eden as an example no man in both empires would have needed to suffer hunger. Who knows if Germany would have then lost the war! In conclusion I will not fail to accentuate again that the above observations and conclusions in regard to nutritional conditions in Eden are not only based on observations on others,

but are also corroborated by person's experience. As a vegetarian of the strictest kind who subsists upon exclusive vegetable food and thereby enjoys the more than average endurance and accomplishment, I express my undoubted scientific conviction that I consider the vegetable food entirely sufficient for the greatest accomplishment and is to be preferred to all others, both as to health and economy. Of course one has to order one's circumstances and the whole condition of life in such a way that the manner of nutrition will bring the fullest worth and use. That the provision in this respect is lacking to the people of today does not speak against the fact, but should only spur us on to bring about such a condition. May this writing also in this respect be well understood and taken to heart!"

Nutritional experiments in Eden.

Introductory remarks by M. Hindhede.

Already since 1910 when I visited Eden for the first time until the present day, this remarkable colony has interested me very much. The idea on which the plan was founded "Back to nature, away from the urban overculture to the simple country life and the liberty, fresh air and sunshine, away from the extreme flesh diet and back to the mainly vegetarian nourishment with exclusion of the modern poisonous delicacies!"--we can only endorse. If those who have formerly been subjected to city culture and already are sickly will be able to stand these ideas that was a question which time only could answer. With regard to this I point to the experience of my associates as well as to my own. The first one hundred and sixty acres of the Eden estate was purchased in the year 1893 for the price of two hundred twenty five marks per acre, that is the ordinary local price for land which was very cheap in comparison to the about ten times a higher price which today is paid for instance in the vicinity of Copenhagen. It is true that Eden is situated about thirty kilometers from Berlin, but only three kilometers from the railroad center, Oranienburg (14,000) inhabitants, having train connection with Berlin every half hour.

Each homestead comprised 2800 sq. meters. If anyone moved away from Eden their homestead went back to the colony and was again handed over to a successor under the same conditions.

That Eden is private property of the association includes also the great advantage that undesirable guests can be refused admittance. Visitors are requested at their entrance to the settlement to abstain from smoking. Intoxicated persons obtain no admittance at all so that such are entirely unknown in Eden. At the questioning of the school children it was found that three fifths of the children had never in their life seen an intoxicated person. In Eden is found no alcohol, tobacco or meat shop, no selling of vulgar literature, picture shows or the like. Dr. Landmann reports that Eden could be considered free from venereal diseases, which is not little said, when we consider the proximity of Berlin. The lamentable and rough and unseemly tone of the city youth is not noticeable in the youth of Eden. Dr. Landmann assures that during his ten years sojourn in Eden he had never heard an obscene word. That all the members are more or less of the same idealistic mind has very encouragingly improved the social condition. Meetings in the association's hall, and musical entertainments etc. are often held. Four times a year community feasts are celebrated Spring and harvest feast, summer and winter equinox (Christmas). One is generally convinced that these feasts which are celebrated without strong drinks exactly for this reason are so quiet and peaceful as is the case. Further it is noticeable that in the thirty years of the colony's existence no inhabitant of Eden has been involved in any court process.

no alcohol, tobacco or meat shops

	I			II			III			IV		
	2	3	1	2	3	1	2	3	1	2	3	
Coffee substitute	1	1.6	1.7	2	3	1	-	-	-	-	-	
Genuine Tea	0.1	-	-	-	-	-	-	-	-	-	-	
Tea substitute	0.5	0.7	-	4	-	-	-	-	0.5	0.2	1.6	
Cocoa & Chocolate	8	6	5	2	5	3	3	4	3	0.2	2	
Salt & Spices	6	6	3	2	2	4	6	6	8	5	6	

Nutrition content in Grams.

	I			II			III			IV		
	2	3	1	2	3	1	2	3	1	2	3	
Albumin	69	85	66	98	85	88	64	70	75	85	71	
From animal	11	13	21.2	28.2	19.0	18.6	10.7	10.7	11.2	15.3	3.4	
fat	78	65	84	99	61	87	68	62	48	63	59	
Carbohydrates	590	639	375	643	695	632	500	593	572	727	572	
Calories	3431	3573	2586	3956	3766	3760	2945	3294	3097	3917	3180	

1. Pensioned pastor's widow (33) with two children at the first examination there was also a sister (29) in the family. At the third examination there were besides those, still an uncle (34) and the third child. They had lived since 1917 in the colony of Eden. As in all pensioned families there is also a certain lack in this family because their increase in pension has not kept pace with the increasing price. Receipts from summer guests must help out. But one does not at all get the impression that real need exists. The family members all look well and well nourished. As may be seen from the table the food quantity (compare the calory figure) is entirely sufficient weight in kilograms.

	Beginning	End	Beginning	End.	of test.
	2		3		
Landlady	70.5	72.5	71.5	66.5	
Child 8 yrs.	30.0	31.0	34.0	33.5	
Child 6½ yrs.	24.0	25.0	26.5	25.5	
Sister	59.0	60.5	64.0	63.5	
Brother in law	---	---	66.0	65.0	
Child 4 yrs.	---	---	18.5	18.0	
<hr/>					
2.95 units during twenty eight days equals	82.60	units	4.70	x 28 equals	131.60 units
Guests	25.92	"	Guests	22.35	"
Total	108.52	"		153.95	"

2. Architect. Man (30) wife (29), 3 children came to Eden 1918. The husband took sick because of the war with tuberculosis. His work was such that when he was home he had to do house work also. Was repeatedly treated in institutions. He died 1923. The economic conditions became very difficult on account of the illness. The food quantity was at the first examination modest. At the two last examinations it was above average.

Weight in kg.	1		2		3	
Husband	73.5	72.0	68.5	71.0	72.0	72.0
Wife	71.5	71.0	69.5	71.0	69.5	70.5
Child 2½ yrs.	16.5	17.0	17.0	17.0	18.5	18.0
Child 1½ yrs.			11.0	11.5	13.0	13.0
Child 5 wks.	---	---	-	-	3.5	4.0
<hr/>						
UNITS	2.5 x 28 equals		70.0	2.5 x 28 equals		70.0
	Guests		0.75	Guests		15.1
Total units			70.75			85.1
						78.4

3. Teacher. M. (40), F. (27) 1 child.

In Eden since 1918. Bought a house with five rooms, kitchen, two bedrooms for ten thousand marks and paid 3000 marks for cultivation.

Weight in kg.	1	2	3
Man.	72.0-71.5	68.0-67.5	60.0-60.5
Woman	63.0-61.5	58.5-61.0	61.5-60.5
Child $2\frac{1}{2}$ yrs.	16.5-16.5	16.0-17.5	18.0-18.0
Units	2.2 x 28 equals 61.6	2.2 x 28 equals 61.6	2.2 x 28 equals 61.6
Guests	---	---	3.5
Total units	61.6	65.1	68.6

The family is doing well, the members look healthy and are satisfied with their condition. The loss in weight in the man is striking, the reason for this is supposedly that at the first examination his attention was called to the fact that in my opinion his food quantity was too great for the work he was doing. The use of bread, grains, potatoes and milk was then diminished. This has caused him no harm--the family gave me the following statement regarding their manner of nourishment: In the morning only an apple or a pear, forenoons: bread and milk. At noon ($12\frac{1}{2}$) hr. cooked food, consisting of potatoes, roots or vegetables together with different kinds of fresh fruit, prepared in various ways, with proper variation. Evenings 7 O'clock: Abstinence from cooked food; in order to make it with as little work as possible. Also: raw food, constituting of salads, cucumbers, peas, carrots, fresh fruits, bread and margarine.

4. Designer. Husband (35), wife (24), one child--at the last examination. The husband came to Eden 1914 and interested himself zealously in sport besides his profession. In the war he contracted a severe pneumonia which came near costing him his life; he was sick in bed 8 wks. He has not yet regained his former health and strength. Under the present conditions in Germany the art profession is also suffering so that his profession is not remunerative. Nevertheless is the nutrition still an average. At the second examination above average, as at that time the wife was in expectancy and for that reason required increased nutrition.

Weight in kg.	1	2	3
Husband	58.0-59.0	55.0-56.5	55.0-56.0
Wife	66.0-66.5	59.0-60.0	57.5-58.5
Child $\frac{1}{2}$ yr.	-	-	8.0- 8.0
Units	1.9 x 28 equals 53.2	1.9 x 28 equals 53.2	2.2 x 28 equals 61.6

Taken as a whole the wife has lost in weight. She is thin, it is true, but otherwise healthy. I would advise her to take at least one half litre milk daily during the time she is nursing the baby.

5. Widow. (63) of a pensioned officer. An interesting example as to how one with good will and perseverance can regain ones former health and counteract old age. Between 40 and 50 she was weak and sickly and suffered continuously from attacks of bronchitis lasting from three to four weeks. Since 1909 she joined the natural healing movements and became vegetarian. Since then she takes regularly in the morning health gymnastics according to Schreber and keeps the temperature of her room low--not over 13 degrees Reaumur. At present she feels entirely well and never has a cold. Since 1916 in Eden.

Weight in kg.	2	3	4
Units	54.5-55.5	53.5-55.5	55.5-56.5
	0.9 x 28 equals 25.2		

Daily amount in unit per gram.

	V		VI		VII		VIII		IX		
	2	3	1	2	3	1	2	2	3	1	2
Meat & Fish	-	-	-	-	-	-	-	-	-	-	-
Fat.	55	38	23	50	43	60	38	35	26	70	54
(Butter)						1			20		
Milk	69	95	188	140	265	31	113	634	506	191	275
Cheese	11	-	-	2	-	0.4	1	16	14	-	-
Eggs	13	10	-	0.5	6	0.6	13	7	7	1	11
Bread	364	248	353	345	306	272	348	292	238	358	430
Flour & Grains	93	107	137	83	158	62	69	29	82	117	76
Sugar & Syrup	19	67	88	52	53	47	32	11	20	90	68
Fresh fruit	694	370	393	613	161	303	840	795	278	359	1297
Potatoes	201	657	652	582	464	592	548	160	270	888	592
Vegetables	113	65	255	368	155	91	132	43	62	444	261
Real coffee	-	-	-	-	-	-	-	0.5	1	-	-
Coffee Sub.	6	-	-	-	11	3	1.4	1.2	-	1.2	-
Real tea	-	-	-	-	-	-	-	-	-	-	-
Tea Sub.	-	-	-	-	-	-	0.3	-	-	0.3	0.3
Cocoa & Choco.	1	3	-	2	4	1.5	4.4	4	4	1.5	3.5
Salt & Spices.	10	12	8	10	15	9	11	5	2	22	10

Nutritional content in grams.

Albumin	65	50	69	59	59	43	54	60	55	79	70
Thereof animal	9	4.0	5.6	5.5	8.7	1.5	5.5	22	18.2	5.8	9.5
Fat	70	46	34	60	54	62	46	66	49	81	66
Carbohydrates	435	434	607	516	486	388	467	369	414	617	623
Calories	2696	2438	3082	2910	2738	2341	2562	2373	2380	3600	3452

The last weight record is from Feb. 1923 that is nine months after the third examination. During this time were, per month, the following amounts per unit and gram consumed: Fat 41, Cereals 184, including flour and grains, sugar 43, fresh fruits 237, bread 324, potatoes 556, vegetables 151, salt and spices 13. Nutritional content: albumin 64, fat 44, carbohydrates 546, equals 2907. All kinds of animal food including coffee, tea etc. was given up. Besides bread, fat, grains, potatoes, fresh fruits and vegetables they only bought rye and wheat mostly ground with a hand-mill roasted with a little fat, and made into soup, or porridge. ~~was made from the mostly ground cereals.~~ Thus she succeeded as the figures show in sufficiently nourishing herself, while she would have had to suffer hunger if she had given out her modest income for animal foods. It was a pleasure for me to see what a lively, fresh and enjoyable influence such an old lady could make by such a Spartan diet.

15. Physician. Our friend, Dr. ^{of} Medicine, F. Landmann (58) yr. Son (28) yr. The family consists of father and son. The first named gave up his activity when he was 45 yr. old and moved to Eden and there bought a little frame house of two rooms and kitchen for 2000 marks. The homestead comprised 1300qm. He hoped to make a living from the interest and what he had been able to economize. But after his capital had been made worthless because of the drafting bungle he rented 5600 qm. in New-Eden on which the father and son in common put up a larger frame house with their own hands. The father cultivates the land and the son works as an electro technician in Berlin. It is a pleasure to see how this poor spot of dry sand has been cultivated. Only a look at his rye field is worth a trip to Eden. Dr. Landmann wrote me Sept. 19, 1923 as follows:—

"You will be interested to know that this year's experiment with Chinese-Japanese beet culture has furnished the yearly needs of bread cereal for me and my son, far above all our expectation." We have thus not to feel starvation for the present. If we now study our table we will see that under XV/3 every trace of animal food is lacking. Under 2 we still find a little cheese, which the son has eaten. This absolute vegetarianism does not in any way correspond to fanaticism. Our colleague Dr. Landmann is a very quiet considerate man and we cannot say that the necessity alone forces him to it. If he were convinced that he could not do without animal food it would be possible for him as well as for others to obtain a little milk also.

	Daily consumption in units per gram.										
	XV		XVI			XVII		XVIII		XIX	
	2	3	1	2	3	1	2	1	3	1	3
Meat & Fish	-	-	-	-	-	-	-	-	-	-	-
Fat	75	59	12	3	6	49	61	48	37	56	84
(Butter)	-	-	-	-	-	-	-	6	-	1	-
Milk	-	-	37	23	11	596	424	134	584	589	110
Cheese	19	-	-	-	-	4	-	8	4	21	11
Eggs & Bread	-	-	-	-	-	-	12	6	4	21	11
Flour & Grains	475	679	256	232	343	241	317	275	714	407	310
Sugar	113	45	166	115	146	218	68	154	106	66	97
Fresh fruit	25	7	38	23	47	62	23	44	93	51	133
Potatoes	821	518	579	1605	328	387	535	474	377	348	179
Vegetables	1067	1091	1330	911	909	604	303	1316	836	250	493
Real coffee	61	60	363	380	338	302	242	567	187	253	651
Coffee Sub.	-	-	-	-	-	-	-	-	-	-	-
Real tea	-	-	-	-	-	-	4	-	-	1	-
Tea Sub.	-	-	-	-	-	-	-	-	-	-	-
Cocoa & Chocolate	-	-	-	-	1.4	1.5	-	-	5	-	1
Salts & Spices	-	-	-	-	-	4	3	7	-	-	2.7
	10	5	9	3	10	2	1	18	12	3	-

Nutritive content in grams.

Albumin	80	97	66	56	63	84	59	82	109	73	63
Thereof animal	5	0	1	0.7	0.3	19.3	14	6	19	22	8
Fat	82	59	18	9	15	76	78	66	85	81	104
Carbohydrates	782	697	683	597	563	558	400	653	829	467	511
Calories	4296	3807	3239	2760	2703	3336	2610	3625	4636	2964	3814

The reason is rather, that he has a great, scientific interest to find out how near he can come to the mark, to live on self produced foods. We see that the sugar also has almost disappeared from the table, syrup made from sugar beets raised by himself has been used. The diet is more and more simplified. Under the date of Sept. 10, 1923, Dr. Landmann gives me the following menu for the past week:

Mornings: daily 4 slices of bread with marmalade (without fat and drinks).

	Noon	Evenings.
Mon.	Peeled potatoes with margarine	Same
Tue.	Potatoes with beans	"
Wed.	" " "	"
Thur.	Peeled potatoes with margarine	"
Fri.	Potatoes with carrots	"
Sat.	" " "	Baked potatoes
Sun.	Potatoes with Cabbage	Beckerman potatoes

Our colleague, Landmann remarks: "The dishes prepared from potatoes and vegetables are prepared without fat and spices and contain an addition of oat

flakes. At each meal bread is eaten and generally following this a little fresh fruit. There was no special beverage given with any meal. I do 10 to 12 hr. garden work daily on this diet; I get up at 5 o'clock and go to bed at 8 o'clock. My condition is splendid in every respect,--in spite of the otherwise miserable conditions in Germany! "

He closes his letter with the following remark: "At the last cattle census there were found out 500,000 hogs more than before. Now Germany cannot go down or perish ! "

Of greatest importance to science is the valuable proof from Eden that the animal albumin even in the form of milk can be dispensed without harm. Vegetable albumin is a perfect substitute for it. That holds good especially with regard to adults.

NOURISHING OF CHILDREN IN EDEN.

What is the most noticeable in Eden are the healthy children. "Eden is the children's paradise", is the expression one generally hears. As already stated in the introduction no child has died during the twenty five years existence of the school in Eden.

The following table gives the weight of the children in each family and farther below are given the summary of the normal weight of the children according to Prof. Monrad. The families which are not entered here had no children.

Weight of the children in kg.

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Age	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Years
Family																	
I	-	-	-	-	-	-	-	26	-	34	-	-	-	-	-	-	-
II	4	-	13	-	18	-	-	-	-	-	-	-	-	-	-	-	-
III	-	-	-	18	-	-	-	-	-	-	-	-	-	-	-	-	-
IV	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VI	-	-	-	-	-	19	-	22	-	-	-	30	34	-	-	-	-
VII	-	-	-	-	-	-	-	-	-	22	-	-	23	27	33	43	-
X	-	-	-	-	-	-	-	-	24	-	30	-	-	-	-	-	-
XI	-	-	-	-	-	-	-	-	-	-	-	36	-	36	-	-	-
XIV	-	-	-	14	-	-	22	23	-	-	-	-	-	-	44	-	-
XVII	-	-	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
XVIII	-	-	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
XIX	-	10	-	-	15	-	-	23	-	-	-	-	-	-	-	-	-
Norm	-	10	12	14	16	18	20	22	24	26	28	30	33	36	40	-	-

The only family with children of underweight is No. 7. As already mentioned the little growth and weight can be hereditary, but it is also possible and even probable that it is caused by under nutrition. The food quantity was small, on an average only 2450 calories per unit. Leaving out of consideration this family, we find only one single child among 22 children above one year, who are underweight. And in this single exception the minimum was only one kilogram. Seven of the others were normal and 14 overweight.

The following figures show the consumption per year.

	1	VI	X	Xi	XIV	XIX	Average
Milk ccm	345	198	204	128	272	350	250
Cheese, eggs g	9	3	28	8	13	32	17
Animal	76	62	63	67	70	68	68
Albumin	12	6.6	12.5	6.6	11.9	15	10
Calories	3502	2910	2828	2996	2970	3389	3099

These figures are of interest in that the calory consumption harmonizes with ~~Voit's statement~~ ^{Voit's statement} ~~normal~~. But Voit required 118 g albumin per day of which 1/3--1/2 should be exclusively of animal origin. These very healthy and active Eden families, content and satisfied with 68 g, of which only 10 g is of animal origin. And this is in the largest families where the need of albumin is comparatively great. A most striking contrast to the Voit-Rubner-Thomas teaching would be difficult to discover. And this proof is to be found only 30 km. from the Berlin university.

But we want to examine the children's nutrition. Here the use of milk is of special interest. We see that only 1/4 ~~litre~~ ^{litre} per unit is used. But how much of it do the children drink? That is difficult to say; but so much is sure that ~~they~~ could not drink more than all of it. If we now divide the total quantity of milk among the children then each child gets:

Per family	VI	X	XI	XIV	XIX	average
ccm milk	229	388	284	317	382	333

Family No. 1, we have left out because the lung diseased man probably liked much of the milk, on the other hand, if we now suppose that each member of the family gets an equal amount of milk, then each one gets:

Per family	VI	X	XI	XIV	XIX	average
ccm milk	147	208	135	190	229	182

The Eden families--children and adults--receive therefore a total amount of albumen only 1/2 of the amount given children in other places and of animal albumen only 1/7 according to Holt's norm. In spite of that the Eden children were unusually healthy and strong. The average amount of albumen was: per kg. 2-3 yrs. 12.2 kg; 6-7 yrs. 20 kg; and 11-12 yrs. 33 kg. If we now compare the Eden children with Holt's estimation we find the following:

Eden (total weight)	Holt (total weight)
2-3 yrs 5 children 70 kg.	5 children 61 kg.

That the Eden diet was in every respect sufficient is further corroborated by the fact that according to Dr. Landmann's assurance that not the least sign of war diseases as xerophthalmy, war edema, beriberi, scurvy etc., had been observed. This is just what one could expect, because where there is sufficient amount of bread, vegetables, fresh fruit, no such diseases as caused by a lack of vitamine can exist.

THE SIGNIFICANCE OF THE RESULTS OF THE RESEARCHES IN EDEN.

These experiments show us, what our researches in Denmark have long ago proved, that adults are in the best of health and able to work on an exclusive vegetable diet, and that children on the same diet with a little additional milk do very well. Meat is entirely superfluous for children and adults.

"It is clear to Germany that the country has to fight three great powers, but it is not so clear to the Germans that they have to fight still another (a fourth), which is perhaps more dangerous than all the others, namely--the German hog! "

Now ~~in~~ my prophecy has been so faithfully accomplished, that the German hog has brought about Germany's fall and thereby delivered up the population to starvation. The same scientific journal (it is now called Klinische Wochenschrift denies me to accept for publication short enlightening articles. The reasons for this is not at all unknown to me. If it should become clear to the population into what limitless calamity a hardened science has brought the country, it would lead to a revolution in which the present governmental advisers would be swept away and replaced by experts. This thought has already caused me a sleepless night that ~~th~~ the whole country perishes, only because their representatives of science either ~~not~~ can² or will confess their mistakes.

Let us remember that this ruin could have been avoided if the representatives of the German food science had studied in Eden as I have.

Dr. Landmann and Dr. Bloeck are in this respect wiser than people whose adherence to the old scientific errors has more than anything else driven Germany into its present food misery.

THE EFFECT OF YEAST FEEDING ON SOME BLOOD CONSTITUENTS OF HENS

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The extensive use of yeast in various forms by mankind as a nutrient as well as a food for animals suggested the importance of studies on yeast as a constituent of the diet. As the advantages and disadvantages of a food become more evident if given in large amounts, and as the composition of the blood reflects the effect of the food on the organism, the writer undertook the following experiments of feeding hens large quantities of yeast, either alone or in addition to other ingredients.

According to Meisenheimer (23), as much as 8 per cent of the total nitrogen of yeast is in the form of purine bodies (guanin and adenin). A yeast diet may therefore cause a rise in the uric acid of the blood, as was shown experimentally by Funk, Lyle and McCaskey (7) on men.

As active yeast contains a series of powerful nucleases, it seemed of value to study the resulting differences in the blood composition due to this factor on high and low purine diets. Up to the present no attempt has been made to lower "physiologically" the per cent of purine bodies in the food by inhibiting the liberation of uric acid from nuclein bodies during the process of absorption and utilization, or by creating within the body such conditions as would stimulate the synthetic power of the corresponding nucleases to store the uric acid in the form of nuclein bodies. The purpose of the writer was to study the possibilities also in this direction.¹

Hens were chosen as material for the experiments because of the ease of forced feeding and also because in the hen "the uric acid is all free and in the plasma" (Jones, 16). Besides, Folin and collaborators (4) said that in birds "the uric acid in the muscles bears no relation to the uric acid content of the circulating blood." Another reason was the high resistance of birds toward uric acid intoxication. In the blood of ducks with ligated ureters Folin and collaborators (4) obtained, e.g., up to 400 mgm. per cent of uric acid. Of interest is also the well-known double origin of uric acid in birds—by synthesis and by derivation from purine bodies. Kionka and

¹ Since 1923, following the suggestion of Dr. Franklin McLean of the Peking Union Medical College, the writer has undertaken the study of the uric acid problem.

Bannes (cited by Hutyra and Marek, 14) produced typical gout in birds by continuous feeding with horse flesh, which is rich in hypoxanthine. Recently Naito and Nishioka (25) found that the human organism also is capable of synthesizing uric acid from urea. Hens are known to respond to a high purine diet in the same way as mammals. It was hoped that studies on hens might help in the understanding of some obscure chapters in the uric acid problem of mammals.

MATERIALS AND PROCEDURE. Eighteen normal hens, Barred Plymouth Rock, weighing about 5 pounds, from 6 to 9 months old, hatched at the same time and coming from one stock, were fed the following diets:

Two hens (nos. 6 and 7)—semi-polished rice (a low purine diet) and water ad libitum.

Three hens (nos. 8, 9 and 10)—semi-polished rice and water during the first period, and semi-polished rice and diluted liquid Taka-Diastase during the second period.

Two hens (nos. 11 and 12)—inactive yeast (heated, Fleischmann's).

Two hens (nos. 13 and 14)—inactive yeast and powdered Taka-Diastase.

Three hens (nos. 15, 16 and 17)—active yeast (Fleischmann's).

One hen (no. 18)—active yeast and wheat bran.

One hen (no. 19)—active yeast and wheat bran the first period, and active yeast and phytin the second period.

Two hens (nos. 20 and 21)—active yeast the first period, and active yeast + acid sodium phosphate² the second period.

Two hens (nos. 22 and 23)—active yeast the first period, active yeast + acid sodium phosphate² the second period, and active yeast + acid sodium phosphate² + cornstarch the third period.

In addition, *five hens (nos. 1, 2, 3, 4 and 5)* were fed a standard diet and served as controls.

All the hens looked healthy and strong. The droppings were mostly more or less soft.

The blood for analysis, about 40 cc., was taken at approximately the same hour after feeding. It was drawn only once from each hen from the jugular vein in oxalated tubes, centrifuged at once, and the plasma analyzed for glucose (Folin and Wu's method), chlorine (Whitehorn's method), non-protein nitrogen (Folin and Wu's method), uric acid (Benedict's method), creatinine (Folin and Wu's method), cholesterol (Bloor's method), inorganic phosphorus (Brigg's method), and albumin and globulin (Wu and Ling's method, 39). Details can be found in tables 1, 2 and 3.

In order to determine the presence of a nucleosidase in active yeast and Taka-Diastase, and also to determine the amount of uric acid present in

² The acid sodium phosphate was given in daily doses of 0.1 gram per kilo of body weight of the hens, as such doses were found by Salvesen, Hastings and McIntosh (33) to be harmless even if given over a long period.

inactive yeast (Fleischmann's) and Taka-Diastase, corresponding determinations were done in connection with *in vitro* experiments, as suggested by Dr. P. A. Levene of this Institute. The findings are given in table 4.

RESULTS. The data are given in tables 2, 3 and 4. Table 1 gives the controls. Hens 11 and 12, fed inactive yeast, show a higher albumin content than globulin. Hens 13 and 14, fed inactive yeast and Taka-Diastase, show higher globulin figures than albumin. In normal hens 1, 2, 3, 4 and 5, the per cent of globulin surpasses that of albumin. The non-protein nitrogen is high in hens 13 and 14 fed inactive yeast and Taka-Diastase. If the corresponding figures for uric acid nitrogen ($= \frac{\text{uric acid}}{3}$) are subtracted from the non-protein nitrogen figures, the residual non-protein fractions remain nevertheless higher than the corresponding figures in the controls.

TABLE 1
Blood plasma of normal hens (controls) fed a standard diet (per 100 cc.)*

NUMBER	SUGAR	N.P.N.	URIC ACID	CREATININE	ALBUMIN	SERUM GLOBULIN	CHOLESTEROL	CHLORINE	INORGANIC PHOSPHORUS
	<i>mgm.</i>	<i>mgm.</i>	<i>mgm.</i>	<i>mgm.</i>	<i>gram</i>	<i>grams</i>	<i>mgm.</i>	<i>mgm.</i>	<i>mgm.</i>
1	266.6	16.06	6.85	1.11	1.96	2.04	94.7	434	4.75
2	285.7	18.75	6.33	1.00	1.57	2.11	97.1	432	4.60
3	307.7	15.80	6.09	0.95	1.88	2.00	91.3	460	5.10
4	330.5	24.01	6.13	1.07	1.46	1.76	115.3	447	4.24
5	333.0	21.42	7.24	1.11	1.46	2.31	115.0	460	4.44
Average	304.7	19.21	6.53	1.05	1.67	2.04	102.7	447	4.63

* Grain (corn, oats, wheat)
Mash (beef scrap, bran, middlings, corn meal)
Oyster shell, grit, charcoal } ad libitum.

The inorganic phosphorus runs unusually high in hen 19, fed active yeast and phytin, and unusually low in hens 11 and 12, fed inactive yeast. The low phosphorus of hen 10 (fed semi-polished rice and Taka-Diastase) has to be noted too. The figures for the uric acid content of plasma of our hens vary largely, depending upon the diet.

Table 4 shows that active yeast as well as Taka-Diastase is capable of liberating uric acid from nuclein bodies.

DISCUSSION. *Adequacy of the yeast diet.* According to Lippincott (21), the maintenance standard per day for a hen of 5 pounds weight consists of 9 grams of digestible protein, 45 grams of digestible carbohydrates, and 4.5 grams of digestible fat. According to this author brewers' grains (barley refuse from the brewing of alcoholic beverages, a large portion of which is yeast) make an excellent food for hens. The analysis of Fleisch-

TABLE 2
Blood plasma of hens fed semi-polished rice, inactive yeast and Taka-Diastase (per 100 cc.)

NUMBER	S.P. RICE*	INACTIVE YEAST†	TAKA-DIASTASE	SUGAR	N.P.N.	URIC ACID	CREATININE	ALBUMIN	SERUM GLOBULIN	CHOLESTEROL	CHLORINE	INORGANIC PHOSPHORUS
				mgm.	mgm.	mgm.	mgm.	gm.	gm.	mgm.	mgm.	mgm.
6	27 days	—	—	235.2	16.22	6.16	1.03	2.25	1.72	150.9	411	4.54
7	Same	—	—	286.0	17.14	4.71	1.00	2.07	2.20	107.3	414	3.70
8	35 days	—	Liquid T. D.‡ for last 8 days of rice feeding	224.2	15.51	5.60	1.18	1.83	2.46	80.9	406	4.14
9	Same	—	Same	258.7	19.80	12.54	1.13	2.06	1.76	107.4	426	5.23
10	Same	—	Same	231.4	19.75	8.01	1.13	2.07	2.38	136.4	437	2.29
11	—	7 days	—	250.3	18.75	8.06	1.30	1.96	1.40	84.1	400	2.17
12	—	8 days	—	250.0	22.70	10.66	1.07	2.15	2.03	88.2	398	3.22
13	—	7 days	Powdered T. D.§ for last 6 days of yeast feeding	250.7	33.33	16.12	1.25	1.65	2.78	100.7	412	5.26
14	—	Same	Same	242.1	30.00	13.33	1.15	1.73	2.53	87.6	401	4.17

* Ad libitum.

† 100 grams of dry yeast, moistened to form a paste, per capita per day by cramming (in two portions).

‡ Of Parke, Davis & Co. (liquid 4 per cent) diluted with 4 parts of water (0.8 per cent). Given ad libitum. Drinking water removed.

§ Of Parke, Davis & Co. (powder). Given in gelatinous capsules before yeast was fed. Average daily dose: 2.4 to 3.6 grams.

TABLE 3
Blood plasma of hens fed active yeast, wheat bran, phytin, starch and NaH₂PO₄ (per 100 cc.)

NUM-BER	ACTIVE YEAST	WHEAT BRAN	PHYTIN	STARCH	NaH ₂ PO ₄	SUGAR	N.F.N.	URIC ACID	CREATININE	'ALBUMIN	SERUM GLOBULIN	CHOLESTEROL	CHOLINE	INORGANIC PHOSPHORUS
						mgm.	mgm.	mgm.	mgm.	gm.	gm.	mgm.	mgm.	mgm.
15	7 days*	—	—	—	—	250.6	23.07	13.35	1.03	1.74	3.80	72.5	404	5.17
16	14 days*	—	—	—	—	249.1	30.00	20.00	1.00	1.76	2.44	88.2	411	5.40
17	21 days*	—	—	—	—	296.3	23.24	14.02	1.07	1.91	2.50	93.8	396	5.33
18	13 days	13 days†	—	—	—	266.0	24.22	10.03	1.00	2.07	1.90	94.0	440	5.53
19	Same*	9 days†	Last 4 days of yeast feeding‡	—	—	400.0	35.31	17.10	1.11	1.86	1.95	75.2	397	7.90
20	18 days*	—	—	—	Last 8 days of yeast feeding§	250.0	35.29	15.27	0.94	2.16	2.97	187.5	336	4.84
21	Same*	—	—	—	Same	322.4	27.27	12.64	0.94	2.13	2.72	88.2	378	4.68
22	25 days*	—	—	Last 10 days of yeast feeding¶	Last 15 days of yeast feeding§	286.3	25.02	17.15	1.07	1.55	2.01	100.0	386	4.59
23	Same*	—	—	Same	Same	251.1	18.75	10.00	1.07	1.69	2.37	95.3	397	5.26

* About 90 grams of dry yeast, moistened to form a paste, per capita per day, by cramming in two portions.

† Yeast and bran were mixed in equal parts, moistened, and fed ad libitum. About 100 to 150 grams of this mixture were eaten per day.

‡ Bran was excluded. Phytin (in tablets, 3 grams daily dose) was given instead before yeast was fed (1.5 gram each time).

§ 5 cc. per capita per day of a solution (NaH₂PO₄·H₂O—4.45 grams; H₂O—to 25 cc.) given in two portions mixed with the yeast (5 cc. of this solution contain 0.2 gram of P).

¶ About 20 grams of starch per capita per day, mixed with the yeast, phosphates and water to form a paste. Fed by cramming.

mann's dry yeast, performed by Hawk, Smith and Holder (8) showed the yeast to contain 52.41 per cent of nitrogenous substance, 37.13 per cent of carbohydrates, and 1.72 per cent of fat. According to Völtz (36) the protein of yeast is digested by animals to an extent of 88 per cent and the nitrogen-free extractives to 100 per cent. Osborne and Mendel (28) give for the yeast protein a digestibility (in rats) of 74 to 83 per cent.

Osborne and Mendel (28) and Meisenheimer (23) consider that the nitrogenous substances of yeast are only about 50 per cent in the form of protein, the remaining part being mostly amino acids, purine bodies (8 per

TABLE 4

The amount of uric acid liberated in yeast autolysate and in a lysate of inactive yeast + Taka-Diastase (calculated per 100 grams of the initial dry substance)*

TIME OF URIC ACID DETERMINATION	COMPOSITION OF SUSPENSIONS			
	Active yeast... 100 gm. Chloroform water to... 1 liter Toluene... 1 cc.†	Inactive yeast... 100 gm. Taka-Diastase... 10 gm. Chloroform water to... 1 liter Toluene... 1 cc.†	Inactive yeast... 1 gm. H ₂ O... to 10 cc. Boiled at once	Taka-Diastase... 1 gm. H ₂ O... to 10 cc. Boiled at once
	mgm.	mgm.	mgm.	mgm.
At once	—	—	26.6	40.0
24 hours	30.8	32.0	—	—
48 hours	32.0	34.8	—	—
3 days	30.8	—	—	—
4 days	—	33.3	—	—
5 days	30.8	—	—	—
8 days	—	36.4	—	—
9 days	29.6	—	—	—

* Determined by Benedict's method in the following way: To 10 cc. of the thoroughly mixed suspension were added: 8 cc. H₂O, 1 cc. Na₂WO₄ (10 per cent) and 1 cc. H₂SO₄ (2/3N). After mixing and keeping the suspension for 20 minutes it was filtered and 1 cc. of the filtrate taken for the determination of uric acid. Four extra cubic centimeters of H₂O had to be added to it in order to avoid turbidity.

† The suspension was shaken from time to time and kept in a stoppered flask at room temperature.

cent), and ammonia. The actual protein content of yeast may therefore be taken as 25 per cent, but the amino acids may also be utilized by the organism for the synthesis of the body proteins.

According to Völtz (36), yeast contains all the nitrogenous substances which are required for all the physiological functions of the animal organism. Osborne and Mendel (28) "have kept rats successfully for more than a year, covering the period of growth, upon a diet in which yeast furnished the sole source of nitrogen as well as water-soluble vitamine." Fleischmann's inactive (heated) yeast which was used in our experiments still contains the water-soluble vitamin.

Therefore the 90 to 100 grams of dry yeast fed to the hens in the present experiments were more than adequate in protein and number of calories (although the ratio protein:carbohydrates was high). The observed changes in the blood composition of the experimental hens can therefore not be attributed to any stage of starvation.

Phosphorus. According to Hawk, Smith and Holder (8), Fleischmann's dry yeast contained 8.75 per cent of ash, 54.5 per cent of which was P_2O_5 . It could be expected that such an enormous amount of phosphorus, mostly in the form of nucleic acid, would have greatly influenced the inorganic phosphorus content of the plasma of the experimental hens fed a yeast diet. But the data obtained on hens 15, 16 and 17, fed on active yeast, show only a slight rise in the inorganic phosphorus content of the blood. According to Levene and Medigreceanu (20), when treated with the extract of intestinal mucosa, "the yeast nucleic molecule decomposes into the following substances: phosphoric acid, purin bases, d-ribose, cytidin and uridin." It has been also recorded by many observers that the yeast nucleins suffer during the process of autolysis a complete disintegration with liberation of phosphoric acid and of free purine and pyrimidin bases. Therefore, the ingested active yeast supplies the organism with a large amount of inorganic phosphorus, the fate of which may vary.

It is of interest to note that hens 20, 21 and 22 show a much lower inorganic phosphorus content in the plasma, in spite of the same diet, consisting of active yeast, and an extra addition of phosphorus in the form of sodium diphosphate. The acid sodium phosphate might have inhibited, in our case, the action of the nucleases of the intestinal mucosa and the yeast on the nucleic acid of yeast by changing the pH (20) and as a result no phosphoric acid, or an insignificant amount, was set free. Hen 23 showed, under similar conditions, a higher inorganic phosphorus in the plasma, which is possibly due to the activity of the yeast itself in the intestinal tract resulting in the utilization of the acid sodium phosphate by the yeast cells in a medium containing starch.

At the present time very little is known about the rôle in the organism of the specific enzymes (nucleases) ingested with the food. Active or inactive (heated) yeast is fed to animals and prescribed by physicians without knowing exactly how it is going to affect the organism in toto. Our experiments with hens 11 and 12 show that when they are fed a sole diet of inactive yeast the inorganic phosphorus of the plasma drops to the abnormally low figures of 2.17 to 3.22 mgm. per cent in spite of the fact that inactive yeast still contains the same 4.4 per cent of P_2O_5 as the active one. But when Taka-Diastase³ is added to this diet, the figures for inorganic phosphorus in the plasma of hens 13 and 14 rise to 4.17 to 5.26 mgm. per

³ Taka-Diastase is the patented name of a ferment, manufactured from the *Aspergillus orizae* mould, which is largely used in China and Japan as a yeast.

cent. Taka-Diastase contains a large number of enzymes, among which are nucleases capable of liberating the phosphoric and uric acid precursors from yeast nucleic acid, as was shown by Iwanoff (15) for the mould *Aspergillus niger* and by the writer for Taka-Diastase (see table 4). These experiments are interesting as they demonstrate the difference in the resulting effect on phosphorus metabolism between the body nucleases of the digestive tract and the foreign nucleases ingested.

Plasma proteins. Winterstein (38) gives for normal chicken blood serum the albumin:globulin ratio to be <1 (analyzed by the $MgSO_4$ method). By Robertson's (31) refractometric method this ratio is >1 . Our experiments show that the effect of the enzymes of yeast and Taka-Diastase on the blood is not limited exclusively to the phosphate fraction. The plasma of hens 11 and 12, fed inactive yeast, shows the ratio albumin:globulin to be >1 . The same ratio in hens 13 and 14, fed in addition Taka-Diastase, is <1 , as is also the case in hens 15, 16 and 17, fed active yeast, and in the controls 1, 2, 3, 4 and 5. This difference can perhaps be explained by the absence of enzymes in the food of hens 11 and 12 and the presence of such in the food of the other groups. Enzymes are believed to be of protein nature, and as shown by Horvath and Chang (10) for lipase and by Pfeiffer and Standenath (30) for peptidases, they possess the capacity of penetrating through the intestinal wall into the blood stream. The writer made no direct attempt to prove the penetration of Taka-Diastase through the intestinal wall by measuring the diastatic power of the blood because Kito (17) showed that in this respect there is no difference even after the direct injection of Taka-Diastase into the blood stream. But in an indirect way the absorption of the nuclease of Taka-Diastase from the intestines was clearly demonstrated in hens 9 and 10 (see table 3) by a rise in the uric acid content of the blood on a low purine diet (of semi-polished rice) with the addition of Taka-Diastase. As the "extra" uric acid could not be derived in these hens from the food, it means that the nuclease of Taka-Diastase had penetrated through the intestinal wall and acted upon some nuclein bodies of the organism in the tissues or the blood. The semi-polished rice contains a practically negligible amount of purine bodies, and 100 cc. of the 0.8 per cent Taka-Diastase solution contained only 3.2 mgm. of uric acid. According to Winterstein (38), the amount of blood in hens is from 3.9 to 8.7 per cent. If we take the lowest percentage (3.9) as a basis for calculation, it will show 87.7 grams of blood in a 5-pound hen. It is evident that 3.2 mgm. of uric acid are not capable of raising to a considerable extent the uric acid level in 87.7 grams of blood.

Löhr and Löhr (22) and others have found a relative increase of serum globulin after injection of protein. Foreign enzymes, as being of protein nature, may perhaps, after having penetrated into the blood from the in-

testines, also be capable of causing a similar rise in the globulin fraction of the blood serum, as is the case in our experiments. Immune bodies, which are believed by some authors to be of enzymatic nature, also possess the capacity of penetrating from the intestinal tract and exerting their effect on the serum globulin, as shown by T. Smith, Howe and collaborators (34), (12), (13) to be the case for colostrum. The proteins of the food (albumins or globulins) are known to have no effect on the albumin:globulin ratio of the serum (37).

Uric acid. According to Levene and Medigreceanu (20), the intestinal juice is capable of forming mono-nucleotides from yeast nucleins, of which the purine nucleotides are further converted into nucleosides. The extract of the intestinal mucosa is capable of setting free the purine bases. But there is no proof that they are capable of raising the uric acid figures in the blood on a low purine diet. On the other hand, foreign nucleases (yeast nucleases and Taka-Diastase) seem to possess such a capacity.

It was just mentioned that the addition of Taka-Diastase to a low purine diet resulted in hens 9 and 10 in a marked rise in the uric acid content of the blood to 12.54 and 8.01 mgm. per cent, while our figures for the normal hen on a mixed diet were 6.53 mgm. per cent. This rise cannot be attributed either to starvation (see Lennox, 18, 19) or to avitaminosis because the hens were eating rice in sufficient quantities, the rice was only semi-polished, and, besides, even complete deficiency in water-soluble vitamin does not cause any rise in the blood uric acid. Folin's (5) data for mixed normal hens' blood are 4.9 mgm. per cent (determined by the indirect method). It was shown (see table 4) that Taka-Diastase contains powerful nucleases which possess the capacity of liberating uric acid from yeast nucleic acid. The rise in the blood uric acid following the ingestion of Taka-Diastase on a low purine diet can be interpreted as a liberation of uric acid from some purine compounds of the body. This effect of Taka-Diastase may perhaps be enhanced by some amino acids present in this diastase: Lennox (18) showed that feeding asparagine (during fasting) resulted in increased elimination of uric acid without any decrease in the level of circulating uric acid. The extra uric acid came therefore from the tissues. Perhaps amino acids are capable of exerting some effect on some nuclein bodies of the tissues similar to that of an enzyme. This point of view is supported by analogous findings of Falk and Nelson (2) for lipolytic activity that amino acids are capable of hydrolyzing esters.

The observed rise in the blood uric acid of our rice-Taka-Diastase hens means that the corresponding ferment (Taka-Diastase) is capable of penetrating through the intestinal wall. This interpretation may be applied also to yeast nucleases. Hens 15, 16 and 17, of table 3, fed on active yeast, show high uric acid figures in the blood plasma (from two to three times

the normal controls). The rise in the uric acid content cannot be attributed in this case to the high protein content of yeast, because, according to Folin and collaborators (4), "A high protein diet reduces the circulating level of uric acid below the levels obtainable on low protein diet."

The data for a diet of inactive (heated) yeast (hens 11 and 12, table 2) and for inactive yeast plus Taka-Diastase (hens 13 and 14) show clearly that inactive yeast causes a smaller rise in the per cent of uric acid of the blood than inactive yeast plus Taka-Diastase. It is therefore remarkable that inactive yeast, which contains the same amount of nucleins and purine bodies as active yeast, is acting physiologically as a lower purine food. Biberfeld and Schmid (1) are persuaded that free purine bases and uric acid can hardly be absorbed in large amounts from the intestinal tract. These authors quote Abderhalden and Schittenhelm, who found that the nucleic acids become in the intestines very soluble and dialysable (mono-nucleotides and nucleosides) and are evidently absorbed as such. Hence the high uric acid content in our active yeast hens (or inactive yeast plus Taka-Diastase) might be attributed to the nucleases of yeast or Taka-Diastase absorbed from the intestines. The data for hens 15, 16 and 17 (table 3) show also that the uric acid figures are not dependent upon the length of the yeast feeding period (1, 2 or 3 weeks).

If these data, obtained on hens, would hold also for mammals, they would emphasize the enormous rôle played by "foreign" nucleases of the food, yeasts or bacteria on the plasma uric acid of other animals and man. Records of high percentages of uric acid will have to be reconsidered from this new point of view and the foods grouped not only according to their content of purine bodies (nucleins) but also in respect to the power of their nucleases. The differences in the data of various authors for uric acid of ox blood may be due partly to the enzymes of the feeds. Hutyra and Marek (14) give records of the capacity of corn smut (*Ustilago zaeae*) to produce gout in hens (feeding). For cows corn smut is probably not very poisonous (Moore and T. Smith, cited by Pammel, 29). The diet of gouty individuals or of those predisposed to gout must be absolutely freed of such enzymes by cooking or other means of inactivating. The harm caused to the uric acid content by beer and wine may be due, from this point of view, chiefly to the presence of yeast nucleases. But the importance of the nucleases of the body tissues and organs must not be underestimated. Lennox (18) found that during fasting "under certain circumstances, marked changes in the concentration of uric acid in the blood were not accompanied by simultaneous and corresponding changes in uric acid output. There must be other factors (such as uricolysis or increased uric acid mobilization) to account for the facts observed." This mobilization was evidently caused by nucleases. The high blood uric acid, associated with leukemia, may be caused by the nucleases of the white blood cells.

GA
+BCF

X

X

It is also known that in man, "The uric acid concentration of the blood is a delicate, if not the most delicate index of renal function at our disposal" (Myers, 24). In nephritis the elevated figures for uric acid are perhaps due not only to uric acid retention but also to some liberation of kidney nucleases into the blood stream as the result of some sort of renal obstruction. In pancreatic obstruction, for example, the lipase is absorbed into the blood stream (9). The blood uric acid figures may perhaps be lower in double nephrectomy than in animals with ligated ureters.

As the action of every enzyme can be reversed, it was hoped that perhaps favorable conditions might be created in the body to synthesize nucleic acids taking the circulating uric acid as one of its constituents. Starling (35) says in his textbook of physiology that "the nucleases can certainly be synthesized by the animal." Attention must also be called to the fall in the non-protein nitrogen of the blood following the uric acid injection (Folin and collaborators, 4). It might be perhaps interpreted as a sign of some synthetic process where the uric acid and some N. P. N. constituents (amino acids?) are involved.

In order to study the possibilities of lowering the high uric acid of the blood plasma, due to active yeast feeding (continuing to feed approximately the same amount of yeast) substances rich in organic phosphorus (bran, phytin) or inorganic phosphorus (acid sodium phosphate) were given to a few hens. It was hoped that the presence of a large amount of phosphorus might inhibit the enzymatic decomposition of nucleic acid, as phosphoric acid is known to be one of its final products of cleavage. The carbohydrates of bran (starch, hexoses and pentosans), of phytin (inositol) and starch were added for the same reason. Yeast nucleic acids are known to contain a pentose (d-ribose) in their molecules, and the body nucleic acids d-ribose or a hexose.

The results were: Hen 18 (fed on active yeast and bran) showed a somewhat lower per cent of plasma uric acid, while in hen 19 (fed active yeast and phytin) the uric acid reached 17.10 mgm. per cent. Hens 20 and 21, where acid sodium phosphate was added, did not show any improvement in the uric acid content. So far the attempt has not been successful, but the work along this line will be continued.

Recently Neuberg and Kobel (27) found that amino-purines (guanine) are subject to decomposition in the presence of methylglyoxal. As the latter is a physiological product of catabolism of carbohydrates, the yeast feeding experiment with the addition of cornstarch and acid sodium phosphate was undertaken also for this reason. The results (hens 22 and 23) showed in one case a uric acid content of 17.15 mgm. per cent, and in the second 10.00 mgm. per cent. It is hard to say what caused the drop in the second case—a destruction of the purine ring in the intestines by bacteria (Rother, 32), the decomposition in the blood by methylglyoxal, or an

inhibition of the action of nucleases on nucleic acid by the presence of carbohydrates and phosphates.

In general high N. P. N. figures were obtained where nucleases were present in the diet. In the case of hens 13 and 14, the 3 grams of Taka-Diastase in the food contained only 18 mgm. of N.P.N., which could not have been responsible for the rise in the blood N.P.N. The high N.P.N. fraction may be due to the albumin fraction of yeast nuclealbumins. In hens 20 and 21 the high figures for N.P.N.-uric acid are associated with very low creatinine figures. Inorganic phosphates are liberated during muscular work, and creatinine and purine bases are products of catabolism of the muscles. It is not impossible that there may exist some sparing effect of the inorganic phosphates on the destruction of more complex substances of muscular tissue. Recently Fiske and Subbarow (3) have offered proof of the presence in voluntary muscle of a compound containing one molecule each of creatine and phosphoric acid. During muscular contraction the compound evidently undergoes hydrolysis.

SUMMARY AND CONCLUSIONS

1. Active yeast and Taka-Diastase possess the capacity of decomposing nucleic acid with the liberation of uric acid.
2. Feeding hens active yeast results in an increase of the plasma inorganic phosphorus and uric acid.
3. Feeding hens inactive (heated) yeast causes a drop in the plasma inorganic phosphorus and a comparatively smaller rise in uric acid.
4. The addition of Taka-Diastase to an inactive yeast ration makes it, in so far as concerns the plasma inorganic phosphorus, uric acid, and protein fractions, similar to an active yeast ration.
5. The effect of a diet rich in nucleins on the inorganic phosphorus of blood plasma may depend also upon the presence of foreign nucleases in the intestines.
6. The effect on blood composition of the addition of phosphates and carbohydrates to an active yeast ration was also studied and discussed.

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A LITTLE JOURNEY
TO
THE BATTLE CREEK SANITARIUM
AND THE HOME OF
DOCTOR JOHN HARVEY KELLOGG

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By Elbert Hubbard II

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In 1603 a marriage took place in England which should have put all the cameras to clicking and set all the tabloids to headlining from Land's End to John O' Groats.

Thomas Parr, of Shropshire, aged one hundred twenty, was marrying his second wife. Parr was a farm-servant. His wife was a strong, healthy country girl, of the earth earthy, like her husband.

Lest you accuse Tamas of a shrewd plan to marry the girl merely to possess a nurse comely and capable for his declining years, let me say that for ten years after his marriage, "Old Parr" continued his accustomed duties with precision and regularity. Not once did he fail to keep provender on the premises or a fire on the hearth.

Somehow or other, even in beef-eating England, he had managed to eschew the fatted calf and lead the simple life. Nature probably assisted in this by making him a farm-servant, without means, and by constantly tempting him with fruits, nuts and berries and the succulent green things which Baron Cuvier declared to be the natural food of man.

"Three score years and ten" is the allotted span of life, so Psalms tell us, but biology reminds us that man should live to be one hundred or more - five times the number of years it takes him to reach maturity.

The fame of this Shropshire farmer had spread. He had already lived twice the traditional three-score-and-ten. London had heard of him. The curiosity of Charles I was aroused. And so it came about that Parr was invited to London to show himself.

Alas! the call of the limelight was too much for him. To London he went - this youthful old man with long flowing beard - clear of eye and with a spring in his step.

London acclaimed him. Charles I was only thirty-five and much intrigued by the thought that he might live to be four times that age. Charles himself knew the value of health, for had he not been a sickly child unable to speak until his fifth year and so weak in the ankles that he had to crawl on his hands and knees until age seven?

And so Charles wined "Old Parr" and dined him - both to excess, without once guessing the secret of the man's

Spartan youth.

Parr knew nothing of food toxins. Thoughts of calories did not haunt his dreams nor flood his waking hours. He was a natural human - and although he practiced the secret rituals of health and longevity, he neither knew that they were rituals nor that they were secret. Nature compelled him to practice rational living and he did it. That his life or habits were different from others, Tammam probably never guessed. The mind of the healthy man is not on himself. I guess not! He has other things to think on.

The toxic table d'hote of Charles I soon sent strange poisons through the system of Thomas Parr and the grand old mechanism which had carried him through two lifetimes and a part of the third, collapsed, unable to filter out the poisons as fast as these new foods could make them.

On November 14, 1635, "Old Parr" passed on, aged one hundred fifty two years and nine months.

Living, he was proof that bounding health and long life have their source in the alimentary canal. In death, caused by forsaking his hygienic regimen of living, he reinforced that truth with a copper-riveted climax.

We might doubt these facts if they were but folk-lore handed down by word of mouth from generation to generation. But the case of "Old Parr" did not end with his passing. Scientific men, then as now, had the urge to know. At his zenith then was the great William Harvey, discoverer of the circulation of the blood. He it was who made the post-mortem examination and testified in his report to the

facts of Parr's age and life.

The country where Thomas Parr was born, where he lived and died - wishing to honor this humble citizen who had set himself apart by the simple, undramatic process of living rationally and long, sent his dust to Westminster Abbey, where it now rests in the corridors of fair Albion's famed.

II.

Some two thousand years before the lusty wails of young Thomas Parr echoed back from his father's low-thatched roof and set his mother to wondering whether he required suckling or spanking - another mother had already started to teach her son the fine art of healthful living as a conscious regimen to be faithfully observed.

She was the mother of Pythagoras, the lad from Samos who was later to give us the word "philosopher" and define its meaning; to found the science of acoustics upon a mathematical basis; and to give us that pleasing phrase: "The harmony of the spheres," which Job perpetuated when he wrote: ". . . the morning stars sang together and all the sons of God shouted for joy!"

Pythagoras' mother taught him, at the age of four or five, to take his morning plunge in the cold stream and to dry his baby skin by running in the wind. Thus did she present Lesson One in her Book of Hydro-therapy. She hardened the boy, built up his resistance, taught him the value of fresh air, sunshine and exercise - and did it in a simple morning ritual, easily understood and carried out by the four-year-old.

The boy Pythagoras grew into manhood, a figure of classic grace and strength. So profound was the influence of his face and form that it was soon bruited about that he

was the son of Apollo, and this fable the boy only gently pooh-poohed! If the populace would make a god of you, it is meet that you should murmur a modest protest, but, there is no need to pursue the matter too far - even a mob may be dissuaded by too much diffidence.

Be it said to the credit of Pythagoras that these plaudits of the people did not turn his head nor make him, in his own esteem, all that the people proclaimed him. Heracleitus said that Pythagoras "was the most assiduous enquirer." He had the urge to know.

Besides this, his mother was ambitious. She, too, had the urge to know, and since too much knowledge was not in the feminine line in those days, she sold her jewels and sent her son to Egypt, there to penetrate the innermost secrets of the high priests of knowledge.

In this he undoubtedly succeeded; but his mother was never to see him again. He was well past fifty when he returned to found his school at Crotona, and his mother had long since passed on, serene in the message that came back to her from the son of her youthful years.

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Pythagoras was the disciple of innate cleanliness of body and of mind, outwardly and inwardly. He lived the biologic life, which is the natural life. As a result of common-sense observation, he avoided flesh foods and confined himself to those "fruits and esculent vegetables" which Linnaeus, the great naturalist, was later to pronounce "the most suitable

food of man."

Pythagoras raiment was invariably white - the symbol of cleanliness and purity. Herodotus speaks of the white woolen garments of Pythagoras and Diogenes expressly states that he wore wool as the use of linen had not penetrated to those parts at that time.

Although he left not a line of his own writings, the thought of Pythagoras has profoundly influenced the thinking of succeeding generations. He was probably the first exponent of rational living. He revered the human body as something to be preserved pure, clean, healthful, and undefiled by any contaminating contact. His superb physique, his commanding countenance, his kingly carriage, his flashing eye, his encompassing intellect - all paid tribute to his conception of man as a biologic organism requiring a biologic or physically perfect standard of living to manifest its God-intended perfection and capacity.

III

Doctor John Harvey Kellogg, Medical Director of the Battle Creek Sanitarium, and citizen of the world, traces an intellectual descent from Pythagoras.

Like Pythagoras, he wears white. It is home-spun from the hand-looms of North Carolina. Dr. Kellogg wears it not only because it was the Pythagorean symbol of purity of body, but because it lets in the fresh air and sunshine, and these are as much a part of the Kellogian doctrine as they were of the Pythagorean. Dark clothes shut out certain of the beneficial rays of the sunlight. To deny Nature the right to help us, is to affront her, and Nature has her own little ways of making good her reprisals.

Responsibilities gravitate to the man who can shoulder them and power flows to the man who knows how.

In 1866, a group of men influenced by the teachings of Dr. Sylvester Graham and his followers, established in a small frame house in Battle Creek, a "Health Reform Institute." The famous "Water Cure" of Priessnitz was then at its peak and despite the influence of the Graham philosophy, the little Health Institute became a water cure.

About the time that Napoleon was losing the battle of Waterloo and making Wellington famous, there was a young peasant, Vincent Priessnitz, in the little village of Graefenberg in the mountains of East Silesia in what is now Czecho-

Slovakia, observing the beneficial effects which followed the application of cold water in the cases of ailments of farm animals and in accidents.

"Why not apply this treatment to man's ailments?" asked Priessnitz of himself and in order to get an answer, he began certain experiments.

Priessnitz' cold-water therapy, crude as it was, began to get results. The young man's fame spread from his own farm-yard to the country-side; thence to the adjoining villages and by 1826, his water-cure had become firmly established and invalids from all over the world were making pilgrimages to this little Silesian village, there to receive the healing ministrations of the already famous hydro-therapist - Vincent Priessnitz.

Following the Priessnitz' success, water-cures had been set up in Germany, France, England and America. The little cottage in Battle Creek was one of these attempts to do empirically what should have been done scientifically.

The Health Institute, unfortunately, did not prosper. In 1876, ten years after its founding, Dr. Kellogg was asked to take it over and operate it, to avoid further indebtedness. This he agreed to do, if empiricism could be banished and the work re-organized on the proper scientific basis.

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In his youth, Charles Darwin once uttered a hasty and wholly unscientific remark, a reminder of which never failed to bring the crimson to his countenance. Having come across some

difficult problem to which the answer did not seem to be readily forthcoming, the youthful scientist, seizing upon some sophistry which had appeared to tempt him, exclaimed: "It must be this, for if it is not this, then what is it?"

That of course, was not scientific.

A scientist, baffled momentarily in his efforts to find the truth, does not seize the nearest label, tack it on with gusto and then exclaim: "There! that must be it!!" He continues the search until he can find the answer - and prove it.

Dr. Kellogg would have no more of the "this must be it" type of thinking. With that firm decision, together with a change of name to the "Battle Creek Sanitarium" he marked the beginning of what was one day to become the world's greatest health institution, founded on a strictly scientific basis, and embracing all authenticated scientific means for the restoration of health to mankind.

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Dr. Kellogg pursues no one "Ism" to the exclusion of all others. His is a balanced intellect. He is not an "Ist." His idea is and has been that there is no universal panacea. He has caused to be brought together in the Battle Creek Sanitarium every proved agent of therapeutic value. He embraces all methods, rejects nothing that is sound.

Following Winternitz' rationalization of the Preissnitz Water Cure, and the reduction of his hydro-therapy to something like a scientific procedure, Dr. Kellogg made a

long study of hydro-therapy in its best aspects and likewise made an important contribution to the science himself. As far back as 1863, he set up his own laboratory and began a characteristically systematic study of the physiologic effects of water. His huge tome, "Hydrotherapy" is a standard work on the subject and represents a lifetime of study and application. If your needs require hydrotherapy at its best, I would say: "Go to Battle Creek Sanitarium!" And yet no one would think of calling the Battle Creek Sanitarium a hydrotherapy institute. Hydrotherapy is only one of numerous modern therapeutic agents which they are trained and equipped to employ.

Dr. Kellogg from the first, had a vision of a health restoring institution of much broader scope than ever occurred to the founders of that little Water Cure. He had studied Dr. Sylvester Graham's "Lectures on the Science of Human Life." He had tested the Graham dietetic regimen and found it good.

And here it might be well to interpose a word in behalf of that towering intellect who put Graham bread into the nation's diet and re-introduced some of the important aspects of rational living to the American people.

Sylvester Graham was the seventeenth son of his father, the Reverend John Graham (Oxford) - which proves whatever it proves. As a lad, he was pale and sickly and after his father's death, he was turned over to a brother-in-law who was a farmer. Here Graham did farm work, ate farm food and was regarded as any other farm laborer.

On three counts, at least, Graham and Calvin Coolidge trace to a common experience. Graham lived on a farm, was graduated at Amherst (1823) and spent the latter days of his life at Northampton, Massachusetts.

The keynote of the Graham Dietetic Philosophy can be summed up in his own words, taken from his lectures:

"Animal or flesh food is not so conducive as a proper vegetable diet - to healthfulness of growth, perfectness of development, symmetry, beauty, agility, permanent strength, uniformity of health and great longevity of the human body; nor to the acuteness and integrity of the special senses and the activity and power of the intellectual and moral faculties."

Dr. Graham, you will note, leaves little to be said upon the subject once he has concluded and, like a good lawyer, the things he reserves to his followers constitute all the entail and interest.

In his "Lectures" Dr. Graham gives a scholarly discourse on bread, its place in man's diet, what it should contain and how it should be baked. He gave to Graham bread its name. He had numerous followers and these were called "Grahamites" and hotels serving his food-formulas were known as "Graham Hotels."

To grind up the whole wheat berry and out of this to make bread, was not new. But in a world where the bran and bulkage was thrown away or fed only to live-stock, where flour was milled to snowy-whiteness and bolted until it was "super-fine," as Graham labelled it - Graham flour and Graham bread may be said to have been almost as distinctly inventions as any of those contributed to mankind by Edison or brought to life by Burbank.

With all his crusading, Dr. Sylvester Graham did not convert any large portion of the population to whole wheat bread. Dr. Kellogg, in one of his books, remarks that in his own boyhood Graham flour could not be secured west of Rochester, New York.

The millers of Graham's day raised much the same outcry against his flour and bread ideas as the packers raised recently against Dr. Kellogg's famous "microbes-in-meat" poster.

And here let a word be said in behalf of the enlightened public thought of today. Whereas in 1830 to 1850, Graham's detractors made considerable headway with public thought and succeeded in having much of their white-flour propaganda believed, today the counter-Kellogg propaganda of the packers is making little or no progress. The world moves and we will not forever deny ourselves the light.

Dr. Kellogg and his helpers in the Battle Creek Sanitarium have done more to popularize whole wheat bread than Graham himself was able to accomplish in a lifetime.

As I have intimated, the world do move - and those of us who do not have the brakes set too tightly, move with it!

IV.

Man consumes four types of digestible food-stuffs: Starch, albumin or protein, fats and sugar.

The human digestive organs produce five digestive fluids, the purpose of which is to digest these food-stuffs:

- 1) Saliva, which digests Starch
- 2) Gastric Juice, which digests Protein
- 3) Bile, which digests Fats
- 4) Pancreatic Juice, which digests Starch,
Protein and Fats
- 5) Intestinal Juice, which digests all food-stuffs.

In experiments leading to an increased flow of saliva, Dr. Kellogg discovered that excellent stimulation of saliva flow resulted from the vigorous chewing of dry zwieback or hard, thin toast. A patient complained, however, that her morning zwieback had been disastrous to her bridge-work. Nothing serious, but a challenge to the scientific mind of Dr. Kellogg. He set to work and in due time, he perfected a process of making crunchy food flakes from whole wheat grains.

These crisp flakes, chewed dry, not moistened as we now eat corn-flakes, supplied the stimulation to the saliva glands without the dental difficulties of zwieback.

Years later, the process was applied to corn - and our now most popular breakfast food - corn-flakes - was born.

Dr. Kellogg and his brother, W. K. Kellogg, formed a company, which has since become one of America's leading industrial enterprises. Years ago, Dr. Kellogg sold his interest in the business and the half million dollars he received was placed in trust for the benefit of the Race Betterment Foundation.

Dr. Kellogg is a free man; he is not in bondage to money. Promises of wealth do not lure him. All his needs are supplied and if you were to ask him what you might do to aid him most, he would probably answer: "Add six hours to my day - there is much good to be done!" In fact, his whole life might be summed up in the five words of Seneca: "To see Truth and do good!"

Dr. Kellogg is eighty-five ^{seven} years young. Age has nothing to do with him, save to add to his experience and to prove the correctness of his philosophy of health. He works twelve to fifteen hours a day. His chauffeur confessed to me that he is seldom off duty before midnight and the mere act of following the Doctor's foot-steps tires this strapping youth of twenty-five to something akin to weariness. He has not quite achieved the biologic life as yet nor has he learned the Doctor's secret. It is this: A clean body - abounding energy; a clean mind - priceless peace!

What more can we ask of life? Energy - and peace!

Useful accomplishment reaching to a high historic peak!

And sweet content!

V.

Each school of medical thought is built around some beneficent idea. But temptation comes to all and soon or late they fall into the error of trying to fit the whole of human ills into their one box of tricks.

Dr. Kellogg holds that all things are good - if they are; that there is no universal panacea and that an unbiased aggregation of the best that men know is the most that science can offer to the ill and infirm.

Dr. Kellogg started out with a fundamental postulate to benefit the human race, to alleviate pain, to restore the ill to health as far as that is possible and to make it more and more possible as the years advance and science progresses; and to teach men and women how to live effective, happy, healthful lives.

Upon this broad purpose, the Battle Creek Sanitarium places no limits. "Embrace all that which is good," was his policy. He became the cosmopolite of the whole medical fraternity. He had no "ism" or "ology" to sell; he made no sacrifices of human welfare on the altar of technique, method, school or pet panacea.

Instead, he made available at the Battle Creek Sanitarium all proved methods. Sometimes when a good thing appeared on the health horizon, he had to test and prove the methods himself in his own laboratories. Sometimes, he journeyed half way round the world to bring a new method to

Battle Creek. But whatsoever was good, whatsoever brought quicker and more lasting benefits, the Battle Creek Sanitarium obtained.

When Winternitz had rationalized the practice of hydrotherapy to a point where it was soundly scientific, Dr. Kellogg introduced it at Battle Creek, perfected its application, became himself a world authority on the subject.

Mechano-Therapy early found its place in the Battle Creek Sanitarium regime. Dr. Kellogg is the inventor of most of the mechanical devices in use so effectively throughout the world for mechanical manipulative technique. He invented the vibrating belt machine for reducing and exercising - a machine now widely used and appreciated. He devised the Exercising Chair, a motor-driven seat that gives a gentle but rapid vibratory motion to the whole body while sitting in the customary upright position.

This chair quickly equalizes the distribution of the blood-supply; it soothes and quiets and a few minutes under the influence of its motion is like a lullaby to taut nerves and tired brains. Ten minutes in Dr. Kellogg's Exercise Chair and that tenseness is gone and Morpheus smiles and beckons you to rest, sweet rest!

The Health Horse, which breaks into a trot or a gallop at the touch of a button, is another of the Doctor's inventions. Horse-back riding exercises all the muscles, or nearly all of them - certainly a different set than those used in the daily round of routine affairs. Here is a horse that needs neither oats nor bedding. You feed him from a wire by pressing a button - and you can open the

window and duplicate a ride through the park or you can switch into a gallop and live over again the midnight dash of Paul Revere.

All of these devices are available in the Sanitarium Recreation Rooms. They are there for the patients - to rouse, stimulate, soothe and restore. If you have lived a natural life, with fresh air, exercise, sunlight, natural foods and unharried thoughts, you would not need these aids. But since we eat too much, exercise too little, and in our natural pursuits eschew sunshine and avoid fresh air, Nature requires that somewhere along the line we make up the deficiencies. This, the Battle Creek Sanitarium is prepared to do.

The Sanitarium is fully equipped for Electro-therapy. A post-graduate course taken by Dr. Kellogg with Dr. George M. Beard, pioneer in the scientific application of curative electricity and famous for his work on "American Nervousness" - plus a visit to Paris a few years later to study the methods of Apoltoli, famous French electro-therapist, gave this Department at Battle Creek Sanitarium an authoritative standing in the use of electricity for therapeutic purposes.

The mind that is seeking, usually finds! In the study of electrical currents which might be of therapeutic value, a new type of current was discovered, which produced strong muscular contractions with each change of current direction, yet without the painful sensations which up to that time had accompanied the use of the old fashioned "shocking machines." A French experimenter later discovered the same fact and found that the painlessness resulted from a change

of direction at the point of zero potential. This discovery at Battle Creek was of major importance and upon it, Doctor Kellogg built the most unique of his devices - the "Automatic Exerciser."

In a comfortable reclining device, half-chair, half-couch, the patient takes his position. Electrodes are attached to arms, legs, back and abdomen, the current is turned on and the painless automatic exercise begins. First the muscles of one leg contract, then of the other; then one arm responds followed by the opposite arm, then the muscles of the back and those of the abdomen.

Patients too feeble to walk, cases of paralyzed limbs which are being brought back to soundness, those fearful of physical exercise, those with stiff joints where ordinary exercise is not possible, in cases of weak heart or in high or low blood pressure - the "Automatic Exerciser" provides the muscular exercise absolutely necessary to the restoration of normal functioning.

In Light Therapy, Dr. Kellogg was likewise a pioneer. Calling upon Thomas A. Edison, who had just perfected the incandescent electric lamp, he made some important observations.

"I noticed," tells Dr. Kellogg, "that when the inventor held his hand before the lamp, the light shown through it, giving it a pink glow. The implication was at once clear - here was a form of light and heat which penetrated.

"I had been experimenting with hot applications as a means by which heat might be brought to the internal organs. I had proved packs and poultices to be of no value in projecting heat internally. The newly-invented electric light seemed

to promise the perfect answer to my need."

Dr. Kellogg went home and immediately built his first Electric Light Bath. It proved all that he had hoped and he installed this new treatment in the Battle Creek Sanitarium, from whence its use rapidly spread to Europe.

As a nation, we have not wholly overcome the consciousness of our national youth. Sometimes a "Made-in-Europe" label is a better introduction to the American market than a trade-mark which reads: "Made-in-America."

So it was with the Electric Light Bath. America did not crowd round and beg for duplicates, but Europe did. And Europe, being older and wiser, and well understanding our ways, made copies of the Dr. Kellogg Electric Light Bath and shipped them back to us as something new - and lo! we promptly capitulated and took this "new" invention unto our hearts and homes - and loud were the echoes of our praises to German genius.

But Dr. Kellogg only smiles at this and tells the tale on himself.

He was alighting from a train in Berlin one day on one of his visits to Europe when at the very station gates he gasped to read on a huge sign-board: "Doctor Kellogg's Famous Electric Light Baths," with full information as to where and when. He found that the enterprising Teutons had imported samples of his machines, duplicated them and put them to work all over Berlin and throughout Germany.

Returning on the liner to New York City, he made his customary call upon the head of a large surgical instrument house there.

"I have something new that I'm sure you will want to see!" exclaimed his enthusiastic host, and he forthwith took the Doctor to the Exhibit Rooms where in triumph he opened a familiar cabinet and began explaining the advantages of this "wonderful new electric light bath from Germany."

Dr. Kellogg batted nary an eye, but examined the cabinet quizzically and then remarked, drily: "Yes, the workmanship is excellent and I rather like the idea - you see, I invented it!!"

Then kindly enough, the Doctor explained to his friend how he came to perfect the cabinet after his visit with Edison, how it had been copied in Germany and returned to the United States for sale as something new.

The head-of-the-firm was considerably confused and confounded - and stammered out his apologies. Nevertheless the acidophilus was on him!

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"Embrace all that which is good!" Dr. Kellogg investigated, adapted, adopted, and in most cases, improved every good thing which had demonstrated its ability to add to the health of mankind. He has no pride of authorship. No one man has a monopoly on gray matter and Dr. Kellogg is no exception - and knows it. He sets no limits upon the number of right ideas which the Battle Creek Sanitarium may employ - and thus he sets no limits upon their progress. Their facilities, equipment and methods reflect the discoveries and inventions of the best minds of all ages and all countries - in medicine, surgery and other sciences.

VI.

Doctor John Harvey Kellogg himself is the world's most famous proof of the value and importance of longevity. Had his work been cut off at sixty, the loss to the world, even allowing for his great accomplishments up to that age, would have been inconceivable.

He has been Medical Director of the Battle Creek Sanitarium for a continuous period of fifty-nine years. He has operated a food laboratory for over fifty years. His eyes are clear, his skin spotless, his breath sweeter than that of the kine in the meadow. His tongue is clean and as pink as a child's - which is the color a man's tongue ought to be. What you see there, is an index to the cleanliness that goes on down through the whole length of the alimentary canal.

When he walks, his body has the eager forward tension that characterizes youth and ambition. There is a spring in his step and motive power to spare in every movement.

After eighty-^{seven}five years of strenuous living, but according to biologic standards, Dr. Kellogg is keen, alert, alive and vigorous. His memory is encyclopedic in scope and historical in accuracy. For sixty years, he has published "Good Health" magazine every month and never once has he missed an issue although much of its contents he has written himself in a style limpid, pure, clear-as-crystal.

He has written and published at least three five-foot shelves of books on how to live in health and happiness. He lectures once, sometimes three or four times a week and still conducts the Question Box sessions at the Sanitarium, where he not only gives out priceless hints on health, but mellow philosophy on living, all tinged with the savor of humor, as evidenced by the merry twinkle in his eye and the gleam of white teeth in his smile.

In these Question Box sessions, Dr. Kellogg, always in gleaming white, takes up again his Pythagorean role, save that instead of secreting himself behind a curtain as he delivers himself of his Delphic utterances, he stands before his audience in plain sight where he loses nothing of the touch-and-go of these sparkling meetings - which are open to all.

These Question Box sessions are an outgrowth of the teaching strain, which is strong within Dr. Kellogg. "Give the people light," he holds, "And they will find their own way!"

The session gets its name from the Question Boxes which are placed at convenient points throughout the Sanitarium and in which guests and patients are invited to place their questions during the day.

About 8 P.M. on the appointed evening, a group of interested questioners take their places in the North Lobby, Dr. Kellogg appears and the fun begins.

Dr. Kellogg needs no faithful Nubian to whisper into his ear: "Remember, thou art only a man!" The Question Box keeps him humble and prevents fatty degeneration of the ago!

VII.

Doctor Kellogg at one time conducted a world-wide survey on the bowel habits of civilized man as compared to those of people still living under more or less primitive conditions.

These reports show what man has lost in the civilizing process.

From the Uganda Protectorate in East Africa, a physician reported that of 9642 out-patients seen in seven months, there were only 174 cases of constipation - 1.8% of the total number. In civilized countries that ratio would be reversed - and the 1.8% would be the percentage of those untroubled by constipation.

Doctor Shepherd of Turkey, one of the leading abdominal surgeons of the Orient at that time, reported: "There is relatively little appendicitis here. I do from five hundred to six hundred important surgical operations a year, but only six to eight appendectomies."

A Shanghai doctor said that he had never heard of appendicitis in a Chinaman and forty-three of one hundred twelve physicians in savage lands reported that they had never once come across a single case of cancer of the bowels.

Must the point be argued? Does not this prove that Nature is our wisest mentor? And that the man who adheres

to the natural frugiverous diet of man will avoid the civilized ills?

In this investigation, one fact stood out like Mars at perihelion. It was this: All savage peoples employ sour milk as a remedy for changing the intestinal flora. Each country had its sour-milk drink and each had its own name for it.

In India, it was called dahi; in Bulgaria, joghourth; in Armenia, matzoon; and in Egypt, leben.

But when Dr. Kellogg sent for samples of each of these soured milks and had them analyzed in the laboratories of the Battle Creek Sanitarium, he found them substantially the same in each case.

Whence came this similarity of remedy and similarity of use? Did savage tribes, far removed from each other, interchange medical aids and formulas? It is unlikely. Milk sours in any land; these savage peoples from time to time drunk this fermented milk-liquor with certain beneficial results. They had tried it again, and again results were seen and felt. Then and there, by a process of reasoning much the same as that employed by the scientist over his microscopes, these primitive peoples had arrived at conclusions about the remedial effects of sour milk. Thus had its medicinal value become known.

From India, reputed land of mystery and black magic, came a report of the most practical of all prophylactic and therapeutic regimens. The reporting doctor advised: "The Chief duty of the 'Indleburds (priests) is the care of the movement

of the bowels. A fine is levied in case of neglect!"

There is a practical priest-hood!

When Moses was leading the Israelites out of the Wilderness, his chief concern was with their health. Many a "thus saith the Lord Jehovah!" was tacked onto a dietary rule that Moses was compelled to enforce for the preservation of his people.

A religious mentor to look after your health first - your soul second - what a priest-hood!

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VIII.

From early manhood, Dr. Kellogg was familiar with the meat-abjuring philosophy of Pythagoras and the dietary philosophy of Dr. Sylvester Graham.

In one of his books, he tells of the experience of Linnaeus, the great naturalist, who cured himself of a severe attack of sciatica by eating strawberries; and of the civil-war camp from which dysentery entirely disappeared after bivouacking near an orchard filled with ripe peaches. With Cuvier, Linnaeus, Graham and others, Dr. Kellogg holds that the natural diet of man in his natural state is nuts, fruits, roots and the succulent parts of vegetables to furnish bulkage.

Mankind have become meat-eaters, to a great extent because of the savoriness of meat. Flesh food is tasty. And in those old days, when you were asked to drop out of your diet all but the vegetable foods, you hadn't many savory dishes left.

So Dr. Kellogg set about developing new foods without flesh, using man's natural foodstuffs as a base but modifying them to make them savory and appealing to the meat-eater's palate.

'Twas only a few years ago that we discovered that even a dairy cow thrives better on a palatable ration, after which we added molasses to the feed and thus secured

increased palatability, larger milk flow.

The influence of savory odors and palatability upon the appetite and digestion was probably first discovered by Professor J. P. Pavlov, of Petrograd, whose book "The Work of the Digestive Glands," published in 1897, was the first authoritative treatment of the subject.

Prior to Pavlov's experiments, almost nothing was known of the digestive fluids, how they were made or how utilized.

Pavlov's experiments on dogs and other small animals attracted the attention of the entire scientific world and his laboratories became the mecca for hundreds of scientists who wished to view Pavlov's moving picture of nature at work.

Dr. Kellogg visited Pavlov in 1907, in St. Petersburg, where Czar Nicholas and the proud Romanoffs still held undisputed sway. The sun shone and the white clouds drifted serene across the blue and whispered never a word of wars to be and wreckage of nations and of men which lay unborn in the near lap of history.

Here, the Doctor saw the famous Pavlov dogs. He saw the kleine magen, or "little stomach," familiarly known as "Pavlov's pouch." Pavlov took the normal dog's stomach and by a simple operation which in no way disabled the animal, made this into two stomachs - one a "working" stomach, the other, about one-tenth the capacity of the normal stomach - a "laboratory" stomach.

This enabled Pavlov to study the work of the digestive apparatus, particularly the secretions of the digestive

glands. Whatever action took place in the working stomach, was duplicated in the laboratory stomach. Thus was he able to trace secretions back to their causes, to determine what it was that set the gland to operating, to discover the rate and amount of flow and countless other valuable facts.

Pavlov, for instance, found that gastric juice was produced when food was chewed, even though it was not allowed to enter the dog's stomach. This flow manifestly was stimulated by the savory odors of the food and by its appeal to the palate. This secretion Pavlov termed "Appetite Juice."

"We are a part of all that we have met." Pavlov's work strengthened Dr. Kellogg's belief that the appetite appeal of meats was in their savory odors and palatability. If the initial secretions of man's digestive organs respond to these stimuli, said Dr. Kellogg, then let us give him meat-substitutes that possess these savory odors and this palate appeal.

This he has succeeded in doing. Today in the Battle Creek Sanitarium guests can enjoy savory soups, roasts, gravies and sauces with the old familiar taste and all the appetizing odors of meat foods - yet all of vegetable origin.

The Battle Creek Sanitarium stands alone in this: While all others who have avoided flesh-foods have simply deprived the patient of them and allowed him to get along for himself, Battle Creek has given him savory and appetizing substitutes which make it possible for him to forget that he is being deprived of anything save the ills of wrong feeding.

Dr. Kellogg believes it ought to be made easy to live biologically. He has taken the food stuffs we ought to eat and made them the food-stuffs we like to eat. Thus has he taken microbes off the menu and dietetically speaking, put man on a possible par with the other primates of his class.

Thousands of men and women today throb with life and the love of life because Dr. Kellogg has done this. It is perhaps his chief benefaction to the human race.

The foods served at the Sanitarium are made in the factories of the Battle Creek Food Company, owned by Dr. Kellogg. They are sold the world over and those who learn the fine art of biologic living at the Sanitarium are thus enabled to return to their homes and keep up the good work without interruption.

And here it should be said that Dr. Kellogg wishes no private profit from his labors. The earnings of the food company go to Battle Creek College, where young men and women are trained in the science of biologic living - and sent into the world to teach others.

As the work of the Battle Creek Sanitarium and Dr. Kellogg unfold, there appears a cosmic pattern, a great conception of a colossal group of facilities for the betterment of the race, for the improvement of human health and happiness, for increasing longevity and for making the span of life infinitely more joyous and productive.

IX.

The half-century dating from the French Revolution in 1790 to the year 1840, was the "Golden Age of Genius." In that brief span, a prodigal Providence sent us the largest crop of men and women - both great and good - ever gathered together on this planet.

Into this age of light came Michael Faraday, English physicist and chemist, pupil and apprentice of Sir Humphrey Davy. When someone asked Davy to name his greatest accomplishment, he replied: "Michael Faraday!"

In 1792 came Shelley and then a list so famous that I need only to name them: William Cullen Bryant, Thomas Carlyle, John Keats, Thomas Hood, Heinrich Heine, Thomas Babington Macaulay, Sir Henry Lytton, Victor Hugo, Ralph Waldo Emerson, Sarah Flower Adams, author of "Nearer, My God to Thee;" Hans Christian Andersen, Elizabeth Barrett, Henry Wadsworth Longfellow, John Greenleaf Whittier, and in 1809, that year of years, Charles Darwin, Abraham Lincoln, Edgar Allen Pie, Mozart, Oliver Wendell Holmes, Alfred Tennyson, Edward Fitzgerald of "Rubaiyat" fame. In 1811, Thackeray was born and following him in rapid succession came Robert Browning, Charles Dickens, Henry Thoreau, Emily Bronté, Walt Whitman, James Russell Lowell, John Ruskin, Louis Pasteur, founder of modern stereo-chemistry and discov-

erer of a cure for hydrophobia; in 1822, Matthew Arnold; a year later, Max Muller, philologist; Ernest Renan; in 1825, Thomas Huxley; 1826, Walter Bagehot; 1827, Joseph Lister, founder of antiseptic surgery; in 1828, Dante Gabriel Rossetti, George Meredith, Hippolyte Adolphe Taine. Then came William Morris, Algernon Charles Swinburne and in 1839, Bret Harte.

During this renaissance of art, poetry, science, politics and all forms of creative thought, Edward Jenner made his first experiment in vaccination and published his first treatise on small-pox and Darwin began his famous voyage on the good ship "Beagle."

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John Harvey Kellogg was born in 1850, with a strong prenatal heritage from this age of genius. Nature had produced a crop of great men, but most of them had died young before their work was half-done. John Harvey Kellogg was destined to teach men and women, great and small, the biologic method of living, so that they might endure to the century mark and mayhap beyond. The man who can double the lives of men of genius doubles their achievements - and thus tops the performance of any of them by giving us so much more of all of them.

It was the long vision of Dr. Kellogg that made the Battle Creek Sanitarium possible. His brain evolved the almost cosmic plan around which the institution has been built. In his mind was the completed picture of what this world health center was to be.

It was the swift sweep of his enthusiasm that inspired other men and women to take up their work here and labor in the common cause.

I present this defense of individual genius because Dr. Kellogg insists upon gently pooh-poohing his part in the work and saying that whatever he has accomplished has come only with the loving aid of loyal helpers. That, of course, is true. For no man liveth to himself alone and he who has loyal men and women to carry out his plans and to become an extension of himself is twice-blessed.

The Battle Creek Sanitarium presents an example of unified thought and action. Once the guest has registered at the Medical Assignment Office, this vast co-operative effort begins to function in his behalf.

The General Entrance Examination requires the consecutive service of a dozen or more specialists and reports from each of several laboratories. When these examinations have been made and the reports placed in the Case History, each specialist studies the reports from the others, before making any recommendations for treatment. This cross-checking of diagnoses is of the utmost value in identifying elusive symptoms and in prescribing the right course of treatment for prompt and effective results.

If you could take the beloved old family practitioner, whose life was devoted to his patients, make him a specialist in every line both medical and surgical, give him modern laboratories for diagnostic studies - and then multiply him by one hundred - you would have a result approximating that

obtainable by the staff of men and women physicians and surgeons associated together at the Battle Creek Sanitarium.

And now a word about the Case History - where all the findings are brought together and recorded. This Case History is, in effect, a continuous conference of the staff specialists upon the case. It may be consulted by the physician in charge before deciding the dietary composition of the patient's daily meals; it will certainly be studied from time to time as treatment progresses; and if the patient should return a half-dozen years later, this Case History will be available for study and comparison by the patient's physician.

X.

Only one letter differentiates the word "health" from the word "wealth." Upon the occasion of addressing a famous club of wealthy men, Dr. Kellogg was asked by a newcomer the nature of his business.

"My business," replied the Doctor, smiling, "is to keep millionaires like you alive after sixty, so that they may enjoy their money!"

But he much prefers to teach mankind the fine art of biologic living long before they reach sixty and thus not only lengthen their lives but add to the sum total of their happiness.

A list of the guests of the Battle Creek Sanitarium would read like a Blue Book of American Business and Society. Statesmen, scientists, leaders in education, finance and business come here to learn to live, to rest, to recuperate and revitalize. Creative people come here to recharge their mental batteries by getting physical health, for it is a truism that a sluggish mind traces to a sluggish body - usually to a lazy colon.

But besides this list of the great and the near-great, there is a larger list of ordinary salt-of-the-earth guests - even as you and I. You cannot guess a patient's rating in Dun's or Bradstreet's by the kind of treatment he receives at the Battle Creek Sanitarium. There is but one brand of

attention and that is the best they know how to give. There are no Number One smiles for the wealthy and some second-hand Number Six smiles for those who are staying on a closely-calculated budget. The person who lacks health lacks the essential wherewithal of existence; and all ill people are poor until they have regained their health.

At Battle Creek, courtesy is in the air. You find it everywhere. Nurses exhibit it in the regular course of their duties, the waitresses in the dining room display it when serving your dinner, and the girls who operate the elevators dispense it without price, as they make their rounds.

Cheerfulness abounds; and instead of the atmosphere of illness and strained suspense which you might anticipate, there is the calm air of peace and health and joyous effort.

The thought of Dietl, brilliant pupil of the famous Bokitanski, keys the mood at Battle Creek, and those who give and those who get each absorb this healing thought with their daily ozone:

"Nature creates and maintains; therefore she must be able to heal!!"

At Battle Creek, the diagnosticians, the physicians, the nurses and dieticians are busy removing obstacles to Nature's beneficent plans.

"Give Nature a chance - she will heal!"

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In no Sanitarium have I ever noted so large a percentage of

patients coming to the Dining Room. Meals are available in rooms, of course, but when you see the unmistakable demonstrations of returning health all about you, it is very easy to hear the voice, urging: "Go thou and do likewise!" And lo! before you know it, instead of invaliding yourself between sheets, you are asking permission to go down to the Sanitarium's beautiful Dining Salon, there to take your meal amidst high-ceilinged sunlight and rippling laughter.

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If I were to sum up the Battle Creek Sanitarium Creed in brief, I would state it in four simple tenets of faith:

- 1) Embrace all that is good - and become proficient in its application
- 2) Organize and co-operate together to the end that all helpful knowledge shall be quickly available to all comers
- 3) Keep forever in step with progress - and let our work today be done a little better than it was yesterday
- 4) Build Strong - and perpetuate all good & useful knowledge unto the morrow.

If that seems too simple to intrigue you, let me remind you that, at the last, all great works are simple. The sophomore always states the most complex propositions and explains them in long and involved Johnson-ese. The man who knows has reduced his knowledge to a few principles and these deep truths he states modestly and with the simplicity of a parable. Only the necromancer and the purveyor of black magic wish to mystify and confuse.

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XI.

The mathematical certainties of existence are summed up in a set of obtuse axioms which taken together comprise the Law of Probabilities. The man who tosses a penny in the air ten times does not know how often it will land heads up. But if he make the toss ten thousand times, he will get a figure that can be depended upon to repeat itself accurately.

In other words, generalizations from individual instances are apt to be erroneous and this tendency to error is not done away with until the number of instances reaches a true mathematical cross-section.

The Battle Creek Sanitarium draws its generalizations from a larger number of cases than probably any other institution of its kind in the world. Hence, its diagnoses are likely to be more accurate and its conclusions more reliable than if compiled from the limited experience of a single individual.

Before me is a paper on "Clinical Spirography" written jointly by two of the major clinical research men of the Sanitarium. It is a study of typical breathing in many types of cases. It is illustrated with typical graphs, called spirograms, showing the periods of inspiration and expiration and the pauses that accompany these acts in

breathing. They represent, you might say, the "breathing pattern" of the individual. The authors point out that these patterns classify themselves into ten broad types and that these types have important pathological significance when studied in connection with the patient's other Case History.

But the important point is this: This paper and its conclusions was based on a study of twenty thousand tests.

A smaller institution, making one such test each day, would require nearly fifty five years to accumulate the tests with which to make such a study; or in a still smaller institution having only one such test per week, it would take them nearly three hundred eighty-five years to accumulate the same volume of data as was used by these two clinical authorities at Battle Creek Sanitarium to prepare this one medical paper. And these twenty thousand cases do not represent their total experience, for many times twenty thousand cases have been studied and their spirograms recorded.

This emphasizes the advantage held by a large and popular institution; they have the volume of cases to make valuable research possible; their diagnostic findings are subject to comparison with an enormous number of cases of similar tendencies. Treatment can be prescribed in the light of an immensely wide experience with like symptoms. The whole activity may be characterized as extensive, comprehensive and conclusive.

When my diagnostician tells me that it is possible, if need be, to compare my symptoms with those of forty thousand

other cases in the same class, it gives me a feeling of confidence.

"Here is a physician," says I, "who has encountered almost every possible variation of the standard condition. When he has made his diagnosis report, the physician in charge of my case will have the broadest possible information on which to act. He will know just what treatment to prescribe."

A large number of those who enter the Battle Creek Sanitarium come bearing letters from their own physicians or surgeons. "The Battle Creek Idea" is recognized all over the world as scientific, ethical, effective.

Medical men themselves come here in numbers when the injunction: "Physician, heal thyself!" is no longer operative. After all, a doctor is only a man with a specialized education, training and experience. He yields to the temptations that ensnare other men; he eats too much or too hurriedly; he forgets to be good to himself in his devotion to the welfare of others. He spent the early years of his life burning the midnight oil to get his education and now he spends much of his time burning the midnight gasoline to make a living and discharge the voluntary obligation to mankind which he accepted when he took his Hippocratean oath.

After a time, being only a man, as I have reminded you, he breaks under the strain and is compelled for a space, to take to himself some of the same advice which he has long been retailing to others.

When that time comes - and it comes to all too many medical practitioners - the doctor is likely to turn his foot-

steps to Battle Creek and the Battle Creek Sanitarium. He not only finds restored vitality and rest here - he can study the best of modern medical methods while he recuperates. And when he has returned home to his practice again, Battle Creek is pretty sure to see some of his patients before long - for to know about the Battle Creek Sanitarium is to want to use it for yourself and others.

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XII

The eternal quest for truth is the distinguishing earmark of the pure scientist. To him nothing is true that cannot be proved and the proof preserved in alcohol for future generations to see.

Herbert Spencer divides all knowledge into the knowable and the unknowable, but if we were making that classification today we would probably change it to read: The Known; The Knowable; The Unknowable - and after the latter put a question mark, for today we are not quite so sure that anything is unknowable, provided, of course, that we keep on the trail long enough and employ enough intelligence in the pursuit.

This battle between the Knowable and the Unknowable is constantly going on in science. It is, in fact, the Grand Drama of the Scientific World. The familiar villain is there with his veil of mystery; the hero, too, with his microscopes. The action begins! Who will triumph? Mystery, with his veil of the Unknowable; or the relentless and pursuing eye of Science?

It is to catch some glimpse of this eternal drama that I have spent long hours in the laboratories of the Battle Creek Sanitarium. Here patient men and women have told me their secrets, explaining them in simple and child-like language that I might understand.

As I recall them, there are ten laboratories at Battle Creek; perhaps there are more, but it will be enough to speak of these. If you are a technical man and wish the correct names for these, I will give them, but when I describe them for you, I propose to speak of them in the simple language of the laymen.

These laboratories are: Chemical, Bacteriological, Pathological, Seriological, Metabolic, Electro-Cardiographic, X-ray, Anthropometric, Nutrition and Pavlov.

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In the darkened X-ray Room, I stood within a box-like structure, the current was turned on and the operator adjusted in front of me a large ground-glass screen much like that you see on a camera. Upon that screen it was possible to see my heart beat and my internal organs function. The operator, by request, confirmed the fact that I had not slipped out unknown to my host and taken on a beef-steak for luncheon.

In this X-ray Department I saw equipment that enabled the diagnostician, like some fabled seer, to peer deep into your intestine and thus tell the present and foretell the future. In one room, I saw a rack with rows and rows of chest views, revealing almost every believable condition - and nearby a huge file containing thousands of X-ray films indexed and ready for reference at a moment's notice.

In another room, I saw X-ray films of colitis conditions showing intestines with a long swaying loop like Patricia's jumping rope, while in still another room were

lighted observation or study racks where progressive films over strong lights could be studied and compared.

In the Deep Therapy Room, I saw powerful X-ray machines for the treatment of deep-seated malignant conditions which other treatments cannot reach.

I have already spoken of the breathing studies or spiograms made under the direction of Dr. Paul Roth in the Metabolism Laboratory. He reduces all breathing to ten basic types. The graphic record of your inhalations and exhalations he reads as confidently as a banker reads a financial statement, and I doubt not that in many cases, he could if he would, state the net worth of the individual in terms of health and life, and do it with great accuracy.

The wide range of inferences which can be drawn from these spiograms was to me an amazing revelation of the accuracy of modern diagnostic methods. And the uniformity with which the findings of the Metabolism Laboratory are confirmed, was to me a still greater revelation.

The Metabolism Laboratory makes many tests besides those of breathing. Here is made the test for alveolar carbon dioxide and the test of the expired air for presence of acetone resulting from fermentation of organic matters in the body.

In the Urinalysis Laboratory, where the customary analyses for sugar, blood, pus, etc. are made, I was most interested in the huge record book, each page containing from thirty to forty analyses; here the laboratory attendant turned through literally thousands of examinations, pointing out a special condition here, another there. Once again, I

was impressed with this fact - the research scientist wishing to pursue his researches can find here work enough, cases enough to cool his ardor and enable him to make a record of permanent value to mankind.

In another Laboratory, specimens of stools are examined to determine the intestinal flora, or the type of bacteria residing in the intestine. The process of changing the intestinal flora occupies a large place in the regimen at Battle Creek and nothing is left to chance in the diagnostic work preliminary to treatment.

In addition to these, I saw chemical and serological blood tests being made, diseased tissues of various sorts being studied under microscopes and many other more obtuse scientific projects in process.

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Now, we will step across the street from the main Sanitarium Buildings to the Battle Creek College Buildings, where Helen S. Mitchell, Ph. D. presides over one of the most interesting of the Battle Creek Sanitarium laboratories.

This is the Nutrition Laboratory - and should you ask me what nutrition is, I would answer, it is the chemistry of life and growth.

In this laboratory, nutrition is studied with live white rats as subjects. If we let a yard-stick represent the span of human life, then the life of a rat represents a little more than one inch on the scale. This animal will eat almost any human food; his digestive tract is similar to that of man and because he has a short life span, it is possible to duplicate in a few years with the

rat an experience which would require many hundred years with man.

The chemist, in his laboratory analyzes foods into their elements - proteins, fats, carbohydrates and minerals. With this quantitative analysis, chemistry halts. It cannot give us the vitamin content nor tell what effect these vitamins - or lack of them - will have upon a growing organism. Here the nutrition laboratory steps in and with the aid of these white rodents makes tests that tell what foods do towards stimulating or retarding health and growth.

Miss Mitchell is a scientist of the first rank; she has published a wide range of articles on nutrition. She has a capable staff of assistants and with these to help her, she has placed the Battle Creek Nutrition Laboratory well to the forefront.

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Professor Pavlov, of St. Petersburg, Petrograd, Leningrad, Stalingrad or what have you? has been mentioned before; so has Dr. Kellogg's visit to his laboratory in 1907 to study the Professor's work on the digestive glands. Professor Pavlov's chief assistant at that time was a young Russian, *(insert name)*. When war came and with it, Red Revolution, many things scientific were shelved or partly so and thus was the work of Pavlov greatly restricted. His assistant came to the United States, a great scientist in his own right and with the Pavlov reputation behind him - but almost penniless.

No matter how great you are, it is well now and then

to pursue the dear Dolidocci, else the world, in one of its long moments of forgetfulness may send you to the junk heap, via the Hunger Route. Of course, sooner or later, your genius will be re-discovered and you will receive a post-mortem medal or a granite column adorned with a stiff and formal laurel wreath, but this is a scant recompense for ignominious cold and gnawing hunger. Robert Burns' mother reminded her native land of this, when standing before the great stone they had erected in her son's honor, she remarked, as she shook her head sadly: "Aye, Bobby, ye askt 'em for bread and they ga' ye a stun!"

Word came to Battle Creek that Pavlov's young assistant was on this side. Dr. Kellogg telegraphed him pronto: "Come to Battle Creek," he said, "here is work to be done!" Had the Russian received the wire, it would have been a healing benison to his tired and troubled soul.

But he had left New York and when the telegram arrived he was no longer at the address. Anticipating the Battle Creek kindness, he was already on the train for Battle Creek and almost before the wire was recorded, he stood on Dr. Kellogg's door-step and said: "Doctor, here I am!"

And the Doctor, glancing up to see whether he should believe his ears, smiled and muttered: "This is too quick to believe - the Western Union should have put a sticker on you reading 'Only 37 minutes in transit!'"

But missed the pleasantry, all save the smile, which he somehow took to mean "Yes" - and he was right at that. He was established in a building somewhat removed from

the Sanitarium and there he has reproduced the famous Pavlov experiments.

I saw the operated dogs, full of life, happy and totally unaware of the deep service they are rendering to science. The day I made the Little Journey, Sonia, the daughter, showed us about, for her father was then in Paris. She is perhaps 27, yellow-haired, blue-eyed, and deliberate of speech, with an accent you are sure must be French.

She called me "Doctor" and smiled a little and asked me shyly if I would mind signing the Visitors' Register. I was very condescending and said I should be glad to sign, all the while feeling that it was I who was fortunate and honored in being here - and not they in having me.

XIII.

As you may have guessed, the Battle Creek Sanitarium is a huge institution. On the second floor of the new building, just off the elevator in the entry-way to the Medicat Director's Office, is a small scale model of the first cottage which housed the original Health Reform Institute.

Ranged round the walls are large photographs of succeeding buildings - the first large fireproof structure erected in 1903 and the magnificent new fifteen-story addition erected in 1928 at a cost of two million dollars.

This new building is the most modern of hotels. You might be in New York or Chicago or Los Angeles - and in the best hotel any of these cities afford - so far as you could judge from the facilities at Battle Creek. But the landscaped grounds, the green trees, the songs of birds and the fresh country-like air remind you that you are not in a city - you are in a huge garden-spot.

The Sanitarium Community consists of fifty-three other buildings and covers fifty acres of grounds. The buildings include a power-house, a dairy, a surgical center, a huge gymnasium and community meeting hall, homes for the helpers - and housing for the various other sup-

porting facilities.

Across the entire front of the new building runs a great colonnade - a stately line of fluted pillars in regular and rhythmic sequence. No picture can do this entrance justice, because none can convey that emotion of over-powering grandeur and beauty which overtakes you as you walk up the entrance way.

You may have tramped through the dust of storied Rome and dugged in the ashes of Athens - but though you were Pericles, you would pause in awe at the classic beauty of the architectural welcome which this entrance-way extends to you.

Here is formality - but inside all is warmth and cheer and hospitality. You register as you would at a hotel, go to your room. Then, when you are ready, you go to the Medical Assignment Office on the second floor. Here an Executive Nurse accepts your registration, assigns you to a Doctor especially trained and qualified in your type of case. You are given an Examination Appointment Card and as the allotted hours arrive you begin taking your general Entrance Examination.

While in the Medical Assignment Office, every business detail of your stay is made clear. You are given a small case record book in which you keep your examination card. With it, you receive a price list of standard charges for various services, together with a clear printed statement of the services which are included without extra charge in your regular weekly rate.

The whole procedure is made comfortable and easy to conclude. Even though you be ill, nervous, shy, backward or self-conscious, you can enter the Medical Assignment Office with a feeling that you are placing your case in the hands of friendly folk, whose first thought is one of helpfulness. Everyone knows you have come for help - and have they not dedicated themselves to this service? If financial discussions are necessary, these are handled sympathetically, simply and with business-like brevity and good sense. The organization is keyed to singleminded helpfulness - You meet it everywhere.

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On the opposite page is a typical program of events for one day. Life goes on at the Battle Creek Sanitarium - there is something for everyone to do. There is no folding of hands and silent communion with self on one's troubles. When you come to the Battle Creek Sanitarium you hand to someone else the responsibility for your physical well-being. In the meantime, you relax - and keep busy and happy.

The "Keep-Busy" Department is on the sixth floor. You think that is a pleasantry - but it is a fact. Here is the department of Occupational Therapy which is simply the application of curative power of work. In this room, the patients make beautiful and useful things by hand, like the craftsmen of old. They weave, knit, spin, crochet, carve, make beadwork and so a hundred and one things in the line of craftsmanship.

The Instructress never knows when she may be dealing

with genius and to discover a second Josiah Wedgewood, or a successor to William Morris would not at all surprise her. This happy union of head, heart and hand is a form of education we can all use. To plan a thing - and then, with your own hands, fetch it along to a beautiful conclusion - that fires the spark of creative effort and sets in motion artistic impulses which may reach out through all of life.

Besides all this, the work is prophylactic - it prevents ankylosis of the thinkery - and that is worth-while even though your fingers be as supple as willows and your joints as smooth-running as a Timken bearing.

XIV.

To every Worker who accomplishes, there comes a day when the cherished peak is reached and victory is in sight. The eye dims with gratitude and the weary soul cries out: "Here is my high mountain; here will I build three tabernacles!"

The tabernacles are builded and their domes burnished with bright gold. The day of dedication is at hand. Hosannas of joy fill the air. Surcease from toil lies ahead - surcease and sweet content.

The songs of praise fade on the evening air - all is peace.

Then through the droning twilight comes a Voice as if from high Heaven. It calls a name - it is the name of the Worker-at-Peace.

He starts from his reverie. Who has called?

Ah! yes - the Worker knows. It is the Voice - he has heard it before. He knows its meaning - it will not be denied.

Stern are its accents; its tones commanding.

"Arise!" it cries. "Arise - and get thee hence - for this is not thy rest!!"

The Worker knows - it will not be denied.

Torn from his brief peace, weary and sore of foot,

the Worker rises and obeys the command. Drawing his cloak about him, he shakes the dust of content from off his sandals and taking his staff, sets forth again, bound, as he knows, for some distant and still higher peak.

As he moves upward and onward with slow and measured tread, the stirring strains of some Emyrean Marseilles come to him. Weariness departs. He quickens his step. His staff beats time to the throb of invisible drums.

Victory has been left behind. He moves on to new Achievement!

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Thrice in his long lifetime has Doctor John Harvey Kellogg builded his three tabernacles on his high mountain. Thrice has the Voice come to him and bid him hence.

First, when the little Water Cure cottage gave place to a real Sanitarium Building.

Second, when the first large fireproof structure was erected in 1903.

Third, when the magnificent fifteen story addition was dedicated in 1928.

If you will examine the charter of the Battle Creek Sanitarium granted back in the seventies, you will find within it the deathless germ of growth. The paragraph which sets forth its objects and purposes is a classic worthy of the pen of Franklin or Jefferson:

"To found a hospital or charitable asylum within the State of Michigan for the care and relief of indigent or other sick or infirm persons, at which institution may be received also patients and patrons who are able to and do pay for the benefits there received, and which institution shall devote the funds and property acquired and received by it from time to time from all sources, exclusively to maintaining itself, improving its condition and facilities, extending its benefits and usefulness, and facilitating and promoting its purposes, by such sanitary, dietetic, hygienic, and philanthropic reforms and efforts as are germane or auxiliary thereto; all of its said purposes being undenominational, unsectarian, philanthropic, humanitarian, charitable, and benevolent, and in no manner directly or indirectly for private profit or dividend to anyone."

Here, in epic language, is the deathless idealism, the founder's vision of this great institution. Proof of the epic quality of this early concept lies in this: The vision has come true and still the clarion call of this founding document rings out to an ill and troubled race. To the fearful and the ill and the discouraged - the very walls whisper, "Seek no more - here is thy true blessing found."

Happy faces echo the phrase.

Willing hands - strong, deft, capable hands - make the promise true.

". . . here is thy true blessing found."

THE EMERSON SYSTEM OF PHYSICAL CULTURE. ++REMARKS BY A. S.

HUMPHREY, COLUMBIA SCHOOL OF ORATORY,

Chicago.

THE Emerson System of Physical Culture was planned upon vital principles of bodily development. The exercises are at once scientific and natural.

Principle the first rules selection. All exercises embodied in a system of physical culture should be demanded by the body for the highest development and preservation.

The second principle covers the law of supply and demand. The vital organs (the organs of supply) should be exercised as much, or more, than the muscular system. In other words, the pneumo-gastric and sympathetic nervous systems must be equally stimulated.

The third principle is that of unity. No part of the body should be exercised irrespective of the whole. The whole must be used as one. With every movement, the body, by reflex action and response, falls into harmonious position. If we use the arm, the rest of the body must, by reflex action, fall into unity with the position of the arm. Holding the body, or a part of the body, rigid, tense, and working that way, is absolutely contradictory of every law of beauty.

The next is the principle of using the least energy to accomplish an end. By that law we get rid of all tenseness of the body that is unnecessary. How many of us hold rigidly. If we are working with

the hand we may be holding with tremendous force at the back of the neck, the calf of the leg, sometimes between the thumb and finger, and sometimes the knees are held rigid. You take a person skilled in physical culture, and he can tell by looking at a person where they are holding themselves. Just in raising the arm and lowering it we are very apt, you see, while the arm is moving very freely, to put a little tension some place. Now do you see that I have a little tension some place? ("Yes, sir.") Where is it? ("In the hand.") That is one of the most common habits, and it is something we almost always meet. A person will be using one hand and the other will give it the lie direct. Now if I am working in this free manner with this hand the other hand should be relaxed. And so in working out this plan, you see, we do away with all superfluous action, and the use of vital force that is not necessary.

(Class rising for exercise.)

The first point is to get our bodies in proper relation to the force of gravity. Very few of us, I am sorry to say, stand correctly. Our environments, our work, our habits of life, and sometimes our personality, militate against a correct standing position. So the first thing is to get in good relation to the force of gravity so that all vital organs are over each other in their proper relation in the torso. Drop the hands easily. Take the weight well upon the balls of the feet, but not off the heels. Now the correct standing position is to

bring the weight over the arch of the foot, but that is a very hard thing to describe so that people will get it readily, so we call attention to the ball of the foot instead, because we are much more likely to be standing upon our heels.

Raise the chest a little. As I look around there are very, very few who are far enough forward with the chest. Come forward a little in the chest. Now do you feel a strain any place? Hold that position most tensely, very, very hard. Let go; feel easy, but retain the position. Exercise life instead of energy. Life imparts subtlety to all motion. Energy gives rigidity and awkwardness. Now my hand upon the crown of the head; push back and up against the hand. Drop the tenseness; just let go, but hold the position. Feel yourself over. Very soon you will come to know the sensation of the best position. In all movements of the whole body the consciousness is centered in the chest. Poise your bodies forward just as far as you can without taking your heels from the floor. Consciousness centered in the chest. Poise back just as far as you can keeping your toes on the floor. Poise forward once more. Position. (Calling gentleman on floor for example.) Observe the articulation at hips and ankles. Poise forward. I am having him keep the torso perpendicular with the floor. Don't try to move much, just a little, but be sure you observe these articulations. Now poise without any command forward and back several times until you get used to the motion. Position.

Tips of the fingers upon the shoulders. Just settle down upon the right foot throwing the right hip out at the side. Glide slowly to the left foot sending the left hip out. The torso must be perpendicular to the floor throughout the exercise. The shoulders hardly move at all. This movement has a double good. It frees the hips for walking. When we step the hips must give to a certain extent. Then, you know, walking is one of the most excellent exercises for the digestive organs; all the organs of the viscera we can exercise to quite an extent in this way. Will you place your hands upon the floating ribs--the ball of the hand, I should say. You readily see what this exercise does. It frees the sides for natural breathing and again the organs of the viscera are exercised.

Place the tips of the fingers upon the chest about the third rib. Sink the chest a little. Now beware of hollowing the back. I want you to bring the chest up very strongly, straight up. Rest. Once more lower the chest; bring it up again; right up toward the chin. Very good. Now drop that stuffed appearance, but hold the position. You see by alternately lowering and raising the vital organs in that manner there is an exercise of all the contents of thorax and viscera. We leave the exercise at the raising of the chest, which position brings all the vital organs high in the trunk. I remember reading an article from the pen of Dr. Kollogg which urged this point most strongly--carrying the vital organs high in the trunk.

The next exercise.--You will place the hands upon the hips, fingers down. Now observe a point of articulation at the division of the thorax and the viscera where the diaphragm joins with the back. It is not to be found by dissection; it is not found by anatomists, but if you will observe Grecian sculpture, whenever a body is posed, you will see that there is a point there which is more flexible than any other part of the spinal column, save the neck. It is one of the most vital points relative to grace of the body. More than that; we tense the muscles over the abdomen to keep the vital organs from lowering in the viscera; while these muscles are tense, bring the thorax down strongly upon the abdomen, and you will see that causes a most tremendous squeezing of all these visceral organs, so when we relax there is a rush of blood to the viscera. You have this exercise in the Mechanical Swedish Movement Department on the revolving stool. Rest.

Next lower the head upon the chest; carry the chin around to the right shoulder. Place the back of the head as far to the left as you can; twist the chin toward the right; place the chin upon the right shoulder; bring the chin front; now let the head just hang in front; the chin to the left; chin upon the left shoulder; front; position.

This exercise of twisting will relieve any stagnation in the circulation there may be. It frees the circulation of the neck so the brain is more readily fed.

Where are you tired? ("In the shoulders.") You are holding rigidly at your shoulders.

Take a good standing position, weight upon the right foot; inhale filling the lungs full. Carry the right arm over, raising it full length front, then carrying it over, back and down. Once more. Very good. Now there will be a tendency, you will find, in that exercise, to let the body turn with the arm. We do not get the benefit of the exercise when we do that. There is a double benefit. You see very few of us breathe deeply enough. This exercise drives the air into the apex of the lungs. There is where trouble in consumption always starts--in the apex. The cells of the lower part of the lungs are always filled when we breathe. Once more carry the arms over strongly. There, do you see when that pull comes there the air is simply forced into those cells which we use so little? Rest. Weight upon both feet, inhale deeply; carry both arms over. Again. Rest. The weight upon both feet; the forearms horizontal, carry the arms out and up. Now the tips of the fingers reach up as high as you can; grow tall until you feel a tremendous pull in all the muscles from the ankles to the fingers. Bend forward at the hips; relax after you are down; position. Once more carry the arms out. Now how many are standing correctly? Bend forward at the hips; go down just as far as you can; relax letting the arms and heads go. Poise slowly to

position. The good of this exercise cannot be enumerated, because there is not a muscle throughout the whole system, vital or muscular, but that is gotten hold of and stretched by the exercise. Take the same movement and bend to the left, right, and also back.

Take a good position again. Weight upon the right foot. Swing the left, 2, 3, 4. Now bring it back to the instep of the strong foot and set it out directly at the side, resting upon the side of the toe. All of the weight upon the strong leg. The right arm up to the head; set it out; push. I want to have you observe a line from the middle of the palm down through the leg; now there is a tremendous pull diagonally through the body. Reach up strongly; rest. Glide slowly to the left; swing the right leg, 2, 3, 4, 1, 2, 3, 4. The left arm to head; set it out; reach; rest. In bringing these lateral pulls through out the whole torso there is not a muscle that can escape, and it frees the whole body from rigidity. Weight upon the right foot. Swing the left, 2, 3, 4, 1, 2, 3, 45 degrees in front. Carry the right arm up, over, and back. Be careful your chest does not follow; keep the chest front; raise the arm a little; reach; rest. Glide left. Swing the right, 2, 3, 1, 2, 3, 4. The left arm, up front, carry it back. Up reach. Rest. Retain position on the left; swing right, 2, 3, 4, 1, 2, 3, 4. Poise the chest forward over the right foot. Observe this articulation at the hips. Will you raise the right arm? Right up to the head. Set it out; reach; rest. Glide left; Glide right.

Swing the left, 2, 3, 4, 1, 2, 3, 4. Now will you poise forward once more over the left foot. Raise the left arm; set it out; reach; rest. Now there you have the first half of the Emerson System,--these exercises which deal especially with the vital economy. We will take up the second half. It is for grace,--for the aesthetic development.

Position. Forearms horizontal; send the forearm up and down, letting the hand alone, swinging in. Let go of your necks. Everyone is working too hard. Rest. Weight upon the right foot. The right arm up, down. Let these movements be very slow. Place the consciousness in the center of the forearm. That will bring strength of movement. That, by the way, is the point to observe in all movements of the arms; every movement the consciousness is centered there. For the whole body it is centered in the chest. Take these movements freely as possible; mind well concentrated; and let slight responses show in head and chest. Allow the body to move if there is an inclination. In this manner we preserve unity.

1894
ALL RISEN

ABOU BEN ADHEM AND THE ANGEL

by Leigh Hunt

James Leigh Hunt was born at Southgate in 1784. He was an essayist, an author, and a poet, chief among his poems being "The Story of Rimini." He died at Putney in 1859.

Abou Ben Adhem (may his tribe increase)
Awoke one night from a deep dream of peace,
And saw, within the moonlight of his room,
Making it rich, and like a lily in bloom,
An angel writing in a book of gold--
Exceeding peace had made Ben Adhem bold,
And to the presence in the room he said,
"What writest thou?" The vision raised its head,
And with a look made all of sweet accord,
Answer'd, "The names of those who love the Lord."
"And is mine one?" said Abou. "Nay, not so,"
Replied the angel. Abou spoke more low,
But cheerily still, and said, "I pray thee, then,
Write me as one who loves his fellowmen."
The angel wrote and vanished. The next night
It came again with a great wakening light,
And show'd the names whom love of God had bless'd,
And lo! Ben Adhem's name led all the rest.

(From "Poems You Ought to Know," p. 107.)

Question Box Lecture

by

Walter B. James, M. D., New York City

October 30, 1922.

I will tell you a little story told by Mr. Schwab. The other day he said a neighboring farmer came to him and said, "Mr. Schwab, don't you want to buy a cow?"

Mr. Schwab: "How old is she?"

Farmer: "I don't know."

Mr. Schwab: "What kind of a cow is she?"

Farmer: "I don't know."

Mr. Schwab: "How much milk does she give?"

Farmer: "I really don't know, but I can tell you one thing: she is a darn good-natured cow and she will give you all she can."

Since you have all such friendly faces I am perfectly willing to go ahead and do the best I can.

Q Has the swelling of bones at the joints anything to do with colitis or autointoxication?

A Now, in our profession it is almost fair to say that there is no one cause which is in every case always the cause of some particular disease or phenomenon, and there is no one phenomenon or disease or known appearance or one single happening which is always the result of some one cause, so swellings in and about the bones have a great many causes. They may be caused, and often are, by syphilis; they may be caused by injury; they may be caused by tuberculosis; but fortunately these causes I have named are comparatively rare. Swellings about the joints are generally

due to arthritis or rheumatism. Rheumatism and arthritis are closely allied. We find that one set of causes produces all kinds of rheumatic and joint phenomena.

I wonder if you agree with that, Dr. Kellogg?

Dr. Kellogg: "Yes, that is right."

Dr. James: "I am glad that I have such good backing."

A great many of these troubles are the result of some form of poisoning. Now, of the different forms of poisoning that may produce such troubles, one, as you all have been told, is infection from an abscess or abscesses of the teeth. Another is infection from diseased tonsils. Unfortunately we have been, I think a little disappointed in what we have accomplished by examining the teeth and taking them out and also by examining the tonsils and taking them out. We do secure cures in many cases by doing this but not all of them. This is because all joint troubles have a great many causes. In this way we cured some of them but we hoped to be able to cure them all. You doubtless remember when tooth infections came out. We were filled with enthusiasm and thought we had found a cure for all the miseries that have been bothering us so many years. But after the question became narrowed down we found, I should say, that the commonest cause of all was the colon. Disease of the colon, or faulty functioning of the colon, giving rise to absorption of toxic properties and substances of the colon is, I suspect, the commonest cause of all kinds of chronic joint trouble.

It is not at all unlikely--I think it is quite possible--there may be other causes we do not know anything about, and in some future time doctors will come forward with some others.

If you have chronic joint trouble, or even acute joint trouble, if you will have the teeth, tonsils and colon examined carefully and the faults corrected in these organs you may be almost sure to cure your joint trouble.

I remember hearing about how Dr. Grenfell of Labrador fame, also a friend, I think, of Dr. Kellogg's, and perhaps he has told you people this incident. Before he turned to religion one evening he strayed into a Moody revival meeting in Boston. He went in through curiosity and stood at the back of the hall near the door. Brother Robinson was offering a prayer, and Brother Robinson prayed and he prayed and he kept on praying; he prayed until the people began almost to wish they were dead. In disgust Grenfell started to go out of the hall. Just as he started to leave, the loud, clear voice of Moody rang out:

"Brethren, while Brother Robinson is continuing his prayer we will all unite in singing hymn page 325."

If I get to be a little bit tedious do not hesitate to start a hymn.

Some of these questions have to do with the Sanitarium technicalities, and I am not going to try to answer them, because it might lead me inadvertantly to make suggestions. The institution is so nearly perfect I would not like to be caught making even a suggestion.

Q If, as you say, no germs can live in fruit juices, then can't a person eat meat and drink a lot of fruit juices?

A I think Dr. Kellogg is making a note. He is going to get after that.

I must say a word about that. I suppose if fruit juices kill all bacteria, if you could eat a little piece of steak and then drink a bucketful of fruit juice I think you might come out all right.

Q When fagged out from not being able to sleep, I crave milk and eggs, also meat. Is this proper, or are there other foods, means or applications which are better and will satisfy craving and strengthen me? I have tried vegetables and changing flora for some weeks.

A Even if I believed in eating meat under ordinary circumstances, I should not recommend anybody to eat meat late at night or in the middle of the night to encourage sleep.

Normal sleep is associated with and probably caused by the determination of the blood or the carrying of the blood from the brain into the other parts of the body so as to bring about a certain anemia or poverty of blood for the time being in the brain. I think that is why eating at night does help to promote sleep by starting the blood to other parts of the body, notably to the abdominal organs. People do not quite realize well enough that principle in connection with sleep and so they do not meet their sleeplessness properly.

It is possible to suffer from sleeplessness from some organic or some other serious condition, but I think that is very rare. Almost everybody who is sleepless is more or less foolish. I have an idea that Dr. Coué would be one of the best people to see.

The body has not enough blood in it to keep all the organs supplied with blood all the time. The blood is like the rolling stock on a railroad. Fortunately, the crops come at different periods. There is not rolling stock enough in the country to move all the steel in the country, all the cotton in the country, all the Southern fruit, all the Western crops and all the lumber all the time, so it is arranged that while the cars are busy with one thing there is a shortage in some other places that do not need them.

When a man digests food he has a lot of blood in the abdominal organs, when he is walking, a lot of blood in the legs, when he is thinking, or working over his books or writing or when he is angry--talking angrily--there is a determination of blood to the head.

One of the wisest men on sleeplessness I ever heard was Rev. Elwood Wooster. He said that the average man goes to bed and cannot sleep. He begins by counting up to a hundred and then backward. Then he begins counting sheep jumping over a fence and then does a whole lot more of such foolishness, all the time getting his mind more and more active and getting more and more blood into his brain. The thing to do is to say just this: "What a fortunate thing it is I have got to lie awake in this nice soft bed and what nice people I am going to meet tomorrow. I will just think over all the pleasant things I have in my life. I won't let anything disagreeable intrude."

Try that. It is the greatest help for sleeplessness I know of. In connection with that cover the feet a little more heavily or put a hot water bottle to the feet which tends to determine the blood to that part of the body and also tends to produce a lessening of the blood in the head.

Q When God made man he supplied him with tonsils. What takes the place of tonsils after man removes them?

A Tonsils are what we call glandular organs. They have functions, of which I must confess we know very little. There is an impression, and it is my own impression, that the tonsils, like the thymus gland, have an important function in early life, but later on they do not have any useful function at all. I am quite convinced that the tonsils in the adult have no value at all. It is possible in very young infancy they may have something to do with checking infections.

We have had so much experience in removing tonsils that I think it is perfectly fair to say today that we never detect any deterioration of health as a result of their removal, but we have vast proof of tremendous improvement in health from taking out tonsils when they are diseased. So I do not think that this person or anybody else who has tonsil trouble need hesitate a moment in having them taken out.

Q Is streptococcus a colon germ or a blood germ? How serious is it?

B I do not think it is fair to describe it at all from a geographical point; I would rather say it is a ubiquitous germ which exists everywhere. There is no possibility of human beings escaping from a touch of streptococcus. Nature has provided us with a mechanism capable of affording us protection. The thing to do is to keep yourself in such good condition you do not mind the streptococcus.

Q Are the cures for obesity safe to take?

A That is a very rational and sensible question to ask.

It is sensible because everybody knows of many people who have injured themselves by trying to reduce their weight. Overweight is something everybody ought to try to avoid. It is not healthy. Let us say that you are stouter than you like to be and you feel that you ought to reduce. Is it safe?

I must say quite frankly after my observations here that I have never found any place where they handle and treat obesity as wisely and safely as they do here. I should say it is a perfectly safe thing for anybody to come here to reduce weight. The reason why it is so unsafe in other places--every other place I have found--and I have visited almost every spa in Europe and taken a course of treatment in one or two, is this: In most places they fix the mind upon the reduction of weight. In the first place, they rarely examine the patient with the thoroughness they do here to find out what kind of a piece of machinery they are dealing with. When they reduce weight they fix their minds upon the scale and do not care a cent what becomes of anything but the weight. So it happens that people who go through cures to reduce slip into illness which last for years.

Here the physicians are so thorough in their examination before they begin to reduce the patient's weight they know all about him. They outline his ration and all the things they do for him wisely one against the other, always having in view as the matter of prime importance not what he will tip the scales at but what kind of a creature he will be when he gets through.

No matter how stout anybody is I could make him look like a skeleton. Unfortunately he would either feel like one or be one, for

it would be done in such a way as to throw an undue burden on some very important organs, the liver and kidneys and on the heart.

No, I should say that a reduction "cure" as it is carried out here is the safest thing a stout person could possibly undertake, far safer than staying at home and attempting it there.

Q Is there any danger of poisoning from hose which when washed leaves the water like blue dye? It does not seem to lessen the longer they are used and washed.

A The gentleman who is out here with Mr. Matheson is an expert on dyes. I have an idea it is an aniline dye they use which is perfectly safe.

Dr. James: Are poisonous dyes used in stockings?

Voice: I think not.

Q Can a women 55 years old who has one lung gone and a spot on the other live for any length of time? She is very cheerful.

A If she is cheerful she can live any length of time. It is a mistake to suppose that people who have lost an organ cannot live. I think, Dr. Kellogg, there is a lot of misapprehension about just that sort of thing. I think in this connection I will have to tell you something that has been going through my mind. We have all of us been in the habit, heaven knows, in connection with the very many wrong things I have taught in medical schools for 40 years, not intentionally, that most of the chronic diseases were progressive. Don't you think that is commonly taught, Doctor? (Dr. Kellogg: "Yes.")

Chronic diseases are progressive. If your doctor tells you

you have Bright's disease you are a goner. If your doctor tells you you have tuberculosis of the lungs, that is progressive; that leads right straight along towards the grave.

I do not think that is the case at all. I think a much healthier frame of mind, a much more true and accurate attitude of mind towards that is that disease, I won't say never, but almost never, is itself progressive. The disease is not progressive. A great many diseases do tend to progress, to grow worse, but that is not the fault of the disease itself. The cause of the disease, which has not been discovered and which has not been removed, tends to make the disease progress. Lately I have been teaching that in medical schools. The disease itself does not tend to progress. When I see a case going on and on and getting worse I am not going to conclude that I am dealing with a progressive disease but I am dealing with a diseased condition the cause of which I have either not discovered or am not able to remove and that the disease itself would stop if I could discover and remove the cause.

Now, tuberculosis continues to progress, but when through good nourishment, good air and a healthy, normal life the tissues of the patient are so strengthened that in the battle with the disease these tissues get the better of the tubercle bacilli and then the bacilli dry up.

The same thing holds good with many diseases which are combated so successfully here by combating poisons--Bright's disease and hardening of the arteries. Remove the cause of the disease and I think you will find in most cases the disease will stop to progress. You will not get perfect arteries or kidneys but you will be able to live happily with them.

If that woman is able to keep cheerful under those circumstances, then I should guess that she was made of excellent material, and if she treats her trouble properly and strengthens her tissues so that they get the better of the tubercle bacilli, I think she will stand an excellent chance of living just as long as anybody else.

Talk by Elder A.T. Jones, to the Helpers of the
 St. Helena (Cal.) Sanitarium, St. Helena, Cal.,
 Sunday, 6:30 a.m., October 27, 1901.

In my connection with this institution and this work as long as it shall last, there is nothing that concerns it that I shall not want all of you to know; so you are welcome to know everything about its workings, and of what is done, all the time, and all the reasons for things; and wherever it becomes necessary at any time to tell you, in the interests of the institution, anything that you do not understand, it will be told. And that is why this meeting is here this morning---to tell you some things about the institution that I am sure you do not understand.

Now yesterday, a little while before meeting began, I did not know what the subject was going to be that I should speak upon. Indeed, I did not know that I should speak, until it was certain that Sister White was not to be here; and that was not certain until the time had passed. But by the time it came time to speak, I knew what my subject was to be, and spoke on it accordingly; and if I had been speaking from the close of the sermon yesterday until now, I could have followed up that subject, because the further I went into the sermon, the more it opened up, and the more it has opened up since.

The situation as the truth stands in that series of texts that I read yesterday, and especially upon the text that

when the word of the kingdom is sowed, and the one that hears it understands it not, then comes along that wicked one and catches it out of the heart, and then he reigns there instead,--- that is the situation in which this institution has stood for I know not how long, and has reached a crisis several times, and reached a crisis the past summer, and changes were made accordingly. So the truth as it was opened up from that text yesterday, is descriptive of the real situation in this institution. And now I am satisfied that you folks and the people generally here do not understand that, have not understood it, or there would not have been done what has been done; the condition of things would not be as it is; for surely no one who makes any pretensions to the third angel's message would choose to have Satan rule in his life and in an institution where he is at work, by him, instead of having the Lord to rule---to choose that. And yet that choice has been made by a whole lot of people here.

I say, I believe really that the choice is made unintentionally, unconsciously, but that does not affect the fact. A thing may be true, and I not know it. I may be doing a thing that is wrong, and not know it; and I may make a choice of a wrong way, and not know that I am choosing the wrong way; and yet it may be as entirely wrong as though I knew it, though if I do not know it, the guilt is not mine yet. But when it is pointed out, and then I choose, then I make myself responsible.

Now it was that reason, because (as I have presented) that the Word of God, the principles of God upon which this

institution is planted, have not been understood and have not been received and given the place that belongs to them in individuals, and in the institution through individuals, and Satan has been allowed to snatch that away and stand there in His stead and occupy the place and be the chief of the institution---that is what called for the changes that have been made so far, and that alone.

Now I know that some have thought that Brother Sanderson was "crowded out" of the institution; and I know, and all who have had to do with that part of the story know, that that is not so; and a part of what I want to tell you this morning is the truth of that.

Brother Sanderson resigned, and we wanted him to stay,--- until the last decision that he made to go, all the provision we made was for him to stay, but with the understanding that the principles and practises in treatments---certain treatments, a certain class of treatments and of medical cases---should be utterly left out; and also that discipline should come in; that it was not enough to state a principle, however sound it may be, and then let everything drift upon the supposed principle that each individual is at liberty to decide for himself whether he will adopt the principle and carry it out, or not. Now that principle is everlastingly true, where the individual is responsible only for himself. A man down here in the valley that is simply a man of the world, is nothing of Seventh-day Adventists, of the third angel's message, nor anything else of the kind, might come up here to meeting some Sabbath, or every day, for that matter, attend every meeting, and listen to every principle,

and pay no attention to it whatever, do just as he pleases, and leave it all out of his life and everywhere---it would be equally true that Satan would rule in his life---but as to whether he should have anything to do with it or not, is altogether for him to say, and there is no other responsibility resting upon him, and nobody has any question to ask him any further; but if that man joins the Seventh-day Adventist church, and becomes thus a member of that church, and thus a representative of the principles for which that church stands in the world, takes upon him the responsibility of a representative of those principles, then as certainly as he hears those principles as Christian principles, the Word of God, so certainly he is under obligation to give those principles a place in his life, a place so far as it is possible for him in the church, so that those principles shall reign, that he shall stand for them, let his allegiance be seen that---and it be known that---his integrity is pledged to that, and that the Word of God and those principles shall reign in his life and through him in the life of the church. And for him to be in the church, professing the principles, professing to ~~represent~~ represent the principles as a member of the church for which the church stands in the world, and then hear the Word of God, and presume to stand upon what he calls the liberty that belongs to the man that hasn't the obligation of the church relationship at all,---that is simply perverting the whole idea of church relationship and for what the church stands in the world. The church stands for the truth in the world. The Scripture says it is the pillar and

the stay of the truth. If the church of Christ and the church of the third angel's message were not in the world, the truth would have no stay, would have no support in the world; so that it is the very pillar, the church is the pillar and the stay upon which the truth of God rests in the world for its integrity, for its defense, and for its standing in the world as it belongs to God.

Now for that man to come from that world, where he has at present no responsibility upon him but himself individually---for him to leave that, and come into the church, and take the responsibility of the church relationship, in the place where the church stands as the pillar and stay of the truth, and then ask to use the liberty that he has when there is nobody but himself, no responsibility but his own responsibility for nothing but himself,---you see that is simply to say, The church is nothing in the world; there is no place for it in the world. That is to take away the very pillar and stay of what hold up the truth in the world.

So then, as certainly as he belongs to the church, as certainly as he stands in that relationship and that responsibility is upon him, so certainly it is upon him as an obligation from God and from the vows that he has taken upon him in baptism and church relationship, to maintain the principles of the truth of God in their utmost integrity, and not allow any exaltation of self, any manifestation of self, in opinion private or otherwise, to take the place of those principles; and not to set himself up against these, so that he shall not understand, and then allow Satan, the wicked one, to snatch them away and

rule in His place, in the place of Christ, in the church---in that individual. That is the papacy.

The papacy has the principle, so far as form, so far as theory is concerned. The ~~same~~ fundamental truths of Christianity are held there. But instead of their having a place there, it is only a theory, a mere ~~mere~~ formal thing. Instead of the truth having a place in the life and recognized by their power there, it is Satan instead. So Satan in the church in the place of Christ---that is the papacy. Satan in the individual who professes Christianity, in the place of Christ---that is the papacy; for the papacy is in individuals, before it can be in the church.

Now Satan in a man who does not profess Christianity at all, ~~is~~ is simply in his own home. That is where he belongs. That is his kingdom. But a man who professes Christianity, and yet allows Satan to occupy a place there---that is a worse thing---that is the papacy, and that is the worst thing that ever can be---the mystery of iniquity in place of the mystery of God; Satan in men, instead of Christ in men the hope of glory.

Now that principle comes right along with ⁱⁿ the church, and the same principle in an institution of this kind. This institution stands for certain principles in the world. If those principles are not found in the institution, manifested and carried out by all in connected with it, then there is no place for the institution in the world. And so in an institution of this kind: to talk the principles, announce the principles, and then say, "Well, it is not for me; it is not for us; it is

not for the management; it is not for the Board;" to say whether you shall adopt these and carry these out, or not, "that is our ^{that} own religious liberty," and it would be an interference with religious liberty to insist that the principles of the institution that are announced and are sound and that should be adopted and carried out by each individual---it is not left to your own choice to say. That is simply to carry on the same principle of speaking the Word of God, setting forth the principles of Christ, and then go no further with it, just let it rest in the air, and Satan snatch it all away and occupy the place in its stead; for that is what he will do every time when those principles are not given a place in the institution. Satan will occupy the place; that is settled.

That is the same principle precisely as the church. This is an institution of the church; it is one of the agencies of the church; it is one of the hands---and God has called ~~it~~ it the right hand by which the church is to do its work in the world; so that it is essentially a part of the church organization in the world, and in its place is the pillar and the stay of the truth which it represents in the world.

Then when one comes to the institution, joins himself to it, takes upon himself the responsibility of being a part of the institution, ~~he~~ he thus takes upon himself the ~~own~~ responsibility of being a representative, standing in the place of a representative of the principles of truth for which the institution stands and of which it is the pillar and the stay, the same as the individual member in the church takes upon himself the responsibility of representing Jesus Christ to the world, and his

life must be pledged to maintain in very integrity the principles of Jesus Christ in the church, and he is to battle constantly to see that the principles of Satan shall not ever get in there, by seeing that they never get into himself.

Now this institution stands as a church agency precisely that way. One who comes to the institution comes and takes upon him the responsibility of being a representative of these principles. Then whenever these principles are announced or set forth, and that individual has the chance to understand them, then the very obligation of his being here, even though he were not a Christian at all when he joined himself to this institution,---the obligation, the responsibility of his being here, and his responsibility of taking that place, occupying it as a representative, it devolved upon him to be faithful to the principles of the institution---and far more. I say that might be; but one who is not a Christian simply can not represent Christian principles. It can not be done. A man who is not a Christian simply can not do Christian work. That is impossible. He may try. He may want to. But he can not, because the spirit of the work of a Christian, and the spirit of the work of a man who is not a Christian, are altogether of a different spirit and character. But I was using that as an extreme illustration. But when a person professes to be a Christian, professes to be a member of the church of Christ, and then comes to an institution of this kind, which stands for the church, and takes upon himself these responsibilities, then it devolves upon him as certainly as these principles are spoken and understood, that those principles

shall have a place in his life, and that Satan shall not be allowed to snatch them away and rule there in that life instead of those principles, and shut them out.

Now that is the situation of the institution. Things have been conducted this way: Principles announced, and then left; and it came to that place where Satan actually had possession and was working actually in the treatment of diseases here, instead of the principles of Christ being carried out in treatment of diseases. I do not say all diseases; but Satan had begun to get in his work, and to be the instrumentality of healing diseases in this institution.

Now maybe you do not know that; but I am telling you now, so that you shall understand why these things are going on; and the change that was made was upon that basis. We asked that these principles be left out; that Satanic methods be not used at all; and for the Doctor to stay. Now I saw to you, as I said to him in a meeting over there, (and more times than one), and others have said, ~~mmm~~---the whole story is upon that basis,---that I was perfectly satisfied, granted him in all honesty that he did not understand that the principles upon which he was working were Satanic. He did not realize that it was hypnotism. And, in fact, it was not full-fledged hypnotism. It was not full-fledged Christian Science so-called---mind-cure; but it was the principle of it, it was the first inception of it. The steps had been taken that put the institution that far upon Satan's ground entirely, and it was only a question of time when full-fledged hypnotism would be found, full-fledged Christian Science so-called, and full-fledged

fledged mind-cure. And, as I say, I gave the Doctor full credit for being perfectly honest, thinking that it was so, that it was some correct thing, and that it was the true science, and that it was the great thing that was to take the place of the understood methods of the world in such cases as that especially; and also granted that he himself was not responsible for it all; but we made it as plain as possible, ~~when~~ it was made as plain as possible by the Testimonies to him upon that one thing, that that was a method of treatment that never could be under God; that it was false science, leading into wrong paths. We talked over there in a local Board meeting one evening when I was there, when he explained the methods and his treatments---I pointed out (the brethren who were there understand it) all the bearing of it, and so that ---and that was before ever I had seen or known ~~anything~~ any such thing as a Testimony upon it, or before anybody had said anything to me about things here,---the arguments that he presented, the statements that he made himself in reference to the treatments given, were precisely the arguments presented, the statements made to me by a hypnotist, a Methodist, who was explaining to me his methods of treatment, in pleading that hypnotic literature should be printed by our presses in the Review and Herald Office. But I told that man, Methodist though he was, that however honest he might be, however honest he was in thinking that these things were for the advancement of Christianity and for the good of mankind, I could tell him plainly that it was simply Satanic, and it was Satan's leading and Satan's work from beginning to end; and however honest he was in doing this work,

it was nevertheless the work of the evil one. And when the statements and arguments were presented in that Board meeting, in behalf of hypnotism as a cure for disease and a means of doing good for man, in the treatments given in this institution, it was not difficult for me to see that the principle of hypnotism was here, as surely as it was presented in the arguments of that Methodist. Of course his was a full-fledged hypnotism; for he travels throughout the country, and makes a practise of giving hypnotic treatments. But I could see that that was the kind of treatments that were being given here for a certain class. It was giving Satan possession.

Now let me tell you this for your sakes. I am not telling you this for Dr. Sanderson's sake, because that same hypnotic influence is in this institution---yes, and a number of you folks are affected by it. Now that is so. You are innocently affected by it, that is so; but there is a subtlety, oh, the very serpentine subtlety of Satan himself creeping in that way. I give you all credit for being honest and innocent of it all; but please, brethren and sisters, allow me to say in all sincerity that that hypnotic influence, that serpentine subtlety of Satan's spirit that charms, that casts over minds and presents a glow upon the life,---that is influencing a number of people in this institution yet. And I want you to enlist yourself with Jesus Christ, put yourself there, ask Him, seek Him, to rid this place of it utterly, and break from your life every influence that can come to you, even unconsciously, from Satan.

Now here is the record of our Board meeting [presenting stenographic report of proceedings], the last one we had down at San Francisco, when the change was finally made, and Brother Sanderson concluded that he could not stay any longer. He had resigned back in, it seems to me August---presented his resignation in August, perhaps in July---at any rate, it was while I was East. But the brethren asked him to retain his position until I returned and we could have a full Board meeting. He did, and after I returned, to California, he renewed his resignation, and sent it to me and to the Secretary of the Association, and it was to take effect not later than the first day of October.

The first day of October we met in special Board meeting, at the Doctor's request, Brother Sanderson's request, that the changes should be made then, and that we should have a special Board meeting to carry it on. And in referring in that Board meeting to his resignation, he says:---

"I considered it carefully when I sent it in, and I have thought and prayed much about it since, and I see no reason to change the action that I have taken."

Then I stated: "The Doctor's resignation before us at the last meeting was to take effect not later than the first of October, and this is the first day of October, and the Doctor is still of the same mind. It devolved upon the Board now really to do something."

Then again I stated, after Dr. Sanderson had made a remark---he spoke to Sister White about the Testimony, etc.---well, I will read it:---

"Sister White stated that she had written some things upon the matter that none of the members of the Board knew about.

"Dr. Sanderson: Since you have given the Testimony you have borne up there in public, the family and patients as a whole know that it is not planned for me to stay there.

"Sister White: They know as a whole?

"Dr. Sanderson: Yes, the patients all know that it is not planned that I should stay there.

"Sister White: What other thing has been planned? Has any plan---we have plead with you to remain. But I should not speak. I should let this meeting go right on. I did not come to speak in it, not at present.

"Elder A.T.Jones: In all the plan that I have had, there has not been any that you should go, but that you should stay and work with Dr. Rand when he should come. And so it is immaterial, of course, which way it is; but as a mere matter of fact, it seems plain that the only real planning done has been by yourself."

Then I stated further:---

"I am satisfied that something definite should be understood and undertaken, for, as Dr. Sanderson says, it is neither for the benefit of any physician or the institution that the influence should be merely tentative for a long time, and we are met not for that purpose, so I hope the brethren will all be thinking of what we ought to do. If he can not find it in his mind or in his practise to make those changes, then so far as I understand the situation at all, it is plain to me that the institution would be better off without him there, if he can not make those changes. I had just as soon work with him as any body else in the world so far as my part in the work is concerned, and all I have ever understood is that if he can make those changes all would be glad to have him stay. And the local Board up there on the 11th of September---on the way down from Healdsburg to this place, I met with the local Board that evening, and the Doctor stated his views of treating a certain class of

cases, and I wish that that could have been taken down exactly as it was. I have thought several times since that I would give twenty dollars if I had it just as it was stated there. I do not know how it would be stated better. As he stated it that day, it was as plain to my mind as anything can be that that kind of practise is simply the first steps to the direct practise of hypnotism, and is in essence that, so far as it is practised now. And with that carried on in the institution, taught to the helpers, to the classes, etc., I could not imagine how much more damage could be done to the institution than to have it so. And it would be impossible for as much damage to come to the institution from Dr. Sanderson's going, as it would be by his staying with those views, practising those methods and teaching those principles to the classes and whosoever might be working with him and expecting them to be adopted and used in the institution. And for him to stay with those views---and another difficulty would arise. I expect to be at St. Helena myself so stay a month or six weeks to work in the spiritual interests of that institution in any way that I can, and a part of my work there would be to teach them simple, plain, Christian experience, conversion, etc. And our service of God is first service of the mind, a transformation of the mind is the first element of Christianity, to receive another mind than the mind which we have---the mind of Jesus Christ. And teaching those simple, plain principles of Christianity would come in direct antagonism to the principles which Dr. Sanderson stated as the principles upon which he would treat certain classes of cases. . . And understanding the situation as he stated it, I do not see how he could stay, nor how the Board could ask him to stay with those views and those methods of practise. But without them I am perfectly free and willing and glad to have him remain and go on in the way that the Lord is leading. But now, if the Doctor can not change his mind and leave our those methods, then we must, it seems to me, provide for something else, and why wait any longer to do it? His resignation takes effect to-day at the latest, as it was written, and unless he finds a place to change his mind, and to go the other direction, why certainly we are here to act; but with any purpose or thought of injuring him, or separating him from the institution at all, but act as we must act with the responsibility of that institution upon us. So that, if the Doctor maintains that attitude still, then the only thing we have to do is to count his resignation final as it was made, and we diligently set about, to the best of our ability, in the fear of God, to find some one whom we can put in there to the best advantage at present. I should say we want Rand, I can see that plain enough; we want him, and I should not be satisfied at all to give up that thing until we get him; even if Dr. Sanderson should stay, I say we want Rand. And we want him for a purpose, and that is, so far as I can understand the history of that institution from the time I went there when it was shut up before---~~discontinued~~ when Dr. Gibbs went over to open the institution---that to my understanding, from that time to this that institution has never had a chance to be founded upon right principles."

Then Sister White spoke in, "That is so." Then after the Testimony was read, and there had been further talk, it came around to this, which I said: "So now, in view of all these things, what is your choice, Brother Sanderson, so we can go ahead?"

"Dr. Sanderson: I can not state my choice any more plainly than I have stated it."

And as he stated it, it was as I read a moment ago, that he had---I will read it:---

"Dr. Sanderson: I considered it carefully when I sent it in, and I have thought and prayed much about it since, and I see no reason to change the action that I have taken."

Now that, in brief, ~~HERE~~ is why that change was made, and why Brother Sanderson ~~was~~ is not here to-day.

Well now, Dr. Band will be here. We got a letter day before yesterday, that he is coming. He will be here sometime in November. Brother Loper will be here, Dr. Loper; so they are both coming, and they come to carry on the work that has begun by my coming here, and all that it is, and all that is asked, and all that is intended, is to bring in the principles of Christianity, the principles of the truth, of medical missionary work, and practise in the institution, as those principles are in truth; and to make these principles the life of the institution, and to put the institution upon that foundation, that eternal foundation, where we expect it to stand to all eternity.

And now I want to call your attention to another thing, and I do it without any reproach or condemnation at all, but simply to call your attention to the facts, and help you to see, if possible, plainly how things do stand:

I have been here two weeks, at work, and I have had to "beg" my way every step that I have taken in this two weeks' work. Now maybe you do not know what I mean by "begging my way." Well, I will help you to see that. Now it is not myself. I do not ask for anybody's favor in this world. I am not courting that, and I do not ask anybody's permission to be here. I am here for a purpose beyond that. But my being here, and my coming here, was for no other purpose than was stated there in that---to bring in the truth of God, and help as far as possible in the interests of this institution, and all that I have attempted is to bring in the ten commandments and the faith of Jesus Christ.

And yet (and I am willing to do it---as I say, I am not finding fault with anybody and condemning anybody---I am perfectly willing to beg my way, and to beg away for the ten commandments and the faith of Jesus Christ in this institution; I am willing to do it for the two weeks, I am willing to do it for the four weeks that I remain, if it is necessary) ---and yet, brethren and sisters, here is the situation: How can it be, what kind of a situation must it be, where that a place for the ten commandments and the faith of Jesus Christ has to be begged and begged and begged every step of the way, day after day, and meeting after meeting? Does that say that the

spirit of the institution is as God would have it? Could anything show more plainly that the situation is absolutely of the Satanic order, and against the truth of God, than the fact that for two weeks, coming here to bring in and asking for nothing but the ten commandments of God, nothing but the faith of Jesus, nothing but the Word of God and sanctification to Jesus Christ---that that work should have to beg its way, and fairly make obeisance to get a place or hearing for it at all?

Elder C.L. Taylor: Brother Jones, in what way has that spirit manifested itself?

A.T. Jones: Well, one way it manifests itself is by, as the roll-call demonstrated, a whole lot of people never comenear. There are folks here, workers in this institution, who have not been at a single meeting that has been held, for all the invitations and persuasions and endeavors that we have made to get them here---and of course that is the extreme; that will not go at all. And modifications of that are, that some that go, every expression of the face, every intimation that can be made by action or look, is that, "Well, that, I will not take any stock in that. I don't need that." And so different modifications of that same style, that same spirit.

Now, as I said a while ago, I do not ask any favor for myself. I do not deserve that. Anybody may treat me just as they please. But, brethren and sisters, I am asking this morning in behalf of my brethren, Brother Loper will be here in a day or two, I suppose. I hope Brother Rand will be here later. I beg of you---I am speaking in their behalf. I can

stand all this. I like it. Nothing I delight in more than just to meet that kind of spirits, and see them struggle to get out of the way of the truth. But I speak in behalf of Brother Rand and Brother Loper. Now they are men of tender spirits; they are men of delicate sensibilities; and it will be exceedingly hard, especially for Dr. Loper, who has been almost worn into nervous prostration by just such things in other places; for he has had to carry fearful burdens in behalf of principle and to hold things level where he was, and he has nearly been worn out by that. Now I say, it will be a terrible thing for him to come here and be met with the work that he is to do, as I have been met---and Brother Rand in the same way. So I just beg of you, in their behalf, that by the time they get here, please do not treat them, please do not show the indifference and the spirit of antagonism to them and their work, that has been shown to what has been attempted here by ~~man~~ me in these two weeks.

Now I know, and others know, and I good many of you know---I would not say the majority, but too many entirely (if there were only one, it would be too many) but I know, and others know, and these know that to this hour there are persons here that have no sympathy at all and no respect at all for what has been done, for what we are attempting to do, nor for what is said, nor for the principles that are announced. Now that is so. And that is nothing to me---I do not care for that. The principles that God has announced for this institution are going to be planted in this institution, and they are

going to prevail in this institution, and this institution is going to stand here to the glory of God. God is going to rule in it; Jesus Christ is going to be seen in it; and His Spirit is going to prevail in it, instead of Satan and his hypnotic spirit. That is so. That is going to be done. That is settled.

And the work is going on. No one here need accept it a hair's breadth, if they do not want to. But those principles are coming in, and they are going to prevail, and that is what we are here for; that is what Brother Loper is coming for; that is what Brother Rand is coming for; and that is what a whole corps of others will come for, if it is necessary that we shall call them. So I say to you all, as I said to Brother Sanderson, We do not want a single one of you to go. We want every soul of you to stay. But in order to stay, those principles and the spirit that has characterized this thing, have got to go. They have got to go, whether you stay or go; because this institution is not the place for those principles. It was planted for another purpose entirely, and we are here to see that the institution---here is the Board, here is the general management, who have the responsibility of the institution, and for what it stands in the world, to see that it shall prevail; and for the general manager, for the local Board, for the general Board, to allow things to go as they have done, why, that is not what we are for. That is not what the institution is for. That is not what the management is for. The Board of management, the Board of Directors, are for the expressed

purpose of seeing that the institution shall do the work that it was designed for, and that the principles for which the institution stands shall be seen in the institution.

Nobody is obliged to come here; nobody is ~~obliged~~ obliged to stay when he does come; but as certainly as he comes, as certainly as he stays, the principles for which the institution stands must be recognized in his life, must be respected in his conduct, and not allow Satan to grasp them away and put his principles in there instead. That is where the thing stands.

So now I am willing to beg the way for the ten commandments and the faith of Jesus all the rest of the time that I am here; and anybody in the institution is perfectly free, they are welcome, to occupy the attitude that makes it essential that the ten commandments shall beg their way for acceptance in the institution---that is all right. But I simply call your attention again to that condition of things, that in an institution planted by the Lord for the glory of God, and representing the truth of God in the earth,---that those standing in that institution, that the situation should be there such that the commandments of God and the faith of Jesus, the very principles for which the institution stands, shall be required and obliged to beg their way! I simply ask you to consider the situation,

And each one of you knows who has occupied that attitude. And if you do not, and want to know, I can tell you. I will not do it here, of course; I would not do that; but, as I say, any of you who do not know that, any of you who have done

it, and do not know it, why, you just come to me, or give me the chance, and I will tell you, in all kindness, in just as nearly a Christian way as I can. I know I can not do it in a very good Christian way, but I will do it in just as nearly a Christian way as I can. So I want every one to be helped in every way he can be.

There, brethren and sisters, is the situation as it is this morning. So I close as I began, by saying that I ^{yesterday morning---} did not know when Sabbath-school closed, only then did I know what the subject was to be that I should speak on---I was not certain that I was to speak at all, until Sister White did not come; but that subject as it was presented to my mind, and presented to you by my words, opened up before me yesterday---as I stated, it opened up more and more; it opened up the whole situation here in a way that I had not seen it so clearly and so fully before, so that I could state it to you in such a way that you could understand. So now please consider these things, and help us to sweep out of this institution everything that is not of the commandments of God and the faith of Jesus Christ, everything that is not of principle.

And now---

[At this juncture ~~many~~ many in the ~~meeting~~ room seemed to be restive, and impatient to get away. A general stir was heard all over the chapel.]

Brother Taylor asked me a while ago how this antagonistic spirit was manifested---

[Uneasiness and restlessness again shown by many.]

O, don't! Please don't be so agonized. You can stand it a little longer. It ought not to be an agony to listen to these things, because you are being paid for your time. Why should you be in agony, when you sit and listen to the things that are the very life of the institution?

Not that is an illustration of what I have been saying all the time---that the principles should have to beg their way. It is an agony for some to sit and listen to them. Why not? It ought not to be; because the institution is not yours. Besides, you are paid for your time. Then since your time goes on, and you are an employee of the institution anyhow, and the time is spent in some one of the institution's connections talking on the principles of the institution, it ought not to be an agony for an employee of the institution, connected with it, to listen to it. So there is the situation again.

Now I have been in this third angel's message these twenty-seven years, and preaching the same things all the time. Fifteen years ago, in California, the same things were opened up, and by me, too, and were begun, that now---Brother Everest knows that---in education, particularly in Healdsburg, the sermons that I gave on education in 1888, thirteen years ago---thirteen to fifteen years ago---then there was outlined and there was announced in this State the very principles of the third angel's message that I am now here to preach again; and yet these fifteen years gone on, without these principles being adopted. And now here I am again, to preach the same thing. And I will

tell you, brethren and sisters, in all conscience and in all fear, God is not going to wait another fifteen years to give those principles a chance to find a place. Now that is so. He is not going to wait another fifteen years. And I do not believe that you want Him to wait another fifteen years, do you? Well, then, come along!

Now I have been meeting just such things as this, year in and year out, all these fifteen years, in all parts of the land; and I am at it still. Now I do not believe that I am an enemy of the third angel's message. I do not believe that I am an enemy of the principles of health and temperance, and medical missionary work. I do not believe that I am an enemy of our institutions. Then---

Why, it is actually so, that when I came to this place, the impression here, the attitude here of a good many folks, could not have been more pronounced if---well, it was as though an open enemy of the institution had come here to do some ruinous ~~work~~ thing. That is so. Well, why should that be? Unless I am an enemy---but I do not believe I am. It is not the opinion of the California people that I am. Well then, why should that attitude be assumed? Why should that spirit be ~~maintained~~ entertained in the institution? Why should not every one here have been just as glad as could be, if the commandments of God are taught, if the faith of Jesus is asked a place for---why should not everybody be glad, and not, "Oh, I wish it were over," and get into a perfect agony when these things were presented in meeting?

EXCERPT FROM

ARTHUR KEITH, M.D. : MENDERS OF THE MAIMED

LONDON, OXFORD UNIV. PRESS, 1919

(Book in Library)

P. 106

"On a former occasion I have spoken of muscles of internal combustion engines -- the engines which work our limbs and trunks. I have been justly criticized for the use of this simile because it is now ten years ago since Sir Walter Fletcher and Dr. Hopkins discovered that combustion occurs, not when a muscle contracts, but between the waves of contraction, whereas in a petro-driven engine combustion occurs during the effective stroke of the piston."

Presented to
In John Harvey Kellogg. *ask*
in hopes of his kindly helpfulness in the problem of *For*
good health.

"The Future of Medicine"

By S. ADOLPHUS KNOPF, M.D. (Univ. of New York and Paris),
New York City

WHAT Medicine may become in remote time, or even in the relatively immediate future, is hard for mortal mind to foresee. What it seems to us it should be, and what it can be, has long been, and is now more than ever felt not only in the hearts and minds, of the seers and prophets, but by all deep thinkers in our own ranks. Being neither a prophet nor the son of a prophet, nor of a seer, my own vision is limited, and I can only hope and believe that the future of Medicine, with its allied sciences, may be such as some day to conquer, not only the disease of the body and mind, but also poverty and crime, as love will conquer hate and man's inhumanity to man. This latter, alas, is still one of the main causes of unhappiness and a hindrance to true progress towards the physical and spiritual welfare of the world of men.

In the future, Medicine will be preventive, curative, and even more comprehensive than at the present time. In speaking of the future of Medicine I take the position that there is nothing in human affairs which has not its direct or indirect medical bearing, though at times, perhaps, it may be remote.

It is the physician of the future who will be the important factor in the progress of mankind because, by reason of the healing art to which he will be devoted with almost religious fervor, he will work for the betterment of the race in its physical, mental, moral, civil, economic and even spiritual aspects. I do not know how long it will take to attain this state, but I feel that the Medicine of the future must play the most important part in the redemption of mankind.

That this can be accomplished by the elimination of the personal element of the physician I do not believe. We will need the family physician in the future as much as we do today. The human touch, so essential in the treatment of the patient, can best be given by the one whom he feels to be also a friend. The majority of physicians are still, as in former times, general practitioners, and their relatively immediate lot must be considered, as well as their relation to the future of Medicine.

ABUSE OF CLINICS

We are now in the stage of huge endowments for medical centers comprising all possible branches and specialities of Medicine, from psychiatrics to dentistry. A large number of endowed private hospitals, besides State and municipal institutions, sanatoriums, asylums, hospitals, free general medical and surgical clinics, dispensaries, group practice, health demonstrations, public health stations, prenatal advice stations, public and private maternities, birth control clinics, free dental clinics, marriage advice stations, etc., are all working for the public good, curing and preventing disease, but decreasing the economic status of the general practitioner and also of the dentist.

If the clientele of these institutions were strictly limited to the absolutely poor, they should certainly be considered an unalloyed benefit to the Commonwealth, and I venture to say that no one would be more pleased to serve them gratuitously than the general practitioner. However, anyone at all familiar with the situation cannot deny that,

instead of being a benefit to the poor exclusively, a good many of these institutions, knowingly or unknowingly, serve the so-called middle classes; and even the upper classes are often treated, if not absolutely gratuitously, at least for so moderate a fee that no general practitioner could compete with them. His financial existence is threatened, if he wishes to adhere to the high moral code of ethics and the Hippocratic oath to which he swore on the day of his graduation. I am glad to pay a tribute here to the many general practitioners who suffer privation, if not actual want, rather than resort to anything not compatible with the dignity of their profession.

It would be unfair here not to pay a tribute also to the many men engaged in public health work who remain in their positions, although they are not better remunerated than they might be in private practice. On the contrary, Surgeon General Hugh S. Cumming, of the United States Public Health Service, recently gave figures to show that the salaries received in public health work indicate that "the compensation, compared with what we are led to believe the private practitioner gets, is not an inducement to young men to enter this work."

There is another group of physicians who deserve our sympathy, and to whom I wish also to pay a tribute. I refer to many who are employed by large private corporations and who, as stated in a recent editorial in the *N. Y. Medical Week*, Vol. IX, No. 22, "are working for salaries that are totally incompatible with the long and expensive training required to prepare them for their work." In comparison with the wage scales for uneducated workers, it is evident that a great injustice is being done to a noble profession. If there is no other way to get justice, physicians must unite in their efforts to overcome this degrading tendency of soulless corporations to commercialize medicine.

OVERSUPPLY OF PHYSICIANS

In regard to the economic status of the general practitioner the question which comes to one's mind is, "Are there too many physicians and too many dentists?" The latest directory of the American Medical Association gives the number of physicians in the United States in 1929, as 152,503; and the Librarian of the New York Dental College reports 67,117 dentists in the United States in 1928. Of

course, it is quite possible that some of the medical as well as dental graduates returned or went to other countries to practice, but these will certainly be a negligible quantity. However, realizing that the number of physicians and dentists is far too great for the population, the better medical and dental schools now in existence are limiting the number of students by requiring a higher standard for entrance and much longer courses of study, as compared with former years. In the medicine of the future, its leaders will see to it that there will be a stabilized population and a corresponding number of physicians, dentists, and specialists.

Unfortunately, merely reducing the number of regularly educated, licensed and ethical physicians will not be enough to make their economic position secure, because the 150,000 regular physicians constitute only one-tenth of the number of men and women assuming the responsibilities of caring for the Nation's health, there being one million other persons directly or indirectly engaged in the cure of illness.

On page 16 in Allon Peebles' "Survey of Statistical Data of Medical Facilities in the United States," published in November, 1929, it is stated that "there are about 1,500,000 persons whose services are utilized by the inhabitants of the country in connection with the cure of illness, including physicians, dentists, osteopaths, chiropractors, Christian Scientists, etc." Neither the enumerated nor the estimated list of such persons contains the non-medically trained psychoanalysts, nor the lay heads of purely commercial x-ray laboratories. These, as well as the self-styled healers, are responsible for irreparable harm often done to trusting patients. Among the thousands following cults and isms, there are many who claim, not only to have equal, but superior skill, to those engaged in and qualified to practice regular medicine.

There is only one way to protect the public against these practices. There will have to be a strict law, *strictly enforced*, that no one shall be allowed to undertake the diagnosis or treatment of the physical or mental ills of any individual, man, woman or child, for monetary compensation, who has not successfully passed the same examination that has been demanded of the graduate of a regular medical school. A license to practice must be required and obtained only in this way. Having com-

pleted such requirements, the licentiate can then practice whatever he wishes and call himself what he pleases. A Federal examining board would be the ideal for this purpose, and I have no doubt that the enforcement of such a law will prove of the greatest benefit to the physical and mental health of the nation.

A warning to the men and women who contemplate entering the medical profession may perhaps be appropriate at this time.

The future of Medicine will primarily depend upon the type of men and women who enter the profession. The future physician should, of course, have a college education, but aside from that there must be certain personal qualifications. First of all, there should be perfect health, without acquired habits which, if continued, might ultimately impair this perfect health.

Neatness in appearance, gentle manners and speech would be required, and high moral and mental qualities; also qualities of heart which would make one a welcome visitor in the sick room and a welcome member of society. However, before selecting Medicine as a career, one must feel the call to it, as the future minister feels the call to religion, for in the service to medicine one will find a religion, no matter to what creed or denomination one may belong, or even if belonging to none.

Never should men or women enter Medicine with the thought that in this career there will be more than an opportunity to make an honest living and serve mankind, or that gaining fame is possible, except by reason of hard work, talent or unusual achievement.

~~There is a justification~~ for deans and admission committees to consider what is known as the personal equation of candidates. The apparent likelihood of making the prospective medical student into a physician of high ethical culture and refinement, and a practitioner of at least average ability, should be as much and perhaps even a good deal more considered than unusually brilliant preliminary college scholarship, standing in society or wealth.

NEED FOR PRACTITIONERS

Opportunities for distinction in Medicine and its various branches will always exist, even for the average man or woman. There will always be specialists in the field of medicine of the future, because of constantly acquired knowledge in scientific laboratories of all kinds—in physiology,

psychology, pathology, bacteriology, radiology, in clinics, hospitals, sanatoriums and sanitariums, preventoriums, maternities, health centers, etc.

This does not mean, however, that the need of the well educated general practitioners will exist no longer. On the contrary, with the relatively fewer men entering medical schools and with the increase of specialization in medicine and surgery, such doctors will be more needed and, because of their all-around knowledge, there will be opportunity for these men to distinguish themselves as well as great or lesser great specialists. There will always be some particular phase in Medicine which will be of greater interest than others to the student, so that even practitioners in remote villages or towns, away from the great medical and educational centers, may engage in clinical or laboratory research. Robert Koch discovered the anthrax bacillus while doing general practice in a little German town, and finally became one of the greatest leaders in bacteriologic science.

We all know that, in spite of the plethora of physicians in larger communities, there is an actual scarcity of competent medical men in many small towns and villages throughout the country. It may require renunciation to settle in a far-away village, but he who does it will find satisfaction, contentment, happiness and reward in the joy of being the family physician, friend and adviser of old and young, and even a blessing to the community in which he has settled. Such men have been many among our forebears in the profession. There are some today and there will again be many needed in the future.

The greater number of medical graduates will, of course, flock to the larger centers of population, but here, too, in the Medicine of the future, there will be a goodly number of positions which can and should be filled by the physician trained as an all-around practitioner.

Any woman expecting to be confined should not be without at least a month, or better yet two months of prepuerperal care, with which general instruction for the care of the expected infant should be combined. While it may not be possible for every woman to be confined in a maternity hospital where specially trained physicians are in attendance, in the future, when social justice will be an all-important factor in the preservation of the health of a nation,

most confinements will take place in such an institution. There will be no more midwives, for no matter how conscientious they may be, they cannot possess the requisite knowledge to assure safe confinement and pre- and postpuerperal care in certain difficult cases.

PRECLINICAL MEDICINE

The periodic health examination, which is now considered voluntary, will in the future be obligatory for every man, woman and child. It should consist in a careful examination of the baby, at least once a month during the first year; every two months during the second year; every three months during the third; every four months during the fourth; every five months during the fifth; and then the examinations may become semi-annual.

Because tuberculosis, for example, develops, usually, between the ages of 14 or 15 and 20 years—that is to say, between the beginning of puberty and the full growth—there should be a semi-annual physical examination, with x-ray study of the chest, during these ages, so as to discover incipient tuberculosis and to start immediate treatment at the right time and at the right place. If it is only a "suspect" case, the right occupation for the young man or woman should be chosen and prophylactic measures taught, so that danger of a developing tuberculosis may be avoided.

There will also, in the future, be no schools of any size without a school physician or physicians, according to the number of pupils. Every child, before becoming a pupil in a public, parochial or private school, should be vaccinated against smallpox and immunized against diphtheria. Perhaps, by such preventive measures, all the infectious diseases may be controlled in the future. Considerable progress has already been made in this direction.

The B. C. G. vaccines, according to Calmette and his co-workers, among them our own William H. Park, are a reasonably sure preventive of tuberculosis in infants. To Dr. Park we are indebted for his brilliant, life-saving work in developing the antitoxin and toxin-antitoxin for combating diphtheria. In the prevention of scarlet fever the scarlet fever toxin, used in the same way as diphtheria toxin-antitoxin, has already proven efficient in epidemics. Measles is now treated, either by convalescent serum or by adult serum, the adult having had measles in childhood. There is even

hope of ultimately having a potent serum for cerebrospinal meningitis. During the World War we learned to appreciate the vaccination against typhoid. All this but indicates what can be accomplished in the future in the line of preventive treatment in children and adults.

Besides preventing the development of infectious diseases in the school, the school physician must also be a psychiatrist and well versed in orthopedics. Perhaps better than anybody else, the school physician could insist that the pupils acquire proper posture; and many a physical deformity might be quickly cured by proper orthopedic appliances, by reason of its early discovery. The child who is hard of hearing or the one with defective vision, would also be easily discovered and attended to and, of equal importance, would be the testing of mental abilities or deficiencies, so that no injustice would be done to the unusually talented or to the backward child.

The vocational counsellor, working with the school physician, will be able to give inestimable help in preventing misdirected study or an unfortunate choice of occupation.

In the future, as many do now, every industrial concern or plant employing large numbers of men and women will employ one or more physicians to look after the workers' welfare. In view of the fact that so many diseases have their origin in defective teeth, a dentist will be an important associate of the doctor in the schools and in industrial establishments. These are by no means the only positions which will demand well-trained physicians, able to diagnose any disease, except in the rare instances when a consultation with a specialist may be needed.

There should, for example, be no court to which alleged criminals are brought for trial without their first having been carefully and, if necessary, repeatedly examined, to ascertain their mental status and physical condition.

Of course, in our reformatories and penal institutions in general, there should be, even now, the closest medical supervision to assure good hygiene, proper food, proper occupation, instruction and even helpful distractions, to combat the idleness or dangerous monotony of prison life and treat the diseased mind. In crime prevention, too, the family physician can do a

vast amount of good as the adviser of both old and young.

BIRTH CONTROL

In the medical schools of the future, scientific and safe methods of contraception will be taught; and also how to treat the sterile man or woman who is fit for and desirous of having children. Besides these subjects, legalized sterilization and all that is known of hereditary diseases and eugenics should, of course, also be taught. These are important subjects for the family physician to know and practice. Contraceptive methods will remove anxiety neurosis, which it is well-known may even lead to insanity, in men as well as in the women who fear the arrival of a child which they know they cannot properly support and rear. Proper spacing of the arrival of the children they may desire will prevent the woman from becoming weakened or even ill by reason of too many and oft-repeated pregnancies, and the children which do arrive will be well-wanted and welcome; and a concomitant better economic situation of the husband will enable him to rear them properly.

No one has a better opportunity to help the married couple in case of maladjustment than has the family physician. He will also have many an opportunity to convince well-to-do, healthy and somewhat selfishly inclined couples that it is their duty and to the interest of the one child they are often content with, to have more children. Let such couples bear in mind that one coddled child is very apt to become selfish, and when he cannot have his way often becomes ill-tempered or violent, and in later years, when his selfish desires cannot be gratified, he imagines that he is not appreciated and will seek all sorts of means to purchase this appreciation, if not honestly, then dishonestly. In the families of the rich as well as among the poor, the watchfulness of the physician may prevent the development of tendencies to alcoholic intemperance or drug addiction.

A moderate number of children (about three or four), well reared and educated, and in whom are instilled high ideals, should be the object of the average family. The well-to-do and healthy portion of the population should be particularly eager to have several such children. Being able to advise the spacing of childbirths, the physician may help to encourage young, healthy people of good moral standing, to marry

early. The great number of illegitimate children and the alarmingly high percentage of young men afflicted with venereal disease would thus be greatly diminished. Here, again, the family physician can make his influence felt for the good of the country and race. The need and reason for this is obvious, for alas, it is now the inferior element in the population which propagates too fast, and these too-numerous children cause many of our unfortunate social conditions, such as overcrowded tenements, unemployment, child labor, truancy, disease and even crime.

My own personal experience in taking histories of many hundreds of tuberculous patients has convinced me that the later-born children in large families of the poor are the ones who contract tuberculosis more readily than the first-born. With the increase of the family there is hardly ever a concomitant increase of the earnings of the father, and the result is under-feeding and less care and supervision, especially of the later-born children, and the mother is, herself, worn out and probably insufficiently fed. The unsupervised boys often join street gangs and many become criminals. I have no doubt that, were it possible to take a census of the criminals in and outside of prisons, this conclusion would be borne out.

FEE SPLITTING

It is not possible to form an idea of what the future of Medicine should or may become without discussing some of the evils or disadvantages now existing in the medical profession, which are, in a measure, responsible for the deplorable economic condition of many physicians and dentists. Let us, therefore, in all frankness and without prejudice, take up that much discussed subject of our times, the division of fees.

"Fee splitting" is a word in itself detestable. The division of fees between consultant and family physician, now often practiced, is unethical and unprofessional, but we must seek out the reason for its existence before condemning it in its entirety, and ask if there are not extenuating circumstances.

Let us visualize a situation which may arise and does arise more often than is known or admitted. A family physician receives for his call \$3.00 or \$5.00. On one of his visits to a patient, he discovers, after careful examination, a typical case of appendicitis. Although the condition

may not be very painful, he knows of the likelihood of its becoming suddenly acute, with sometimes the danger even of a fatal ending, and he advises consultation with a surgeon. The latter confirms his diagnosis, operates, and receives \$300.00, \$500.00, or more. The patient is, of course, out of the hands of the family practitioner until he has completely recovered, and the family physician may have received only another \$3.00 or \$5.00 for accompanying the patient to the surgeon's office or for his presence at the consultation at the bedside.

Would it not be perfectly just and right if, instead of the secret dealings now so often practiced, the transaction should become a matter to be dealt with openly and in all frankness and honesty. When the surgeon is asked his fee for the operation he should state the amount, but insist that the physician who called him in be present at the operation, watch the patient's respiration and pulse, and give additional information about his physiologic idiosyncrasies, etc. For this he should receive \$25.00 if the surgeon receives \$300.00; \$50.00 if the surgeon's fee is \$500.00, etc. In this way, for his presence and help at the operation, the family physician should receive (and the surgeon should insist upon his receiving) an approximate remuneration of about 10 percent of the surgeon's fee, and the patient or his family should pay the family physician directly. The latter certainly deserves such compensation, because of the early and careful diagnosis and because he called in the surgeon at the right time. *He deserves as much credit for having saved the life of the patient as does the surgeon himself.*

In regard to the division of fees in a medical consultation the case differs somewhat. The internist receives a comparatively small fee, yet to prepare the history, urinary and blood analyses, etc., and the consultation itself, all take much more time than a mere visit, and I believe entitle the family physician to a compensation equivalent in proportion to the fee suggested in the case of the surgical consultation, and it should be paid directly by the family of the patient.

What, however, is the physician or young surgeon or dentist to do if a patient comes to him and asks the charges for his advice and treatment and, when it is given to him, replies that by going to such and such a man, such and such a pay clinic, or

such and such a medical center he can get just as good advice and treatment, and at a far cheaper price? Only by an ethical adjustment between institutions and private physicians, and not by putting the latter out of business, can and, I believe, will such conditions be remedied.

HOSPITALS AND CHARITY

Are there, perhaps, too many hospitals or, in some places, not enough? Such questions should and will have to be answered in the future by special committees, composed of physicians chosen from the County Medical societies, the local or State health officers and social workers representing charity organizations. Such a committee should also be called upon to determine what philanthropists, desiring to donate their wealth to the foundation of healing institutions, should do, to avoid unjust distribution and multiplication of efforts.

That there are among the physicians attached in various capacities to public and private hospitals, free clinics, dispensaries, etc., many who have financial anxieties just like the family physician, because so much of their time is given gratuitously, is well known. I really think that it would be but fair if these men should receive a just compensation for the valuable services they now render gratuitously, and very often to patients who could well afford to pay. I even hope that some day a just pension system will be devised for physicians who have served a lifetime as internists or surgeons to private hospitals, as is now the case in municipal and federal institutions.

I may here suggest one possible remedy for the abuse of medical charity in general. Barring accidents where immediate medical or surgical aid is indispensable and life-saving, every applicant for free treatment or treatment at a reduced rate in clinics, dispensaries, medical centers or hospitals, etc., should be required to declare, under oath, the amount of his net income per year. A group of the wisest and best men and representatives of academies and county medical societies should form a committee to determine what class should be worthy and deserving of absolutely free treatment and what minimum honorarium should be paid to private physicians, surgeons, dentists, medical centers, clinics, etc., by applicants for treatment, according to their statement of net income. I do not think that many applicants will commit

perjury. The prices determined upon should be uniform for all and by all, so that lowering of prices for the sake of competition, by institutions or individuals, will become impossible. Such a standardization of prices for medical, surgical and dental services will by no means deprive the grateful patient who is richly endowed with earthly goods, of the privilege to bestow a larger reward on the medical or surgical attendant who has done so much for him in the relief of suffering and probable saving of life.

STATE MEDICINE

One of the most important factors in the Medicine of the future will doubtless be the functioning of what might be termed State Medicine, Official or Governmental Medicine, comprising the activities of Federal, State, and municipal health departments. The beginning should be to have, what is now the United States Public Health Service, become the Federal Department of Health, with its first Officer having a seat in the President's Cabinet, as Secretary of Public Health.

Besides the present admirable work the United States Public Health Service is doing in solving health problems of other than local interest and assisting, in times of emergency, in the prevention of endemic or epidemic diseases, with its increased authority it should be helpful to the medical profession in the enactment and enforcement of wise laws for the public good. It should also serve as a protection against the passage of unwise and absurd laws, proposed by non-medically trained legislators, which often become a hindrance to the legitimate practice of medicine.

With the aid of such a Federal Department of Health, one of the greatest menaces of our time, which in our own country arises from the legitimate but by far-too-great amount of opium imported, and the manufacture of its derivatives, not to mention the large uncontrollable quantities of morphine, heroin and cocaine almost daily smuggled into the country, would be more effectively dealt with than it is at the present time.

Federal, State, and municipal authorities could combine to enact and enforce laws to protect the public against quacks and quackeries, fraudulent claims of sure cures, etc.

State and city departments of health

should maintain laboratories where facilities could be offered to the general practitioner to obtain diagnostic, preventive and curative agents, which he cannot possibly procure from his own resources.

These departments should cooperate with the general profession in educating the masses in the importance of prophylactic measures, such as vaccination, immunization and semi-annual and annual health examinations. They should also determine how many families among those unable to pay a physician should be assigned to a general practitioner and paid for by the municipality or State.

CONTROL OF SURGEONS AND HOSPITALS

To prevent, in the future of medical activities, the very serious and deplorable practice of incompetent persons undertaking to perform surgical operations, there should be, first, a regulation that none except fellows of the American College of Surgeons, or those who have qualified as surgeons before a special examining board, should be allowed to perform capital operations, or call themselves surgeons publicly or privately, so as to obtain cases to operate upon. Exceptions to this ruling must, of course, be made for the general practitioner, in emergency and accident cases demanding immediate surgical intervention.

Every public and private hospital should be licensed by the local or State board of health, and none should receive a license which has not demonstrated to the health department authorities that it possesses a perfect installation, in the form of operating room and sterilization apparatus, in good working order, to insure aseptic conditions. Whether or not it may even be advisable to make contemplated capital operations reportable, will become evident from future developments. We now have, in New York, that fortunate law which does not permit even a therapeutic abortion, no matter by whom, without the Health Department being duly notified.

WE CAN BEGIN NOW

Many of what I hope and believe will be the tendencies of Medicine in the future can begin to be effective very soon, or even at the present time.

The genial and very energetic health commissioner of New York City, the Honorable S. W. Wynne, has already devised an excellent measure, whereby his department has served the community, and thou-

sands of family physicians have become valuable co-workers in the prevention of infectious diseases and at the same time have received a reasonable remuneration. Thus, for example, of 42,541 children examined upon entering school for the first time during 1929, 18,541 were examined by private physicians, and of the 211,985 children who were immunized with toxin-antitoxin, 62,583 (more than 30 percent of all children immunized) were taken to the family physician. This is an excellent and concrete example of cooperation between the health department and private practitioners.

We are indebted to Dr. Wynne for another unique institution of incalculable value in the combat of tuberculosis as a disease of the masses which, at the same time, helps the family physicians' livelihood. I refer to the so-called tuberculosis diagnostic stations, operated solely for the benefit of private physicians who are caring for the tuberculous. At these stations, patients are examined only when referred by their private physicians, and the report of the examination is sent to the physician referring the case. These examinations are made by specialists selected from the

younger consultants and the stations are equipped with all modern medical facilities, including a fluoroscope, x-rays, etc. There is no charge to the patient and the station will, under no circumstances, treat him.

The marvelous progress the Medicine of the present has made, since Jenner, Pasteur, Koch, Lister, Roentgen and their co-workers and pupils conferred their discoveries upon the world, is familiar even to the lay mind. Smallpox, typhoid and diphtheria have almost disappeared; tuberculosis mortality is cut in two; life-saving operations, unheard of fifty years ago, are now performed with impunity, and the American surgeons are considered among the foremost in the world in their achievements.

However, there is still much for Medicine to do in the future, in order to become the most important factor in conquering, not only the disease of mind and body, but also poverty and crime, and to bring in the day when social justice shall reign supreme.

May this goal be reached in a not-too-distant time!

16 West 95th St.

THE ELECTRIC LIGHT BATH.

Dr. Kuhner, Int. Klin. Rundschau, Wien, 1894.

The physiological and therapeutic effects of the hot air and steam baths have been frequently emphasized in literature. I will set down the effects of the hot air and steam baths whose variety of operation I have borrowed from the literature referred to here. I will in my own way set forth as follows:

The sweat bath constitutes the most thorough method of cleaning of the body in that it not only decidedly assists the production of the cutaneous activity whose combination of sweat and sebaceous secretions dust and other foreign materials, whose presence in over-filled, unclean human habitations is made known by the odor, but also assists considerably the machinery of the skin in its great functions of human house-keeping. The sweat bath is furthered by reason of its preliminary and later quieting influence upon the numerous branching nerves in the external skin, the most excellent refreshing measure.

In the third place the sweat bath on account of the strengthening of the regulating heat apparatus is a most excellent means for increasing the bodily resistance; for example it is the method which is prescribed to the Swedish sailors at Stockholm at the Marine Station.

The most important therapeutic indications of the bath are muscle and articular rheumatism, nephritic oedema, uremia etc., I take it for granted, and refer to my publications which have appeared elsewhere. I have referred the same upon the ground of its important change working power upon the skin and all other systems such has been made use of in the treatment of all chronic organic affections which have arisen either from congestions or complicated with such wherein the derivative operations of the sweat baths are seen.

"should such affections occur in the liver, stomach, spleen, kidneys or lungs, they will ~~be~~ always be favorably influenced if we withdraw the congested blood and make way for better nourishment for furnishing fresh blood rich in oxygen."

Heat accumulation together with the effects of hot air baths, steam baths and dry packs can be attained by other measures, namely electricity. The electrotherapy and its improvements ~~has~~ as we know suffered a severe blow since such an experienced writer as Mobius has denied the therapeutical effects of electricity, and has explained those produced on the theory of suggestion. Eulenberg, Weiss, and others, have refuted this declaration. Forel as is well known maintains in a chapter worthy to be read by every physician that the therapeutical effect depends chiefly upon suggestion.

All these objections do not apply to the effects of sweat baths whose curious influence upon the respiration, circulation, secretion and excretion have been founded upon experiment. The same applied to the electric light bath. With the many-sided developments of the electrical industry the easy applicability of the electrical current to the many purposes, considering the always increased and extended facilities of the electric light in institutions it becomes easy to make use of the electric light for purpose of heat accumulation and since so far as I know the electric light bath is not found a practical application in Germany I describe the same in the following pages.

since the above mentioned "American Annual Report" has nowhere mentioned the electric light bath so I have derived its method of application, its physiological and therapeutical significance from periodicals ~~written~~ written by the authors already mentioned true always to the aphorism that when it related to the treatment of the patients trusted to us we ~~made~~ made use of the good wherever it was found. The warning however which appeared on the original work "copyright reserve" on which permits

us only to give notices and other matters of interest have to be referred to the original.

The electric light bath was originated by a intelligent woman the first woman physician of the sanitarium of Battle Creek Mich., and was improved by Kellogg. In Menschenfreund there is an exact description given of the electric light bath of Willibald Gebhardt based upon some experince gained by a American tour during the winter of 1890 and 1891.

Construction: A chamber of something more than a quarter of a metre base and of about two and a half metres height so that one person can sit quite comfortably upon a revolving chair, and is provided with from forty to fifty electric lamps on the four walls, which are completely covered with mirrors in such a way that each part of the body of the person in the chamber is uniformly covered with rays. On the top and on the ~~bottoms~~ openings are made for the purpose of letting in and out fresh air. One of the walls forms the door, which opens from within out. After one has taken his place in the chamber unclothed the lights are turned on; a powerful current passes through the lamps which is reflected through all the sides and falls upon the person. Should the irritation of the light be too strong for one person or another one has conveniently at hand to make a slow transition by having the lamps arranged in rows to be shut off. In the electric light bath at Battle Creek the arrangement is also made whereby the head of the person bathing can appear entirely outside of the bath just as is found in the steam or sweat baths of Germany. The electric light bath has the advantage over these steam baths that the temperature of the bathing room can be uniformly warmed, that it can be raised or lowered at will according as one ~~turns~~ turns on more or less lamps./

In three minutes the temperature is seen to be elevated up to 35 deg C. After two minutes more up to forty deg., and the same may be raised to 45 deg.C. or more.

The stay in the bath lasts fifteen to thirty minutes and is then followed after a few minutes as after other methods of producing perspiration by the application of cold water.

Another circumstance must be mentioned here which seemed of special importance for the electric light bath. We know from our experience with the physiology of plants that the electric light just as sunlight favors the growth of plants. We know further after the beautiful experiments of Prof. Hertz (Alas taken away from us too soon) that the light and electricity are in like degree properties of ether; that light, electricity, and heat represent only wave movements of ether, forces which may be transformed one into another so that as a matter of fact in the electric light bath the electrical current in the glow elements develop light only in a very slight degree from 5 to 8 % and develop heat in a far greater degree, from 92 to 98 per cent. Wherefore the electric light bath may be referred to with perfect right as an electrical heat, sweat or warm bath.

We know finally from the experiments of Proll (Badgastein) that the effects of electricity are advantageous to the human organism. ~~waxxxxxxxx~~ When therefore Dr. Willibald Gerhardt says in his original work upon the basis of his own experiment that the electric heat bath "above all others, however, the heat absorption of the body from the electric light bath is of much greater effect than in the steam bath or the hot air bath," so also upon the basis of this fact that attempts and their results justify the consideration whether in the operation of the electric light bath it does not concern this mysterious specific effect of electricity. At any rate as was emphasized also in the

original publications the psychical effects of the electric light bath are not to be underrated or to be substituted by any other kind of apparatus. The electric light bath forms an excellent substitute for the sun bath, whose importance has long been held ~~highly~~ in high esteem by science and practise.

The electric light bath constitutes a substitute "which may apply at any time in the sultry summer days, in the night, or finally in the winter."

What a hopeful outlook for the dwellers in our regions who remain such a little time in the beautiful sunlight. The American author finally believes that suitable arrangements may be made for partial baths as head, hip and foot baths, easily, upon this basis, and thinks that the attempt might be made in this connection at the health resort Bergsdorf on the Nordbahn where institutions which in a short time could become the pioneers in such matters.

THE PHYSIOLOGY OF HUMAN PERSPIRATION
Prof. Yas Kuno, Mukden

SKIN GLANDS.

Historical sketch.

Pores were first noticed by Malpighi in 1687.

Sweat glands were discovered by Purkinje in 1833. They are tubulous glands with muscular fibers between the epithelial and the basement membrane.

Sebaceous glands were described by Weber in 1827 and are acinous glands.

Classification by Ranvier:

Holocrine or sebaceous glands are those in which the gland cells are cast off and after disintegration form part of the secretion. Also called apocrine glands.

Merocrine glands are the sweat glands in which the secretion is formed in the cells and discharged without damage to them. Called eccrine glands.

Kölliker classification:

Large sweat glands are found in the axillary and inguinal regions. The discharge is fatty and contains nitrogen. The circum-anal and glands of Moll are also of this type, developing directly from the hair follicle.

Small sweat glands are found distributed over the rest of the body. They are not associated with the hair follicles. They are found only in the hairless regions in animals but over the entire body in humans.

Distribution of the Eccrine glands.

Number per square centimeter.

Forehead, 125; cheek, 54; neck, 130; chest and abdomen, 113; nape of the neck, back and buttocks, 112; internal forearm, 109; outer surface of forearm 109; palm, 273; dorsum of hand, 149; internal surface of thigh 57; .
outer surface of thigh 55; internal surface of leg, 57; dorsum of foot 92; sole of foot 268.

The number of sweat glands does not increase after birth.

The total number of sweat glands over the body is about 2,380,000.

Nerve supply to the sweat glands.

Sweat glands are surrounded by plexi of non-medulated nerve fibers. They pass through the basement membrane and end on the gland cells. Some medulated fibers are found in the connective tissue.

Thus far the sympathetic nerves are the only sudorific nerves which have been confirmed in man.

There seem to be both sympathetic and parasympathetic sweat centers in man. Pharmacologically the response is characteristic of the parasympathetics.

Some inhibitory nerve fibers run through the posterior nerve roots to the sweat glands.

Sweat centers:

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Four sweat centers are found in the cord.

Bulbar area extends from the fovea inferior to the calamus scriptorius.

Anterior portion of the hypothalamus is a center for sweat. In the cortex, lesions corresponding to the tactile areas produce a hyperhidrosis.

MEASUREMENT OF PERSPIRATION.

Total amount.

The apparatus used consists of a respiration chamber and balances for measuring body weight.

To measure cutaneous respiration an air-tight enclosure and hair hygrometers are used.

In measuring a small area of skin the limb is enclosed and the moisture which is absorbed is weighed.

Sweat secretion:

Direct observation of the sweat drops by aid of the binocular skin microscope.

The capillary tube method involves the insertion of a tube into the sweat pore. Movement of the column of sweat is optically recorded.

Colorimetrically the density of dye imprint corresponds to the density of the sweat glands in action, and the amount of sweat discharged.

A simple method is to paint the dry skin with iodine and powder it with fine starch powder. With this method there are seven discernable stages in the production of sweat.

Perspiration Chamber.

Sudorific effects are produced concomitantly all over the body.

Thus a study of a local area gives reliable results.

Water discharged from the body is measured, rectal and skin temperatures noted. Apparatus for heating and muscular exercise is arranged for.

Insensible Perspiration.

Insensible weight loss equals the weight of water plus the carbon dioxide given off minus the weight of oxygen consumed.

Magnitude of the weight loss due to the gaseous exchange depends on the respiratory quotient.

Total amount of insensible perspiration.

Figures vary between .45 and 1.9 kg per 24 hours for adults.

Infants lose .87 to 1.94 grams per kilo.

Water loss through the respiratory passages amounts to 154 to 468 grams per person in 24 hours.

The gaseous exchange through the skin is very small. It amounts to about 1% of that which takes place through the lungs.

Cutaneous respiration is increased 3 to 4 times when profuse sweating occurs.

The proportion of cutaneous to respiratory perspiration.

Naked: Lungs 33, skin 67.

Clothed: Lungs 31, Skin 69.

In dry weather there is more water loss through the lungs and

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proportionately less through the skin.

Factors affecting insensible perspiration.

Surrounding temperatures.

At 15 to 20 degrees weight loss is 19 gms per hour.

At 35 to 40 degrees it is 112 gms.

Remarkable increase in the cutaneous perspiration when humidity is lowered.

Ventilation and clothing make very little difference in the water loss from insensible perspiration.

Perspiration is increased by the hyperemia due to amyl nitrite, and alcohol. It is decreased by venous stasis due to adrenaline.

When heat is applied to one hand there is a parallel heat rise in the contralateral hand with an increase in the insensible perspiration.

The greater part of insensible perspiration can be in progress independently of circulation because it is due to the evaporation of tissue fluids.

Ingestion of food causes a rise, though the intake of water does not increase it except in infants.

Insensible perspiration is increased by 50 to 60% by walking.

Metabolism in insensible perspiration.

The total heat loss of the body is one fourth due to the heat lost by perspiration.

Regional relationship of perspiration loss.

Chest 1, cheek 1.74, palm 4.10, thigh .36 and forearm .30.

Persons devoid of sweat glands give off just as much insensible perspiration.

SWEATING CAUSED BY THERMAL AGENTS.

With a gradual rise in room temperature perspiration does not markedly increase until 30 degrees centigrade is reached.

With a rapid rise in room temperature there is a latent period of about 30 minutes before sweat breaks out.

In summer sweat may break out immediately on exposure to heat.

Thermal sweating is produced over the entire body except on the palms and soles.

With moderate heat sweating is moderate and fluctuates

With severe heat sweating increases progressively with no fluctuation.

With a full hot bath the latent sweat period varies from 15 to 45 minutes when the temperature is 38 to 39.2 degrees

Local hot air baths:

Sweat breaks out simultaneously on the heated and unheated legs.

Sweat was almost three times as great on the heated member.

Heat stroke.

Sweating is not sufficient to keep heat from accumulating in the body.

Sweating diminishes or disappears in the later stages.

Symptoms are: sleepiness, irritability, giddiness, nausea, Vomiting in some, headache with throbbing, stupor, dyspnea and salivation.

With a room temperature of 40 to 72 degrees C. the pulse rate advanced to 198 and the rectal temperature to 40.8 deg.

Sweating commenced on entering the chamber, remained the same for 5 minutes, increased markedly for 15 to 20 minutes. Later it increased only gradually and then decreased at the time the patient became stuporous. After returning to cool air 25 to 45 minutes elapsed before sweating stopped.

The application of cold to a small area causes a general depression of sweating.

There may be localized sweating of the face due to gustatory stimulation.

Hemihydrosis may be produced by pathological lesions.

Regional relationship of sweat.

Face, 57.8 cc per square meter.

Forearm, 48.9 cc.

Legs, 17.7 cc.

Perspiration on the palms and soles is not influenced by a rise in the surrounding temperature.

Parts from which water can evaporate least, sweat the least. Sweating is diminished over the parts most rich in subcutaneous fat.

Severe heat applied to an area of 20 square cm. produced local sweating in that area and for 5 mm. around it.

Exposure to moderate heat produces:

An initial fall in the rectal temperature which rises in about 20 minutes. With the appearance of sweating there was no further increase in body temperature.

Exposure to severe heat:

The temperature starts to rise earlier and continues in spite of copious sweating. On returning to cool air, the temperature continues to rise for 5 to 10 minutes

With one extremity in a cold water bath the rectal temperature fell .4 deg. C. though the surrounding temperature was high enough to produce a general sweating.

Influence of temperature and blood circulation on the sweat glands.

The skin temperature rises in a warm room until sweating occurs. Then it falls or remains about the same.

With profuse sweating the skin continues to sweat until cooled to 26 deg.

With moderate sweating it ceases at 28 deg.

The skin loses its ability to sweat at 45 deg.

Hyperemia of the skin does not perceptibly increase the perspiration.

If the circulation to a part be obstructed the production of sweat is gradually diminished after 10 minutes.

The sweat reflex due to change in body position.

Lying on one side produces a hemihydrosis of the upper half of the body.

Application of cold.

Ingestion of 200 cc. of ice water causes sweating to disappear in 10 minutes.

Sweating may still be produced on exposure to severe heat, even when the subject is cooled so intensely that the rectal temperature falls considerably.

SWEATING DUE TO MENTAL OR SENSORY AGENTS.

With mental arithmetic cold sweat appears on the palms and soles and in the axillae. Skin temperature also rises.

Electrical changes in the body may be registered on a galvanometer with emotional and sensory reactions.

The psychogalvanic reflex appears most prominently on the palms and soles and is essentially due to the activity of the sweat glands.

Pain is more effective in producing sweating than mental stress.

Peculiarities of palm and sole sweating:

During insensible perspiration the process is constantly in progress.

This type of perspiration is not augmented by a rise in the surrounding temperature.

The distribution of sweat is more profuse on the protruberent parts of the palms and soles.

Mental arithmetic produces a congestion of the palmar arterioles.

Characteristics of axillary sweating.

Eccrine and apocrine glands are both present.

Sweating occurs with high temperatures and also with mental activity.

Axillary sweating occurs only in the area where hair grows. It is less in subjects with little hair.

It appears at about the 7th year in life.

Individuals who sweat lightly due to mental effort do the same when exposed to high temperatures.

Effect of the variation in temperature on mental sweating.

When a subject feels cold there is no mental sweating on the palms.

At very high temperatures there may be no palmar but a general sweating produced by mental stress.

In very hot weather mental arithmetic suppresses general sweating.

SWEATING DUE TO MUSCULAR EXERCISE.

Sweating commences after the exercise has lasted for some period of time and is progressive in nature.

Sweat appeared on the general body surface and at times on the palm and sole. Palmar sweating if it appeared at all, broke out as soon as exercise started.

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After exercise was over the sweating remained at the same level for 10 minutes and then subsided gradually.

With a series of exercise periods there is a latent period for sweat only with the initial effort.

There is no constant correlation between body temperature and the outbreak of sweat due to exercise.

Asphyxia is sometimes an additional cause of sweating on the general body surface.

LOSS OF WATER AND SALT BY PERSPIRATION.

The maximum amount of sweat is 1 to 2 liters per hour.

In hot weather in India the active people may lose up to 30 pounds a day due to sweat.

Sodium chloride is the sole prominent constituent of sweat.

It constitutes about .3% of sweat.

Labourers in a warm environment may lose 10 to 12 grams of salt per day.

When the body fluids have been depleted, subjects are no longer able to sweat profusely.

Unless salt is supplied, tissues depleted of water can not utilize the fluid intake.

ABILITY TO PERSPIRE.

The sensitiveness of the sweat apparatus is easily changeable.

Exposed to intense cold one can not sweat for a considerable period of time.

The temperature at which subjects perspired was about 34 degrees in winter and 30 degrees in summer.

Abnormal body conditions can change the ability to sweat.

A tippler sweats much more readily the day after he is intoxicated.

There is increased sweating in hyperthyroidism, hyperpituitarism and tuberculosis.

Sweat often follows each meal in convalescents.

The sweat apparatus may be trained.

Repeated applications of heat produce a progressive increase in sweat.

With exercise, sweat decreases with increased training.

Variations in the osmotic pressure of the blood.

During early exposure to heat the blood plasma is increased at the expense of the tissues.

Decreased osmotic pressure causes sweating.

Sodium chloride administered to tuberculosis patients with their night meal decreased their night sweats.

MECHANISM OF SWEAT.

Production of sweating due to the nervous centers.

The subthalamie area may be considered the one responsible for sweating over the entire body.

This center is activated by a warmed blood supply.

Sensory nerves are stimulated by thermal changes and act reflexly.

With muscular exercise the motor impulse excite the sweat center.

Higher centers of emotion stimulate the sweat center.

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Sweat center may be stimulated by chemical agents as in asphyxia.

Severance of the median nerve causes the area of the palm supplied by it to remain dry.

Perpetual secretion seems to be maintained by the tonic action of the sweat center.

Periodical discharge of sweat.

Not all sweat glands are active at the same time.

Metabolism is increased when exposed to high temperatures by 11% at the outbreak of perspiration and 14% during the next 30 minutes.

SIGNIFICANCE OF SWEATING.

To regulate body temperature.

Continuous sweating occurs in the palms to protect them from excessive dryness.

They become moist during mental stress to facilitate work.

Axilla plays an important role in the diffusion of scent.

Excretory sweat.

Sweat contains besides salt, urea and pharmacological substances.

During exercise it removes lactic acid from the blood stream, thus protecting the kidneys.


It seems probable that as soon as sweating is established with muscular exercise that the hydrogen ion concentration of the blood falls due to the elimination of lactic acid by sweating.

P. Richer & H. Meige.

De la station sur les talons chez les myopathiques.

Revue neurologique, Paris, 1894, V. II, pp. 345-353.

..... We shall here call attention only to one special mode of standing, which in myopathics may be the source of interesting diagnostic signs: We want to speak on standing upright on the heels.

In the ordinary upright position, the two feet rest on the ground not by their whole extent, but only by the heel, the external border and the anterior part of the foot. The line of gravity of the whole body passes exactly at equal distances from the two feet in front of a line which connects the apophyses of the fifth metatarsal bones. What takes now place in standing on the heels? We shall first see that such a position is possible in all normal individuals. The usual right-angle formed by the axis of the foot with that of the leg becomes an acute angle opening forward and upward and the sole of the foot is raised to a height which varies in different individuals.  The line of gravity of the body, which normally passes in front of the tibio-tarsial articulation, is thrown back and falls in the point where the heel touches the ground. This produces marked modifications in the contour of the external aspect of the leg. From a morphological point of view there are three physiological states of the muscles: relaxation, distention and contraction.

In a general way we may say:

1. In the living man the muscular relaxation shows itself by a uniform relief more or less rounded out of the perpendicular furrows at the division of the fleshy fibers. The tendons are protruding but little and disappear in the neighboring parts.

2. Distension, which is always accompanied by the lengthening of the muscles causes external appearances quite different from relaxation. The muscular bulging is slighter; there is a more or less flattening according to the degree of distension.

3. Contraction is the active state of the muscle, but the important point is that it may occur in a relaxed or in a distended muscle, but with this difference that the relaxation ceases by the very fact of contraction, while distension may persist in its various degrees in spite of the contraction of the muscle.....
 But what we have tried to establish is the fact that a normal individual may stand upright and walk on the heels, without the sole of the foot resting on the ground. This can be shown very easily by experiments.

What takes place now with the myopathic?

We must first remark that in persons having amyotrophy, the muscle has undergone modifications in its external aspect under the influence of changes in the muscle fibers. Its relief may be diminished (atrophy) or increased (pseudo-hypertrophy). But there is one point, on which the writers have not sufficiently laid stress: we mean the diminution of the length of the fleshy body which shows itself by appreciable modifications of the external form
 We have seen that in the normal man the muscles of the calf are already distended in the ordinary upright position; but that they may be still more so by standing on the heels. The muscle must therefore possess a certain degree of contraction added to this distension. We cannot assume any kind of a ligament action, as the tibio-tarsal joint has no poster ligaments sufficiently powerful to oppose themselves to the flexion of the foot forward.

Besides the myopathics having lost all or a part of their voluntary contraction, do not seem to have in their gastrocnemii the power necessary for maintaining equilibrium. It is precisely here that by an eminently favorable compensation the effect of the muscular shortening intervenes. The gastrocnemius diminishes in length attains in general its maximum of distension when the foot rests flat on the ground in the ordinary upright position. Being in full tension in this position and being incapable of a greater tension, it is comparable to a veritable ligament, and its purely passive role is limited to preventing forward flexion of the leg on the foot. This explains why myopathics, though deprived of the assistance of muscular contraction, can maintain themselves in perfect equilibrium in the ordinary upright position. Even more, the patients are in this respect in a better condition than healthy individuals since they do not have to call to their aid muscular contraction to prevent forward flexion of the leg on the foot. We easily notice this shortening, if we carefully observe the feet of a myopathic in the upright position. We notice that the heel does not as completely rest on the ground as in normal individuals. The same peculiarity is visible in the sitting posture and if we palpate the tendo Achillis we find that it is much more tense and resisting than usual.

But the muscles of the calf have not at all lost their contractive power; and even in the most marked cases we have frequently seen patients capable of maintaining themselves on the ends of the feet as easily or better than normal individuals. And it is a striking contrast to see patients with extreme muscular failing entirely incapable to kneel down, to rise, to go up stairs, and who, on the other hand can easily assume positions which are consid-

ered difficult for healthy individuals.

But though the invasion of the muscle by fibrous tissue gives the myopathics certain advantages, it is also the cause of deformities and of troublesome functional incapacities. One of the first results of this lesion is the exaggeration of the fibrous process itself, which gradually reduces the length of the muscle. In some cases this shortening is so marked that the foot cannot be placed at a right angle with the leg. This is the origin of talipes equinus (club-foot) in myopathics. These same fibrous contractions produce also an absolute obstacle to standing on the heels. If a myopathic is asked to stand on the heel, he can with his best will, not detach the forepart of the foot from the ground..... Another result of the muscular shortening of the gastrocnemii consists in the fact that the patients in walking do not touch the ground with their heel as completely as healthy individuals. Some walk on their toes. They also cannot crouch down, as this motion requires forward flexion of the leg on the foot. The patients themselves rarely notice these conditions themselves.

P. Richer.

De la station et de la marche chez les myopathiques. --

Nouvelle Iconogr. de la Salpetriere, Paris, 1894, v. VII,

pp. 129 - 141.

..... (conditions in healthy men here omitted).....

We have particularly examined a female patient. The muscles of the lower extremities, as the plates show, do not show a considerable degree of emaciation. They even seem to have increased at certain points. However though the muscular forms have

been preserved there is an extreme weakness. The glutei, the femoral triceps as well as the sural triceps have lost all their action on the bony levers. The examination of the active and passive movements by electrical reaction confirms this. And yet in spite of this almost absolute functional impotence, this patient can maintain herself upright in a perfectly stable equilibrium. The lower extremities, so weak to accomplish the slightest movements, perform their role as rigid and resistant supports in the standing position very well. This phenomenon, which at first sight seems paradoxical, is explained by the results obtained by the study of the standing position in healthy individuals.

I have shown, in studying the normal position of standing, that all the different segments, into which the human body can be divided, are movable on each other, the head on the trunk, the trunk on the thighs, the thighs on the legs and the legs on the feet. The upright position can only be realized, under the condition that these segments are maintained in a state of extension, one on the other, and fixed in this position by means of a mechanism, for which several theories have been proposed. The muscular theory of Fabricius of Aquapendente ascribes to the muscles the proponderant role. The mechanical theory of the brothers Weber (1846) considers the action of the ligaments acting in opposition to the weight as the chief element. Besides there is a mixed theory.

..... The head, as a lever whose point of support lies at the niveau of the occipito - alloid articulation, is maintained in the upright position by



the action of the muscles on the neck (nuque). The action of the muscles must be very efficient, for the lever arm, on which they act is very short. Besides atrophy of these muscles produces flexion of the head forward. This is shown in our patient. But this is not a constant characteristic of myopathics; indeed a very slight conservation of the functional power of the muscles of the neck suffices to maintain the head in extension.

Now let us examine the trunk.

We have seen the powerful muscular masses, which surround the hip-joint are not necessary to maintain equilibrium. The gluteus maximus remains relaxed in the upright position and that it only assumes its kidney-shaped aspect of contraction when the trunk is bent forward. The examination of our female patient fully confirms this condition of normal physiology. With her, indeed, the glutei have lost almost all their contractive force. They are incapable to bring the body back to equilibrium after it is bent forward. But the upright position is possible, for it does not require the assistance of these muscles.

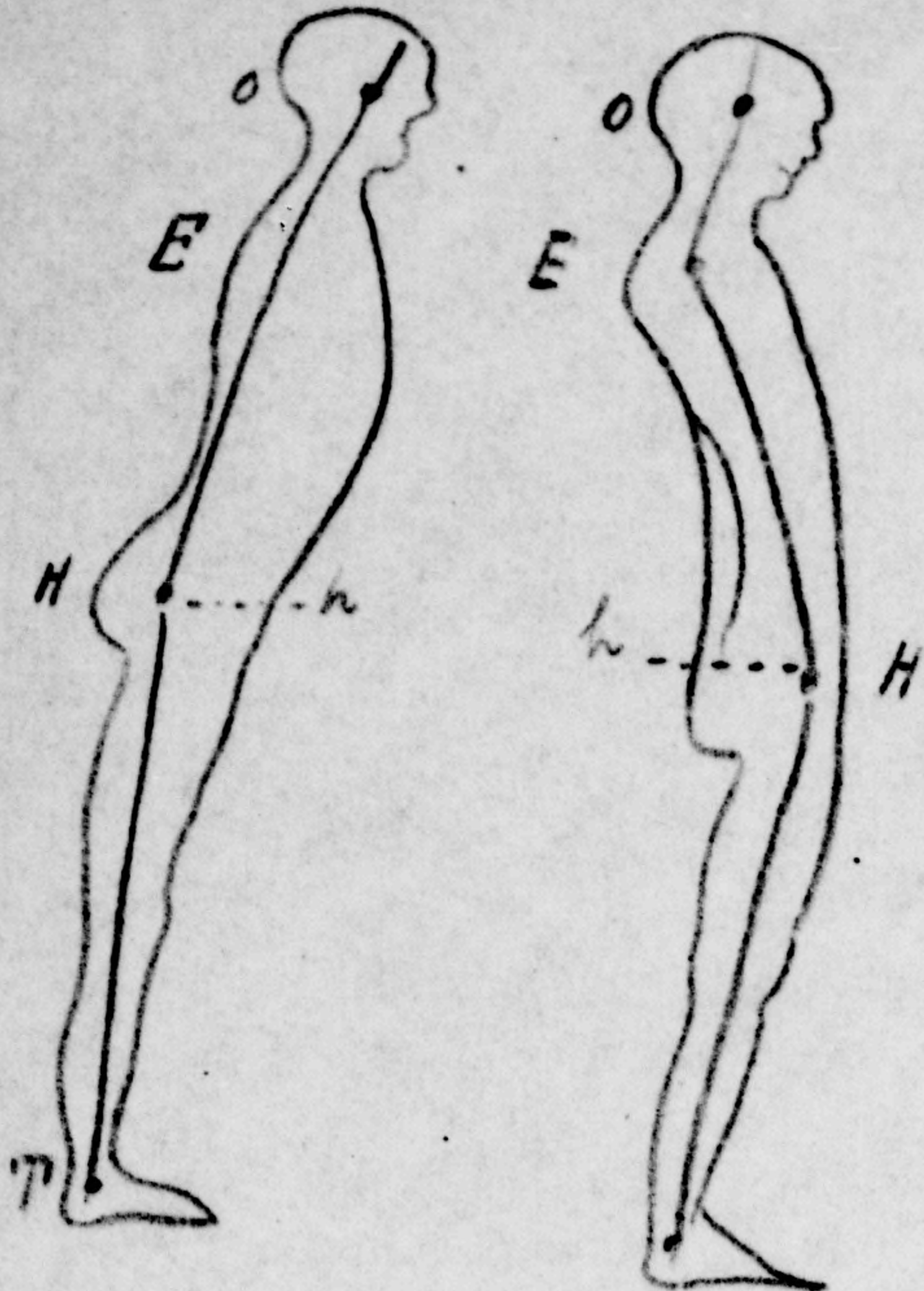
The same is the case with the quadriceps femoris intended to assure the extension of the leg on the thigh: as its role is useless for standing upright, the patient (female) remains in equilibrium by the mere fact of the resistance of the ligaments which limit the extension of the knee joint. But she cannot contract the anterior muscles of the thigh, where the characteristic aspect of the quadriceps contraction is never noticed.

There remains the ankle joint and this is a delicate point. Here muscular action seems absolutely necessary for the fixation of

the foot on the leg in equilibrium. The weight tends to bring the body forward, its fall can only be prevented by the posterior muscles of the leg and especially of the large gastrocnemius muscle. Now in our young woman the voluntary contraction of this muscle is almost nil; and yet she maintains herself perfectly upright on her feet. How is this possible? We may give the following interpretation: If the gastrocnemius in our patient has lost almost completely its contractile power, it is not entirely destroyed. It possesses still a respectable volume, and possesses some powers of resistance. It is these passive qualities which are put to work on standing upright. But if in our patient the contractility of the muscle cannot be maintained, the muscle is then perfectly comparable to a large ligament extending from the femur and tibia to the heel.....

There is a circumstance very favorable to the upright position in our patients. I mean the shortening of the muscle. Muscular retractions are frequent in myopathics, and the club-foot is not at all rare; and if in our patients we find no club-foot, we notice in all those, in whom the muscle of the calf has undergone changes, a diminution of the length of this muscle. In trying to bend their foot on the leg, these patients never get beyond a right-angle.

In standing posture our patients have rather an advantage over the normal man. These then are the reasons why our patients, in spite of the poverty of their muscular system, can maintain themselves perfectly upright. If we now consider the profiles in the upright posture we arrive necessarily at these conclusions: the



pathological postures are of two types: One in which the height H is reduced to zero or in the opposite sense, i. e. in which the plane of the shoulders is placed in front of the plane of the hips; (Fig.41) the other in which H is preserved and more or less increased (Fig. 42).

The upright posture of the myopathics and atrophics belongs in a general manner to the latter type.

Whatever the deformities of the trunk depending either on muscular retraction or on a specially localized atrophy, the posture of atrophics presents on the whole the same characteristics as the physiological posture. The various segments of the body are oblique, one to the other, in the same sense, but sometimes with an exaggeration which makes of the myopathic posture a veritable caricature of the normal posture. In this case the length $H - h$ is increased. The reason of this resemblance is found entirely in the similarity of the mechanism. The same conditions of equilibrium persisting in atrophics the same obliquity of the various segments of the body persists. It is even increased for the purpose of assuring a greater stability

On Walking.

In Normal Individuals

.....There is a movement in walking where the two legs, being extended like the prongs of a compass, the two feet rest on the

ground at the same time, one with the toes, the other with the heel. This is the period of double support. Then the foot which is behind leaves the ground and advances. During this time we have the period of unilateral support; it is much longer than the first. Walking then consists in a succession of double and unilateral supports.



The period of unilateral support should be divided into two periods, namely the period behind the perpendicular of the moving leg and the one in front of the perpendicular. We have then the following order:

1. Period of double support.
2. Posterior step.
3. The moment of the vertical line (Period of unilateral support.)
4. Anterior step.

Let us now consider the movements of the trunk. They are very complex. We have first the movement of "translation" which is the object of walking. It consists of the following movements.:

First the vertical oscillations. At each step the trunk rises and falls, so that every part of the trunk describes an undulating line. There are also the transverse and horizontal oscillations. When the trunk rises and falls it is at the same time carried to the left and then to the right side. These oscillations

are double the vertical oscillations. There is also a movement of inclining the trunk forward and backward, but in the normal walk it is not much marked. There is also a movement of rotation on its axis, as a result of the movement in an opposite sense of the shoulders and pelvis: During the period of double support the anterior aspect of the pelvis is not directed straight forward. It is oblique, turned toward the side of the leg which is behind. When the leg has reached the vertical line the obliquity disappears, but appears again toward the opposite side and reaches its maximum at the moment of double support. The center of this rotatory axial movement seems to be at the coxo-femoral joint of the supporting leg, while the joint of the oscillating leg occupies the periphery. But this is not all. Does the pelvis stay perfectly horizontal in walking? Girard says the pelvis rises on the side of the oscillating leg. But just the opposite is the case, as our instantaneous photographs show. But this inclination is very slight.....

..... The anterior muscles of the pelvis produce flexion of the thigh.... But the action of the glutei muscles is interesting. The gluteus maximus plays a very limited role in walking. But the action of the gluteus medius is of capital importance. We see the middle gluteus contract on the hip at each step on the side of the supporting leg and this contraction lasts during the whole duration of unilateral support. It opposes itself to the lateral fall of the pelvis pulled by the weight of the oscillating leg.

2. The Walk in Myopathics.

These patients present in walking a peculiar swaying, to which the expressive name "duck walk" (demardre de canard) has been given.

The duck walk is due to chief causes: L. A lateral inclination of the pelvis which is exaggerated at each step on the side of the oscil-

lating leg.

2. A lateral inclination of the trunk in its entirety. What is the cause of these two phenomena? It lies entirely in the weakening of the muscular masses of the pelvis and especially of the glutei medii. The pelvis not being held back on the supporting side by a sufficient force, falls necessarily at each step on the oscillating side, pulled by the leg which is then suspended.

The movement of the trunk is the direct result of the abnormal movement of the pelvis. It is an action of compensation. The trunk could not follow the vertical inclination of the pelvis without causing the fall of the whole body. To preserve the equilibrium and maintain the line of gravity in the base of support formed by the supporting foot, it is necessary that the upper part of the body is thrown to the opposite side. One of our patients has only one gluteus medius atrophied, the swaying movement of the trunk is therefore observed only on one side.

P. Rider.

Des rapports de la station hanchée' avec la scoliose dorsale primitive des adolescents. -- Nouvelle Scen. de la Salpetriere, Paris, 1897, v. x., pp. 12 - 14.

.....In this posture the weight of the body, instead of being equally supported by the two legs as in the straight position, is thrown almost completely on one side. This leg is in extension like a rigid column, while the other, flexed in the knee joint, is brought a little forward and serves only to produce equilibrium. The pelvis inclines laterally on the side of the flexed leg, while the vertebr. col. undergoes a lateral flexion whose convexity is turned toward the side where the pelvis inclines. This curvature lies generally at the level of the juncture of the lumbar and

dorsal region. Its effect is to bring the ribs on the side of the concavity and to pull them apart on the opposite side. The thorax thus compressed on one side undergoes an expansion on the other. The result is a difference of the level of the shoulders. The shoulder of depressed thorax side is lower, while the hip of the same side is raised; the other shoulder is raised, by the thorax extended above the hip, which on the other hand is lowered. There is also a movement of ~~the~~ rotation in the horizontal plane of the two transverse axes, the axis of the shoulders and the axis of the hips, one in the opposite direction of the other. Instead of being perfectly parallel as in the straight posture, both are oblique, approaching each other on the side of the flexed leg, and diverge on the side of the supporting leg. From this it is clear that a veritable physiological scoliosis, absolutely comparable to the pathological scoliosis is the result. Indeed, in the classical type of primary right dorsal scoliosis, we find in a normal individual who rests (hancherait) on the left hip, a poster. thoracic convexity to the right, with an elevation of the corresponding shoulder, and a sinking in of the left flank and projection of the hip of the same side.

It follows that the hip posture (altitude hanchee') may influence in one sense or other a given scoliotic deformity, either by accentuating it or in correcting it. This is an important indication as to treatment.In young subjects who have one leg shorter than the other (a few centimeters) on account of an irregularity in the development of the osseous system, the pelvis in the straight posture is inclined laterally toward the shorter leg.

This obliquity of the pelvis reacts by means of the vert. column on the whole trunk and gives it, in the permanent state, the characteristics of the hip posture, which are increased by the habit of children to rest on

the longer limb, thus accentuating the primary deformity. There is certainly a certain number of scoloses which have no other origin. If the condition is noticed at its beginning, a small heel which raises the shorter leg sufficiently to produce a horizontal pelvis, causes the deformity to disappear and suffices for a cure.

CLINICAL ENDOCRINOLOGY
OF THE MALE

WITH ESPECIAL REFERENCE TO THE
MALE CLIMACTERIC

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Miami

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THE DUCTLESS GLANDS IN THE MALE

It is generally agreed that the first known facts in endocrinology are the effects of castration on the male slave eunuchs of the oriental potentates centuries ago. That fact notwithstanding, the most remarkable advances in endocrinology have been heretofore generally connected with the endocrine system of the female and very few attempts have been made to study the particular male endocrinological picture in general.

As it is impossible in the time allotted for this communication to make even a mere resume of all the peculiarities of the endocrine system characteristic to the male sex, I am going to try to bring to your attention only a few of the many facts involved in the sexual physiological and psychological development of man, especially those having a particular relationship to the establishment of the climacteric syndrome.

THE PITUITARY HORMONES

About fifteen hormones have been identified with the pituitary gland.^{5, 17, 19, 20}

The anterior lobe produces most of them: the growth hormone from the acidophile cells and the sex or gonadotropic hormone from the basophile cells are the best known of the anterior pituitary hormones. Others are the thyrotropic, adrenotropic, lactogenic or prolactin, diabetogenic or hyperglycemic which is antagonistic to insulin; pancreatropic or contrainsulin hormone, stimulator of the islands of Langerhans and parathyrotropic hormone.

The posterior lobe has been credited with pitocin or uterine contractor and pitressin or vasopressor hormone, also controlling water metabolism and gastro-intestinal secretions. The pars intermedia produces intermedin, regulator of pigmentation.

A fat metabolism hormone, a nitrogen metabolism hormone, a melanophoric, an erythropoietic hormone and others have been

tentatively identified in extracts of either anterior or posterior lobe, but are not yet well known.

The growth hormone and the gonadotropic hormones take important part in male sexual development. They are antagonistic with each other, but their effects take place successively and in that way they complement each other. The growth hormone is mostly produced in the earlier periods of life up to adolescence, when the growth of the body must be carried on at its highest intensity. With the onset of puberty and development of the genitalia, together with onset of full activity of the gonadotropic and gonadal hormones, growth becomes slower and with the establishment of the reproductive functions in full swing, the growth function finally decreases. As age advances, the number, size and activity of the eosinophile cells of the pituitary decrease to a minimum, when the growth hormone is no longer necessary in amounts as large as in youth.^{5, 20}

The gonadotropic hormone produced by the basophile cells is really a complex of two principles:⁷ prolan A, follicle ripening factor in the female or spermatogenic factor in the male and prolan B, luteinizing factor or masculinizing factor.⁸ Prolan A stimulates in the male the germinal epithelium of the seminiferous tubules with the production of spermatozoa and, indirectly, through the testicular hormones it stimulates also the growth of the prostate and seminal vesicles.⁹

Prolan B in the male stimulates mainly the interstitial tissue of the testes and produces important effects by way of the testicular hormones, determining the increase in size during fetal life of the penis, scrotum, cord and inguinal canal to produce the descent of the testicles and further on in life it is instrumental in the development of the male secondary sex characteristics.

MALE PITUITARY HORMONAL DISTURBANCES

A disturbance in the production of growth hormone is manifested by abnormalities in the bones, muscles and other parts of the system. If there is a deficiency in the secretion during the growing periods of life, growth is stunted with the production of dwarfism in

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several varieties. An excess in growth hormone during childhood will produce exaggerated growth of the long bones and if maintained for long before the epiphyses are closed, will result in gigantism. After closure of the epiphyseal lines is complete, an excess of growth hormone results in acromegaly. Sometimes both pictures are superimposed in the case of acromegalic giants.

Both gigantism and acromegaly have a predominance for the male sex²⁰ and in both syndromes there is marked hyperpituitarism in the first stages, manifested by increased growth and muscular strength, early sexual maturity, decreased sugar tolerance, glycosuria and hyperglycemia frequently carrying into diabetes and also frequently polyphagia, polydipsia and polyuria as manifestations of diencephalic involvement due to pressure from a pituitary gland more or less considerably enlarged, either by simple hypertrophy, or by the formation of an adenoma of the eosinophile cells.

During its late stages, hyperpituitarism gives place to a completely opposite picture due to the destruction of the pituitary cells, with increasing mental, physical and sexual degeneration and the end comes usually early in life by asthenia due to adrenal involvement, by intercurrent infection, by cardiac disorders or by pituitary cachexia.

Hypersecretion of the gonadotropic hormone causes precocious development of the gonads with marked enlargement of the prostate, seminal vesicles and Cowper's glands. In some cases, a pluriglandular syndrome may be produced by primary overfunction of the pituitary basophile cells, characterized by plethoric obesity of the middle of the body, hypertension, disturbances of pigmentation, hypertrichosis and hypergonadism in the young and gonadal degeneration associated with progressive weakness, headache and glycosuria in the adult. Cushing attributed this syndrome to the pituitary adenoma of the basophile cells and named it pituitary basophilism.

Insufficiency of the gonadotropic hormone, if it occurs in childhood causes sexual infantilism by lack of stimulation of the gonadal hormone and, if in the adult, it results in a regression from the state of sexual develop-

ment previously attained. In all cases, a lack of the gonadotropic hormone contributes to frigidity and impotence and to deficient development of the genitalia and of the characteristic male evolution of the body.

There are several syndromes identified with hypopituitarism in the male: thyropituitary infantilism, usually associated with mental retardation and obesity; pituitary eunuchoidism with slight predominance of growth, tall stature and underdeveloped genitalia, adiposogenital or Frölich's syndrome in which a characteristic obesity, gynecomastia and arrested sexual development accompany a normally developed mind, occasionally a genius; somatic type of dwarfism or Loraine-Levi type, and many others that we have no time to mention.

THE GONADS

Like the ovaries, the testicles have both external and internal secretion. The former is spermatozoa and some of the suspending fluid produced in the seminiferous tubules. The internal secretion is produced by certain cells situated in the connective stroma of the testes. These cells, first described by Leydig in 1850 without knowledge of their function, are known today to exert through their secretion of the male sex hormone, a decisive influence upon the maturation of the skeleton and skeletal muscles, the ossification of the epiphyseal lines; the development of the larynx into the adult male type with large vocal cords capable of emitting the low-toned voice of man; and over the male type of hair and fat distribution on the body.¹ They also contribute vitally to the development of the penis, scrotum, testes and seminal vesicles, assist in spermatogenesis and genital function, and create and maintain libido and sexual power; in other words, they regulate directly the whole male sexual physiology and, indirectly, the male psychology and social reactions.

The Leydig cells function under the impulse of the gonadotropic pituitary hormone² and their secretion of male sex hormone inhibits and regulates the secretion of the anterior pituitary gonadotropic factor. Another necessary stimulator to male hormone secretion comes from the adrenal glands which, if removed, result in testicular atrophy.

THE MALE SEX HORMONES

There are three main forms of male gonadal hormone, in analogy with the three forms of estrogenic substance of the female organism. They have all been obtained in crystalline form soluble in oil, and are now chemically synthesized:^{1, 6} (1) testosterone has been obtained from the testicle; (2) androsterone and (3) dehydro-androsterone are both excretion products obtained from male urine and very much less potent than testosterone. All receive the common generic name of Androgens in opposition to the female Estrogens. Androkinin and Androtin are less commonly used terms.

A water soluble factor, allegedly responsible for the inhibitory action upon the anterior pituitary lobe is called inhibin and its injection into castrated male rats prevents the formation in their pituitaries of castration cells.

The excretion of androgens starts shortly before puberty as indication of the approaching sexual maturation under the gonadotropic stimulus of the pituitary. It increases gradually until in the adult male the daily output has been estimated at from 40 to 50 international units daily.²⁰ Its production is influenced by vitamins A and E and is definitely increased by ultraviolet irradiation, particularly over the skin of the genital region.⁹ Between the ages of 40 and 60 the production of male sex hormone decreases gradually and in old age it is reduced to minimal amounts, but rarely disappears completely.

Chemically the androgens and the estrogens are intimately related to cholesterol from which they are prepared synthetically by degradation.⁶ They are probably slight chemical variations of the same fundamental substance and show imbricated and similar effects in both sexes. Also both hormones, or at least their excretion forms, are found in the urine of both men and women. In the female the secretion of androgens has been estimated at from 25 to 40 international units daily, while the estrogenic substance is found from 40 to 60 units. And in the male, estrogens are excreted up to from 20 to 40 units daily.²⁰

The normal predominance of the respec-

tive hormone in each sex determines the characteristic orientations in both the physiological and psychical spheres, peculiar to the types of the ideal male and female.

DEVELOPMENTAL ABNORMALITIES AND FUNCTIONAL DISTURBANCES OF THE GONADS

In eunuchism there is total absence of the testes and in eunuchoidism the testicular secretion is deficient resulting in important somatic, physiological and psychical changes ranging from mild cases with deficient sexual power, low metabolism and general physiologic slowing, to those in which there are characteristic antropometric measurements with decrease or total lack of development of the secondary sex characteristics if occurring before maturity has been attained, or with their regression if occurring in adulthood.

These patients share a common low resistance to infection¹¹ and high allergic sensitiveness which makes them chronic sufferers of colds, dermatitis, asthma, etc., and their span of life is usually shorter than the average.

Obesity of the girdle type is a frequent complication.^{2, 5, 14, 17, 18, 19, 20} Others are: dementia praecox, homosexuality, cirrhosis of the liver, malignancy, diabetes, and other endocrine disorders.⁶

Cryptorchidism is the failure of the testes to descend to the scrotal sac, due to a lack of endocrine stimulus from the pituitary, usually together with congenital abnormalities of the inguinal canal, the gubernaculum, or the testicle itself. Cryptorchidism usually accompanies hypogonadism. The testicles usually do not suffer degenerative changes before puberty and frequently descend spontaneously at or before that time but, if retained in the abdomen after puberty, the spermatogenic tissue undergoes degeneration with loss of function and they also become more prone to malignant degenerations and tumors.

Hermaphroditism is really only the exaggeration of the fact that both male and female characteristics are, from the hormonal point of view, present in all individuals.⁶ True hermaphroditism, in which functioning generative organs of both sexes would be present in the same individual, has very rarely been demonstrated. Pseudohermaphroditism may be in a male in which malformation, atrophy or malposition of the penis, scrotum and

testes resemble superficially the female genitalia, usually with accompanying gynecomastia and the feminine traits of character, and it may occur in the female in which an enlargement of the clitoris, rudimentary vagina and labia and hirsutism, low pitched voice and typically male psychological tendencies are apparent.

Hyperfunction of the testes with hypersexualism in a pathological degree is rarely found except in the presence of tumors, either of the basophilic cells of the pituitary, or of the adrenal cortex or the pineal gland, or of the testicle itself.¹¹ The latter are usually malignant, either seminoma or the sarcoma type or teratoma, very malignant tumor involving cells from all three germinal layers.

The usual attraction between the normal individuals of opposite sexes is caused by the predominance of their respective sex hormones.⁵ In homosexuals, a reversal of the usual balance has been consistently found by several authors. In the male, a comparatively high estrogenic with low androgenic excretion in the urine, parallel the opposite picture in the female homosexual. Thus, according to Wright,²¹ "sex attraction of the homosexual is as physiologically logical in relation to his hormone balance, as that seen in normal individuals. . . The fact that these abnormal tendencies frequently begin in youth or puberty, would in itself indicate an endocrine etiology."

It also suggests an endocrine treatment of these unfortunates by the administration of the sex stimulating hormones of the anterior pituitary lobe and of suprarenal cortex hormone, both with the purpose of enhancing the sex characteristics of the individual and restoring his normal hormonal balance.⁶

CLIMACTERIC CHANGES IN THE MALE

We have seen how the secretion of the interstitial cells of Leydig, or male sex hormone, is directly responsible for the development in the boy of his secondary sex characteristics. We know that androgens are not secreted in appreciable amounts before puberty, but at a time just preceding sexual maturation their secretion and excretion reach a maximum which is in direct relationship with both the sexual activity and psychic and physiological functions.²⁰

The production of testosterone follows a parabolic curve with its ascent started between the ages of 10 and 14, and continued gradually up to the age of 22 or 25. It then remains almost at the same level for from 5 to 10 years, and starts a gradual decline, almost insensible at first, at the ages of 32 to 35. This decline will be rapidly accentuated between 40 and 50, and at the age of 55 to 60, in most men, the activity of the Leydig cells is about the same as that before puberty.¹⁷ The number of the cells themselves is known to decrease in the interstitial tissue along with the passing of the years, and in old age there is a reversal to a state similar to that of early childhood, with the Leydig cells reduced to a minimum in the senile atrophied testicles.⁹

We see, thus, how the periods of life when the male human machine is at its best, are those in which the stimulus of the male sex hormone is at its maximum. We know that the peculiar aggressiveness, the creating power and, in general, the capacity for success in an individual are directly dependent upon the secretion of his own sex hormone.

When the decline in the number of Leydig cells begins at the age of 40, more or less, the individual has passed his peak and begins the inevitable descent. This descent is normally so gradual that the individual has plenty of time to get the necessary resignation without too serious mental and physiological derangements. But though gradual, the descent is continuous and we can observe the gradual undoing of all the products of gonadal stimulation during the puberal period. Any one of the following may announce the process: (1) The sexual powers diminish and the penis and testes start to undergo slow, gradual atrophy after losing their younger turgescence, and although the production of spermatozoa may be maintained for a very long period of time,¹² the decreased libido and potency make their utilization for generative purposes a matter of exceptional rarity. The prostate, on the contrary, usually starts a process of fibrous hypertrophy at about 40, in some cases slowly, in others rapidly, reaching a large size and interfering with the free elimination of urine, facilitating infection of the bladder and obstructive toxic phenomena. (2) The hair begins to lose its pigment and

in many cases begins early to fall, never to return, thinning gradually in head and body until the characteristic scantiness of senectud. (3) The skeleton and skeletal muscles start losing some of their hardness and strength, fractures are slower to heal and a definite shortening of stature is established. (4) The larynx, that had enlarged by the specific action of testosterone, with characteristic change in the vocal range from the high pitched voice of childhood to the deeper tones of adulthood, first relaxes with a change to a still lower basso and then atrophies changing the voice to the typical crackling of senility. (5) The distribution of fat over the body is frequently affected by increased deposits, especially over the abdomen, face, shoulders and buttocks. (6) Finally, the masculine psychologic pattern and attitude undergo changes that make this picture of the male climacterium a very interesting one in many aspects.

In women, the psychological changes of the menopause are very well known. The irritability and susceptibility of the woman past middle age have been the subject of innumerable scientific and literary contributions and in Spanish it has received a name accepted even in medical literature which translated means "mother-in-law complex."

In men, these changes have been for many years obscured by the importance given to the natural accompanying degenerative changes of the system resulting in arteriosclerosis, myocardial and coronary diseases, hypertension and the innumerable types of gastro-intestinal neurosis, manifestations most of them in my opinion, of the neurovegetative changes brought about by the decline in sex hormone production.

The practical demonstration of this theory lies in the proved ability of testosterone to relieve most of these symptoms for a more or less prolonged period of time in most instances. I am not claiming that testosterone could cure arteriosclerosis or coronary disease or gastric ulcer, but I am positive that in many cases it can slow those processes and delay their fatal outcome for a certain time at least.

We have seen time and again how menopausal hypertension subsides in many women with the administration of estrogenic sub-

stances. The same thing happens in many cases of hypertension in males past middle age after several injections of testosterone propionate. And we could go on in the same manner over each one of the elements composing the climacteric picture of man.¹ Brown-Sequard was the first one to show, by injecting himself at the age of 72 with testicular extracts, the invigorating effect of the Leydig cells secretion upon the waning forces of the body and of the mind.^{5, 20}

Steinach of Vienna proved less than twenty years ago that by vasoligation or vasectomy in both animals and humans a reactivation of the Leydig cells bring about renewed sexual vigor and potency, disappearance of wrinkles from the face, increase in mental and physical powers, decrease in graying of hair, etc.

Kammerer also of Vienna, reported shortly afterwards how mild doses of x-rays to the ovaries and testes, sufficient to destroy the parenchyma, would produce the same effects as the Steinach operation and Doppler's modifications, by reactivating the interstitial tissues bringing rejuvenation in both women and men.

We still remember also the attempts of Voronoff and his occasionally astounding results after transplanting testes from chimpanzees into a pocket in the abdominal skin. Although in most cases the implant has not taken or has been absorbed rapidly, in others the results of rejuvenation have lasted for as long as three years.

In all these attempts, the purpose was to increase the production of the male sex hormone. Today we are fortunate enough to be able to handle the synthetic testosterone in a form readily useable and in amounts sufficient for effective substitution therapy in a parallel with the estrogenic therapy in the female.

If we consider, added to the normal climacteric picture in man, the hypogonadism carried on in many instances from childhood or early adulthood, we might be able to understand how much good can be done by the judicious application of this blessed therapy, as much at least as the relief of suffering, and the peaceful life brought to so many women by the estrogenic therapy in the last few years.

The most active form of the synthetic male hormone is that of the salt of the propionic acid, testosterone propionate, sold commercially under several trade names usually in ampoules containing 5, 10 or 25 milligrams in about one cc. of sesame oil. The effect of these injections in hypogonadism, eunuchoidism and even in castrates,^{1, 4, 10, 15} is too well known already; in the hypogonadism of the physiological male climacterium it has been recognized only recently.⁹

In the form of an ointment to be applied by friction on the skin, testosterone seems almost as effective as in injections.²⁰ The advantages of the lack of necessity of the injections are great, but many patients report a dissatisfaction with the greasy manipulation and the amounts to be given in this manner are necessarily limited. As a maintenance dose, it is very useful after the maximum benefits have been established by several injections.

Proved effects of testosterone propionate therapy in men past 40 are: (1) Definite "lifting" of the usually depressed and melancholic psychics with marked improvement in power of concentration and memory and ability for mental work. (2) As a corollary to that, there is a rapidly established euphoria and renewed ambition with apparent increase in "pep" and general bodily vigor. (3) One of the first nuisances of the male climacteric to respond is the prostatism and nocturia; although definite shrinking of the prostate has not been proved to be the rule, it has occurred in many cases and in the last issue of *Sanidad Militar*, Muxo of Havana, Cuba,⁹ reports a group of 25 cases of unselected prostatic hypertrophy treated with testosterone propionate with definite anatomic decrease in size in some of them and a remarkable functional improvement in all. (4) In climacteric men whose testes have not yet suffered too extensive degeneration, sexual powers and libido can be restored in a moderate degree, bringing in many cases peace and renewed marital happiness to them.

To better illustrate the therapeutic effects of this hormone in the climacterium, let me succinctly relate a few cases that I have had the opportunity to observe personally:

CASE 1. G. B., business man aged 40, married, father of 4 children, with a normal sexual history, had noticed for 4 or 5 years, along with the waning of his libido, a decreased ability for the management of his affairs, nervousness, irritability, insomnia and crises of mental depression and of amnesia. Ten mgm. of testosterone propionate 3 times weekly changed his general attitude in about two weeks, with cessation of practically all his symptoms. On a maintenance dose with 5 gm. of ointment containing 2 mgm. per gram of the hormone, rubbed nightly on his skin, he is again enjoying life and his work.

CASE 2. J. L., lawyer, aged 44, monocryptorchid, married for 20 years, had been impotent during the last 7 years. This was a typical case of hypogonadism with early climacterium because of the impaired testicular function. Mental depression and worrying about his condition, together with increased loss of memory, irritability and lack of ambition, forced him to retire at 40 when a lawyer should be at the peak of his career. Obesity of the hypogonadal type, microgenitosomia and hypotrichosis, were marked. Treatment in this case required a low caloric diet and appropriate vitamins A and E surplus, with stimulation of the anterior lobe by prolan injections, and gonadal substitution with male sex hormone. Although sexual potency and libido were very slow to reappear in this case, the improvement in the general well-being, "pep," mental ability and ambition, together with the loss of excess weight were so marked from the beginning, that he has been able to return to his work and he is today again able to support his family. After three months of continuous therapy he can already, at least occasionally, perform his duties in a manner satisfactory to his mate and he feels today happier than he was a year ago.

CASE 3. J. T., a businessman, aged 50, married, father of 3 children, was slightly hypergonadic with history of more than average sexual powers in his youth, hypertrichosis, pituitary basophilic obesity in a mild degree, intermittent glycosuria and mild hyperglycemia for the past 2 or 3 years. He complained of retrosternal pains, general weakness and lack of ambition appearing with the rapid decline of his potentia coendi, gone already for more than two years. In this typical case, the physiological decline produced very intense psychic changes. A very successful man in a business involving hundreds of thousands of dollars, he suddenly gave it up and started to drink. At his first visit he told me that he did not believe he would ever be himself again and that he was anxious to die. Omitting the many interesting details of this case, be it enough to say that under proper psychotherapy, diet and exercise, with testosterone propionate in doses of 25 mgm. daily for a week and on alternate days for three more weeks, he was not only full of energy and ambition again, but able to perform his marital duties once or twice weekly. He, too, reopened his business and carried on a very successful season last year. Today he is kept on a maintenance dose of 10 mgm. of testosterone propionate by skin inunction three times weekly, after about 6 months of injections.

CASE 4. B. L., a retired merchant, aged 67, with a normal past history, complained of increasing nocturia and general debility, anorexia and insomnia. His prostate was only moderately enlarged and his residual urine (about two ounces), was free from infection. Injections of 25 mgm. testosterone three times the first week brought gradual but immediate relief of the nocturia. Continued biweekly for three more weeks, he got up only once instead of 8 or 10 times every night, slept well and had recuperated his appetite and zest for life. He has been kept on 10 mgm. injected weekly for over six months now, without recurrence of his symptoms.

These four cases are typical of some of the most frequent problems presented by the climacteric period in men: early sexual decline

with hypertension, arteriosclerosis and melancholic depression; still earlier decline in hypogonadal cases, and the nocturia of benign prostatic hypertrophy.

Of course, glandular hormone therapy, *per se*, is not all that we have to do for these patients, and general measures of readjustment of life ought to be advised together with proper medication in specific instances, but it is undoubtedly a blessing to man, that just when, because of the advances of the last half century of medical progress, his span of life is being prolonged far beyond the fifties, we can also make those added years happier and more comfortable, creating with this addition to our armamentarium, a new weapon of incalculable possibilities.

SUMMARY

Most of the studies made of the endocrine system have been intimately connected with the mechanism of the female glandular system. No attempt has been made heretofore to make a particular study of the endocrine system in the male.

There are many peculiarities of the endocrines that belong to the male. Among the anterior lobe pituitary hormones, the growth hormone is more active and its disturbances very much more frequent in the male. The gonadotropic factors have specific actions regarding the male gonadal functions. Disturbances of these functions produce characteristic pictures in the male, and the deficiency of the androgens in man past middle age brings about a syndrome similar to that of the menopausal woman.

Symptomatic relief and reactivation of general physiology, psychis, and of sex powers may be attained with the judicious application of substitution male sex hormone therapy.

Four typical clinical histories of the male climacteric are presented.

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340 Ingraham Building.

ENGLISH SCIENTIST MARVELS AT "PEP"

OF AMERICAN PEOPLE.

"They Know How to Work, Whereas Britishers Are
Slackers and Lazy." He Contends; Calls Dry
Law a Farce.

By Sir Arbuthnot Lane

(Eminent British Scientist)

London, March 6.-- "Every time I set foot on the soil of the United States I am more and more astonished at the difference between the average American and my fellow country-men, and after my latest trip, that impression is more vivid than ever.

"Since 1901 I have visited America 11 times, but years before, as a boy, I had experience with the people 'over there,' for my early education was obtained in Canada.

"The man who pays but periodical visits to the United States must hold an opinion similar to that of the man who has been there only once. That is, that the American knows how to work, whereas we, over here, know how to slack! As a nation, we are lazy.

Seldom Quit Their Jobs

9 "Men in the United States seldom retire from their jobs. They die in them. They have the work habit and they cannot help themselves. Clerk, stock-broker, banker--all carry on despite their ages. They have been accused of having the money-grabbing habit, but that is hardly true.

"If you keep working, and take an interest in your work, you make more money, but it cannot be said with any degree of truth that all the

big men in America who have amassed huge fortunes and yet remain in harness are doing so for the sake of money.

"It is the work habit that they are proud of, and I wish we were similarly afflicted.

"The average man in this country looks forward to the time when he will have enough hard cash invested to keep him in comfortable retirement. If he can save, he will--but watch him if he suddenly receives an unexpected, and even small, sum of money! He will immediately slack off.

"Americans are thorough.

"Englishmen are not.

"The latter contract to work, say, eight hours a day, and leave off punctually to the minute. So long as they have been working during the day--however leisurely--they are satisfied. They do not take that interest in their work which they should. To sum up the British workman in a word--he is casual.

"Apply Also to Women

"My remarks apply, equally, to the women. And yet ordinary life, with its round of pleasures, goes on as well 'over there' as in this country. Sports, parties, dances and theaters draw their numbers of care-free men and women who, perhaps, enjoy themselves better than we do. The harder one works, the more one appreciates recreation.

"Americans go ahead with everything. They have prohibition, but they have, also, their wines and spirits.

"Of course the 'dry' law is a farce. The rich man gets 'the real stuff,' the poor man the poison.

"Before the prohibition law came into operation the American had his open-air bar and his beer garden. We have not.

"The Englishman is not burdened with such a stupid restriction as prohibition, and he may drink with impunity, but, unless he is in a position to use a hotel, he has to go to public houses, which have hardly improved at all during the last quarter of a century!

"While the English girl is continually sipping her tea, Miss America is chewing gum. I have nothing to say for either of the practices, but of the two, I prefer the chewing, although when I was over there this time I wished it had never been introduced.

"I could not sit down at a desk or table without discovering a parcel of 'spent' gum stuck at the side or underneath--probably put there for future mastication and forgotten.

"That we are mean is obvious.

"How many people in this country think of giving--and give-- a little to charity every week?

"Very few.

"Those who do not forget all about it. The ultimate destination of their gift does not worry them. In fact, it never enters their heads.

"America's Medical Progress

"It is different in America, With a few exceptions, everybody gives a quota to help others. The rich man gives much, the poor man 'his bit.' The average working man in the United States does not fail to contribute

to the hospitals he might some day have to use.

"But, although the rich American gives money **freely** and liberally to charitable institutions, he takes, also, a great interest in them in order to see that what he and others have given shall be properly expended.

"The result is patent to everybody who has been in America. Every time I go there I am amazed at the wonderful progress made since my previous visit. The people are doing more for medicine than any one else. They are building enormous hospitals and taking great interest in the development of the science and art of medicine.

"Not only does this mean that America has the finest institutions in the world, but the continuous flow of money and the advice of keen-eyed business men allow of a sufficiency of up-to-date material. All the newest inventions are adopted and all the out-of-date contrivances scrapped.-

World-Wide News Service, Boston, Mass.

(Detroit Free Press, March 7, 1926.)

SOYA FLOUR

Address delivered by DR. J. A.
LECLERC before the Annual Meet-
ing of the American Soybean
Association, Sept. 15, 1936.

SOYA FLOUR*

By J. A. LeCLERC and L. H. BAILEY

Food Research Division, Bureau of Chemistry and Soils, U. S. Department of Agriculture

Address delivered by Dr. J. A. LeClerc before the Annual Meeting of the American Soybean Association, Sept. 15, 1936

Last year, a paper was read before this Association giving some of the characteristics of SOYA flour. Since that meeting an article on the subject of SOYA flour and soybean has appeared in the journal "Cereal Chemistry" giving considerable information on this subject. Some 4,000-5,000 copies of this article have been distributed among manufacturers of soybean products and among soybean growers, and I feel sure many of you are more or less familiar with the data therein given. A cursory review at this time may, however, not be out of place.

There are, as you know, three sources of materials for making SOYA flour:

- (1) The whole bean, processed so as to remove at most only the seed coats;
- (2) Selected press cake resulting from the expeller process, and
- (3) The cracked or flaked bean from which most of the oil has been removed by a solvent such as a special portion of the hexane type of hydro-carbon.

SOYA flour made by the first process has approximately the same composition as the original bean, i.e., about 20 per cent. of oil and 40 per cent. of protein; flour made by the expeller process contains about 6-8 per cent. of oil and is somewhat richer in protein than the whole bean flour; flour made by extraction with a fat-solvent generally contains less than 3 per cent. of fat but proportionally larger amounts of protein and of the other constituents than flour of the other two types.

The following table gives the average composition of the three kinds of SOYA flour, the analysis having been made in the Bureau of Chemistry and Soils:

TABLE I.

The Composition of Average SOYA Flours of the Three Types.

	(a) Whole Bean	(b) Expeller	(c) Solvent
Moisture	7.0	7.7	7.0
Fat	21.1	7.3	2.0
Fibre	2.3	3.0	2.8
Protein	41.6	47.5	54.0
Sugars (mostly sucrose)	9.3	11.4	12.0
Other Carbohydrates	14.1	17.3	16.5
Ash	4.6	5.8	5.7
Lime (CaO)	0.28	0.35	0.37
Phosphoric Acid (P ₂ O ₅)	1.21	1.40	1.54
Lecithin	1.10	1.30	....
Alkalinity of Ash ¹	24.1	27.9	....
Urease Activity ²	2.5	2.4	....

SOYA flour is considerably richer in protein than are the flours made from such other legumes as the navy bean, pea, lentil, lima bean, etc., and about four times richer

¹ cc Normal acid required to neutralize the ash from 100 grams flour.

² cc 0.1 N ammonia.

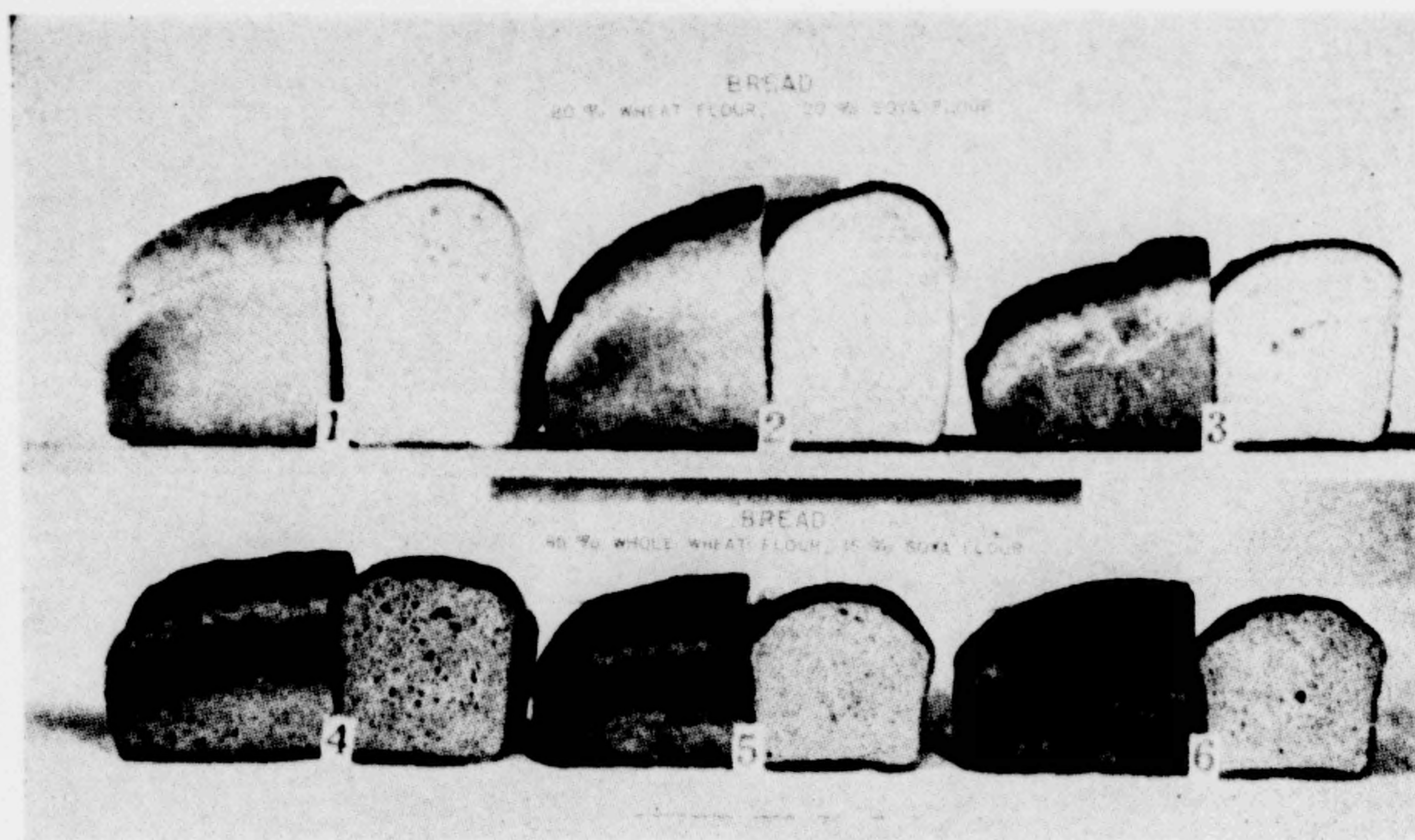
*Food Research Division Contribution No. 101.

in this constituent than are the cereal flours. SOYA flour protein is of especially good quality. SOYA flour contains less than 2 per cent. starch whereas starch is the main constituent of the cereal flours, containing as they do about 30 times as much.

RICH IN VITAMINS

SOYA flour is especially rich in vitamins and in minerals. The amount of calcium is 20 times greater than in potatoes, 12 times that found in wheat flour, 5 times that in eggs, about 2 times the amount present in liquid milk, but only $\frac{1}{4}$ as much as in dried milk. Milk has always been regarded as the calcium-food par excellence.

SOYA flour is an excellent source of vitamin B, a fair source of vitamin G, and contains some vitamin A. Vitamin C is present if the flour is made from the germinated seed.



STRAIGHT DOUGH METHOD

1—All clear flour. 2—80% clear flour and 20% high fat soy flour. 3—80% clear flour and 20% low fat soy flour. 4—All whole wheat flour. 5—80% whole wheat flour and 20% high fat soy flour. 6—80% whole wheat flour and 20% low fat soy flour.

SOYA flour is one of the *cheapest* foods available to man, when judged from the amount of protein, minerals (especially calcium), vitamins, or even energy obtainable for a unit of money. Only lard, sugar and corn meal are cheaper sources of energy.

TWENTY PER CENT. IN BREAD

Our experiments in baking last year indicated that well-risen bread can be made with as much as 20 per cent. SOYA flour mixed with wheat flour, and that such bread contains 40 per cent. more protein and 150 per cent. more of the salt-free minerals than are found in white bread.

Recent experiments have been carried on not only with bread but with cake, and cookies. The bread was made from a mixture of 80 per cent. strong, clear flour and 20 per cent. SOYA flour. The SOYA flour used was representative of the first and third types, already described, i.e., a whole SOYA or high fat flour, and an extracted or low fat flour.

Bread was also made by using whole wheat flour instead of the clear flour, with each of the SOYA flours. Plain cake, pound cake and sugar cookies were likewise prepared with combinations of wheat flour and SOYA flour; or whole wheat flour and SOYA flour, the cake containing 25 per cent. SOYA flour, and the cookies 50 per cent.

The following table shows the composition of the ingredients used.

TABLE II.

Composition of Ingredients Used in Making Bread, Cakes, Cookies, Etc.

	Water	Protein	Fat	Carbo- hydrates	Ash
Patent Flour	12.01	11.69	1.45	74.37	.48
Clear Flour	12.00	13.00	1.50	72.85	.65
Whole Wheat Flour	12.00	12.00	2.00	72.00	2.00
SOYA Flour (whole bean)	7.00	41.60	21.10	25.70	4.60
SOYA Flour (expeller)	7.70	47.50	7.30	31.70	5.80
SOYA Flour (solvent)	7.00	54.00	2.00	31.30	5.70
Skim Milk Powder	10.50	36.20	1.20	44.00	8.10
Yeast	74.90	16.50	1.00	4.70	2.90
Malt Flour	6.00	11.00	2.40	79.60	1.00
Sugar .....	.....	.....	.....	100.00	.....
Salt .....	.....	.....	.....	.....	100.00
Shortening .....	.....	.....	100.00	.....	.....
Milk (liquid)	87.1	3.2	3.9	5.1	0.70
Eggs	73.7	14.8	10.5	.....	1.00
Baking Powder	14.0	.....	.....	40.00	46.00

THE FORMULA USED

The formula for making the bread was as follows:

	Grams
Wheat Flour	325
or	
) Wheat Flour	260
) SOYA Flour	65
Sugar	10
Salt	6
Shortening	8
Skim Milk Powder	10
Yeast	8
Malt Extract (Powd.)	1
Water	As needed

Use preferably an unbleached hard wheat clear flour.

Straight Dough: Mix the ingredients 3 minutes in a mechanical mixer. Ferment at 86° F. for 2 hours, punching at end of 60 minutes and 30 minutes. Pan at the end of another 30 minutes. Proof 50-60 minutes. Bake at 450° F. for 35 minutes.

Sponge: Mix 1/2 the wheat flour, all the SOYA flour, 3/4 of the yeast and about 3/4 of the water for 3 minutes. Let stand overnight at 70° F. or for a shorter time at higher temperature. To the sponge add the remainder of the ingredients and enough water to make a dough of proper consistency. Mix for 3 minutes. Ferment for 1 to 1 1/2 hours. Pan, proof and bake.

In the formula given above, whole wheat flour may be substituted for the clear flour, thus making a whole wheat flour-SOYA flour bread.

THE CAKE MIX USED

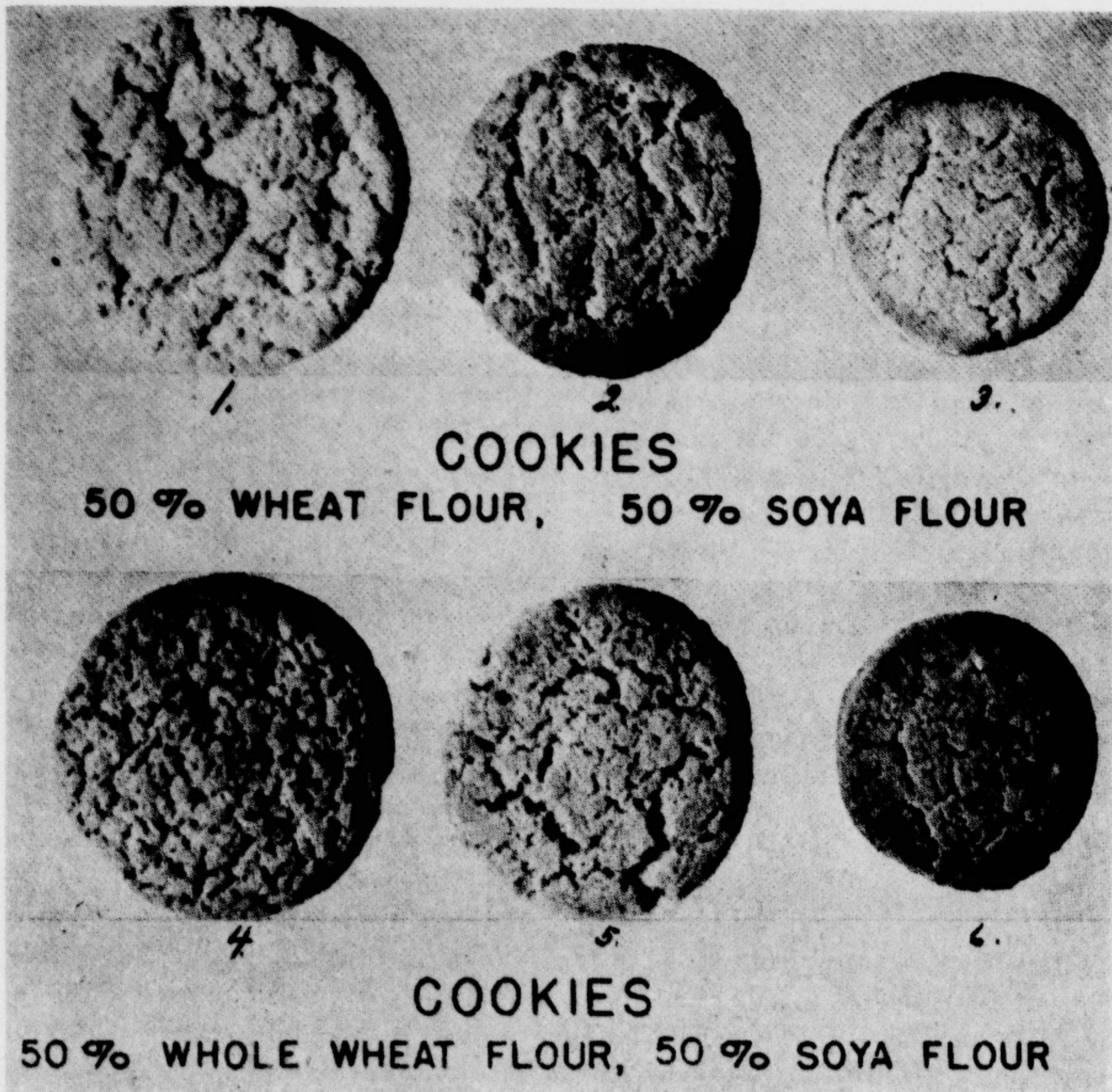
The plain cake was made by mixing at one time all the ingredients except baking powder:

Patent Flour	180 parts
Eggs	50 parts
Sugar	150 parts
Liquid Milk	120 parts
Shortening	50 parts
Salt	2 parts
Baking Powder	5 parts
Flavor to suit.	

Instead of 180 parts of patent flour, use 135 parts of patent flour and 45 parts of SOYA flour. The patent flour may be replaced by whole wheat flour.

Mix the ingredients for 8 minutes in a cake mixer, add the baking powder and continue mixing for 2 minutes longer.

Put 525 g. batter in a pan and bake for about 1 hour at 350-375° F.



1—All wheat flour. 2—50% wheat flour and 50% high fat soy flour. 3—50% wheat flour and 50% low fat soy flour. 4—All whole wheat flour. 5—50% whole wheat flour and 50% high fat soy flour. 6—50% whole wheat flour and 50% low fat soy flour.

SUGAR COOKIES

Flour	212 parts
or 106 flour (patent or whole wheat)	
106 SOYA flour	
Salt	2 parts
Eggs	44 parts
Sugar	198 parts
Shortening	75 parts
Milk	20 parts
Baking Powder	7-8 parts
Vanilla	1 part

INCREASES BREAD PROTEIN 40%

The use of 20 per cent. SOYA flour with white flour in bread making increases the protein content of the bread over that of ordinary white bread by 40 per cent. or more depending upon the type of SOYA flour used. With whole wheat flour and SOYA flour the increase of protein in the bread over that of ordinary whole wheat bread is of the same order. The increase in the naturally occurring minerals, due to the use of SOYA flour is 120 per cent., and 160 per cent., respectively.

On the other hand, the decrease in carbohydrates of bread as the result of using 20 per cent. SOYA flour and 80 per cent. wheat flour instead of wheat flour alone, or whole wheat flour, is notable, viz., 17 per cent. and 14 per cent., respectively.

As already stated, SOYA flour contains 12 times as much calcium as is found in wheat flour. The amount of calcium in 20 per cent. SOYA flour bread is more than 50 per cent. greater than in white bread.

TABLE III.

Composition of Bread, Cakes and Cookies.

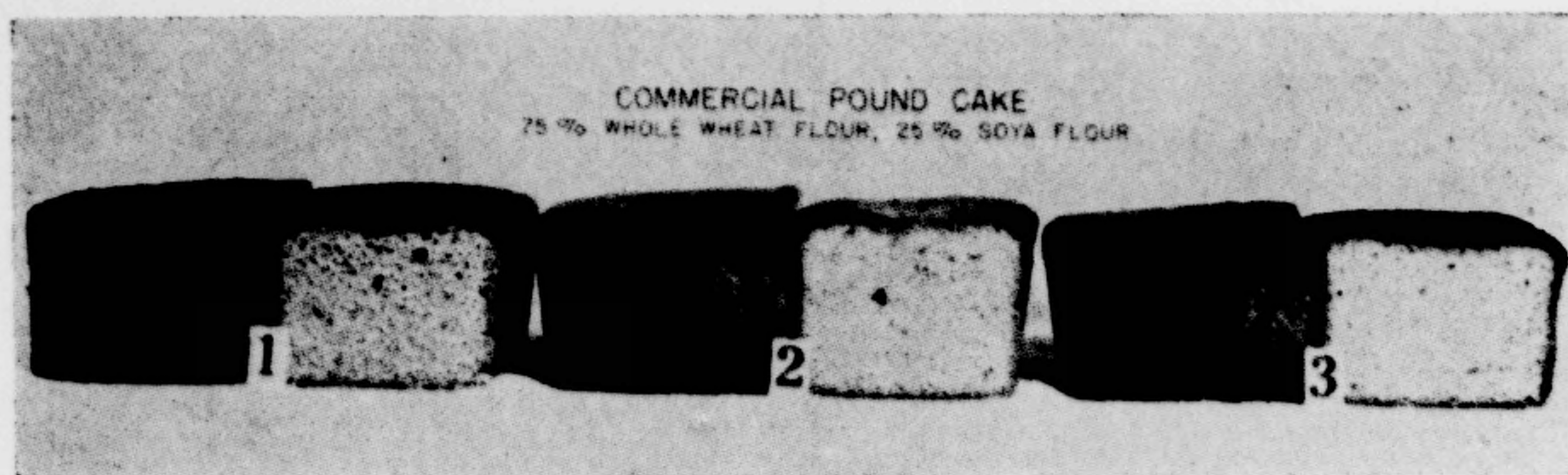
<i>Bread (80-20)</i>	Water	Protein	Fat	Carbohy- drates	Salt Free Ash
Wheat Flour	35.6	8.8	2.6	51.2	0.5
Wheat Flour-SOYA Flour (high fat)	36.8	13.2	5.2	42.5	1.1
Wheat Flour-SOYA Flour (low fat)	36.8	14.8	2.7	43.8	1.3
Whole Wheat	37.3	9.1	2.9	47.9	1.5
Whole Wheat-SOYA Flour (high fat)	38.2	12.6	5.3	40.9	1.8
Whole Wheat-SOYA Flour (low fat)	38.2	14.1	2.8	41.5	2.1
<i>Plain Cake (75-25)</i>					
Wheat Flour	18.5	6.7	12.9	60.5	0.9
Wheat Flour-SOYA Flour (high fat)	18.2	9.5	14.7	55.8	1.4
Wheat Flour-SOYA Flour (low fat)	18.2	10.6	13.0	56.5	1.5
Whole Wheat Flour	19.4	6.7	13.0	59.0	1.4
Whole Wheat-SOYA Flour (high fat)	19.6	9.3	14.6	54.3	1.7
Whole Wheat-SOYA Flour (low fat)	19.8	10.4	12.9	54.7	1.8

Commercial Pound Cake (75-25)

Wheat Flour	15.5	7.5	19.3	56.5	0.6
Wheat Flour-SOYA Flour (high fat) ..	16.4	9.8	20.5	51.8	0.9
Wheat Flour-SOYA Flour (low fat) ...	16.5	10.7	19.0	52.0	1.1
Whole Wheat	16.5	7.4	19.2	55.2	1.1
Whole Wheat-SOYA Flour (high fat)	16.9	9.8	20.6	50.8	1.3
Whole Wheat-SOYA Flour (low fat) ..	17.8	10.6	18.8	50.8	1.4

Cookies (50-50)

Wheat Flour	3.3	6.4	16.8	72.0	1.0
Wheat Flour-SOYA Flour (high fat) ..	5.3	12.4	20.3	59.7	1.9
Wheat Flour-SOYA Flour (low fat) ...	8.6	14.5	15.9	58.8	2.0
Whole Wheat	8.2	6.3	16.3	67.5	1.5
Whole Wheat-SOYA Flour (high fat)	6.0	12.4	20.3	58.7	2.1
Whole Wheat-SOYA Flour (low fat) ..	7.1	14.8	16.3	59.0	2.4



CHEAP SOURCE OF CALCIUM

As is well known by students of human nutrition, calcium is one of the elements that is most apt to be deficient in low cost diets and hence a small addition of calcium to our bread should be regarded with greatest favor. At present prices and under present economic conditions it is probably difficult in the case of millions of our population to secure even the minimum requisite of calcium, not to mention vitamins and high quality protein.

The importance of having bread containing 50 per cent. more calcium than is found in ordinary bread is recognized by physiologists. SOYA flour is one of the cheapest sources of calcium known. 100 grams of calcium in SOYA flour costs about 1/15 as much as it costs in wheat flour and 1/3 as much as it costs in milk.

The use of SOYA flour with wheat flour in baking increases appreciably the calcium-phosphorus ratio. SOYA flour has a calcium-phosphorus ratio of 1:2.5; wheat flour, 1:7; rolled oats, 1:6; rice, 1:10; wheat germ, 1:13. The protective foods, viz., vegetables, fruits, dairy products, and eggs, have for the most part a narrow calcium-phosphorus ratio, varying, e.g., from 1.08 in milk to 1:3 in eggs.

PRODUCES ALKALINE RESIDUE

The use of calcium-containing food such as SOYA flour likewise improves the acid-base qualities of foods made therewith.

Recent studies by Davidson of the Food Research Division show that the excess of base-forming elements over acid-forming elements in 100 grams of soybean meal will neutralize approximately 25 cc. of normal acid, whereas the excess of acid-forming elements over base-forming elements in 100 grams of wheat flour will neutralize about 7 cc. of normal base. In other words, SOYA flour gives an appreciable alkaline residue while wheat flour residue is slightly acid.

SOYA flour contains a greater concentration of the essential food elements so nec-

essary for human nutrition than any other common food. Further, it is practically free from starch, the one element that is found in superabundance in the diet of the masses of the people. The high calcium content of SOYA flour and the alkaline reaction of the ash are added reasons why SOYA flour should be classed with the protective foods.



Of the 20 or more amino acids which constitute proteins, 9 are, today, regarded as essential for the growth and maintenance of the animal organism. Most of these are found in the soybean protein—besides, of course, appreciable amounts of most of the other amino acids. SOYA flour protein costs only 6 per cent. as much as meat protein and 7 per cent. that of milk protein.

PROTEIN MORE EFFICIENT

Several years ago Johns and Fink of the Bureau of Chemistry found as the result of experimentation with rats that SOYA bread (75-25) contained a protein mixture and water soluble vitamins adequate for normal growth; that the protein from such bread was 2-3 times more efficient than that from ordinary white bread. While no such experiments have been conducted with cakes, cookies, etc., there is every reason to believe that what is true of SOYA flour-wheat flour protein in bread would likewise apply to cakes and cookies.

Besides being suitable for use for all kinds of baked products, SOYA flour or soybeans can also be used in breakfast foods, diabetic and infant foods, in pancake and self-rising flours, macaroni, doughnuts, pretzels, soy sauce, pâté de foie gras, potted meats, meat loaf, and spreads, mayonnaise, soups, confectionery, beverages, coffee substitutes, beer, milk, cheese, ice cream, dog food, besides numerous industrial products. It is understood, of course, that food products containing SOYA flour should be properly labelled.

The use of SOYA flour as a component of diabetic foods is due largely to the low starch content—less than 2 per cent. The content of lecithin makes SOYA flour a particularly valuable food, the phosphorus being an essential constituent of all the vital organs and nervous tissue of the body. Lecithin plays a favorable role in baking probably because it permits of a more even distribution of the fat or shortening used. That may account for the fact that, generally speaking, bread made with appreciable amounts of the whole bean flour or expeller flour is superior to that made with low fat SOYA flour.

THE POTENTIAL SOYA BEAN FLOUR MARKET

The commercial baker makes 8-9 billion pounds of bread yearly. An even larger

amount of bread is baked each year by the housewife, railroad and steamboat companies, hotels and eleemosynary institutions together. Some 500,000,000 pounds of macaroni are manufactured every year. The biscuit and cracker manufacturers use some 5 million barrels of flour. Over 5 million barrels of self-rising and pancake flour is the yearly output; the amount of flour utilized in the manufacture of sweet goods is approximately 10 million barrels. For most of these products as much as 20 per cent. of SOYA flour could be used to advantage. The total potential output of SOYA flour that could be used with wheat flour is well over 15 million barrels. But that is not all. About a billion pounds of sausage are made per annum. At present, cereal products to the extent of 3 per cent. can be legally admixed as a filler, with sausage meat. If SOYA flour were a permitted component of sausage meat the potential amount that could be then used is 150,000 barrels. Then there is the brewing industry. Recent work indicates that SOYA flakes or flour improve the foam stability and other characteristics of the beer. At the rate of 1 pound SOYA flour per barrel, the amount of SOYA flour that could be used by the brewing industry is 250,000 barrels.

The foregoing does not take into account the quantity of SOYA flour or soy beans that could and should be used for the manufacture of SOYA milk to be made in localities distant from the dairy centres. The experience of the Far East countries fully proves that cow's milk need not be a component of human nutrition. Products of the soy bean can be utilized instead.

Furthermore, the soybean itself might well be used in the preparation of a coffee substitute and thus replace some of the 1,500,000,000 pounds of coffee imported yearly.

All in all, no other product has such possibilities for expansion as the soybean.

BAKING INDUSTRY NOT SCRATCHED

The annual production of SOYA flour at present probably does not exceed 100,000 barrels, most of which is used in the meat industry. The field of baking has not yet been even scratched. The baking industry could well use 100 times more SOYA flour than is being used by it at present.

I should not close without in some way impressing upon you the important role which SOYA flour can and should play in our diet. On the average, in this country, fully 70 per cent. of the food consumed is mineral- and vitamin-poor or deficient. Sherman states that fully 50 per cent. of our diet should be mineral- and vitamin-rich, i.e., from protective foods. If the average diet consists of only 30 per cent. (at most) of protective foods, what about the diet of the 20 million on relief and of the 10-20 million on the border of relief? According to the League of Nations Mixed Committee on the Problems of Nutrition, in no country of the world does the whole population attain the physical standard desirable, so widespread is defective nutrition. Not only is this due to poverty of the masses, but the ignorance and mismanagement of a large portion of those who have plenty of means are also responsible for much of the malnutrition. It is notorious that the people on the East side of London live largely on bread, jam and tea. In this country the poorer classes live little better, from the standpoint of adequate nutrition. Even the well-to-do working classes live largely on meat, bread, potatoes, pie and coffee. The use of SOYA flour would improve this diet immensely.

IMPORTANT ROLE FOR SOYA

The League of Nations Committee further states that deficiencies in diets are usually due to a lack of sufficient protective foods, which, of course, are the expensive foods based upon the amount of nourishment they supply. It is manifestly impractical to supply such foods in adequate amounts to people on relief and the poor can ill afford to purchase a sufficiency of the ordinary protective foods for proper nutrition. Here is where SOYA flour, which is cheap, could play an important role. One pound of SOYA flour is equivalent to 2 pounds of meat in protein content. To the extent that people

might consume one-half pound of SOYA bread per day instead of ordinary bread, the extra amount of protein in the SOYA bread is sufficient to replace a quantity of protein in over $\frac{1}{4}$ of the daily intake of meat on the average. Meat protein costs 5 times that of SOYA protein.

It is possible by the use of SOYA flour to secure for the masses on relief and for those with meagre means, a supply of the food-essentials so necessary for the well-being of the human body. In advocating so enthusiastically the greater use of SOYA flour, it should not be construed as an attack on other food products. The fact that SOYA flour is to be used largely with wheat flour need not necessarily lead to a lesser consumption of wheat. I am mindful of the fact that when the baker began to make bread containing 20 per cent. or more of raisins, there was a decrease in the consumption of bread. On the contrary, it is the general opinion that many people ate the raisin bread when they would not have eaten the ordinary type of bread. To that extent the addition of 20 per cent. or more of flour substitute in the form of raisins resulted in an actual increase of wheat consumption.

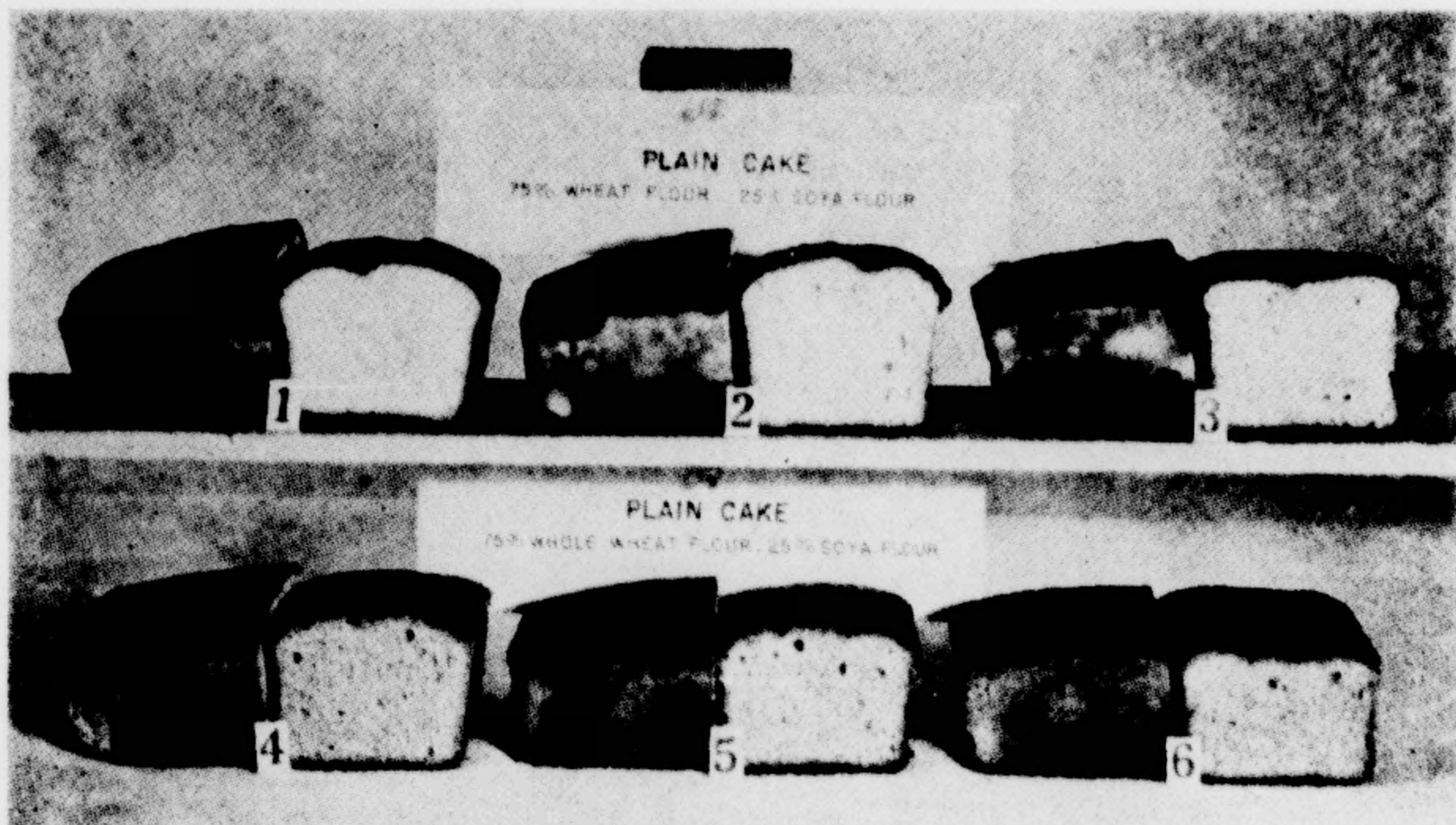
The baker and miller should also bear in mind that flour consumption in this country is far below that in many European countries. France, Belgium, Great Britain, e.g. consume on the average 35 per cent. more bread per capita than we do. If this country consumed as much bread per capita as the average in the countries just mentioned, the mills would grind 680 million bushels instead of 504 million.

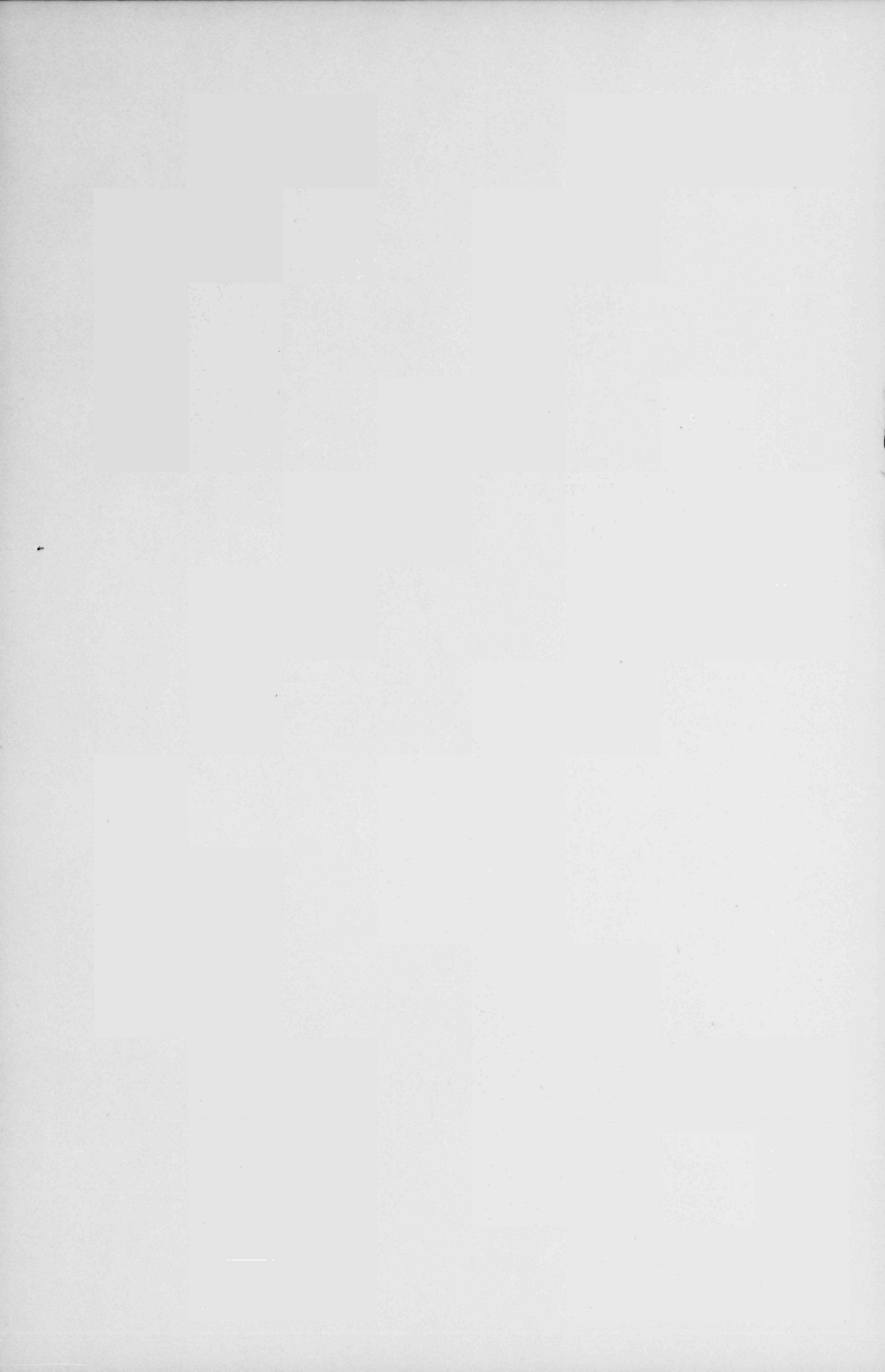
SHOULD HELP FLOUR CONSUMPTION

It should be remembered that the decline in the consumption of flour in the last 30 years has been over 25 per cent. viz., from an average of 225 pounds per capita to 165 pounds. The production of special breads, special cakes, special cookies, etc., all of which have a peculiar appetite appeal, may well stimulate the greater consumption of these products. It is our belief that SOYA bread, SOYA cake, SOYA cookies, etc., are not only richer in high quality protein, minerals and vitamins than are the same products made of wheat flour alone, but they do have an appetite appeal and their production should lead to the greater consumption of wheat flour.

The baking of white bread may well remain the lode-star of the bakers' business but there is certainly a wide field for special breads and other special baked products.

SOYA flour and wheat flour are natural allies—not cut-throat competitors. The use of SOYA flour and wheat flour together for most purposes will redound to the benefit of not only the consumer but the miller, the baker, and the farmer as well.





Monday

November 16, 1931.

Attention Dr. Kellogg:

Enclosed is a summary of an article by Dr. Lewis on the subject you mentioned. Dr. Lewis' work in recent years seems to have been in relation to vessel spasm and the origin of pain. If you wish further abstracts along this line please let me know. The present paper is the only one (recent) that takes up the matter of peripheral neuritis.

I am planning to leave Battle Creek Friday unless I hear from you to the contrary.

Sincerely

Luigi G. Berzallo

Centripetal Paralysis Arising out of Arrested Bloodflow to the Limb, Including
Notes on a Form of Tingling

by

Thomas Lewis, George W. Pickering and Paul Rothschild
Heart, 16:1, October 7, 1931.

If the circulation in the arm is arrested by means of a pneumatic cuff placed on the upper arm for many minutes, and the cuff pressure is then released, tingling of the variety popularly known as "pins and needles" soon occurs. These pricks increase in number and intensity when the fingers are touched or tapped against solid objects.

The duration and intensity of tingling is influenced by the length of previous circulatory arrest. Using cuff pressure on the upper arms, an arrest of 10 minutes is always followed by tingling that begins 45 to 70 seconds after release, comes to its height in $1\frac{1}{2}$ to 2 minutes, subsides gradually, and ends about 4 to 6 minutes after release. If arrest is longer, the time at which tingling begins tends to shorten and the tingling is more severe and lasts longer.

Tingling nearly always begins in the fingers, usually in the tips; after the longer arrests it frequently extends into the hand and may even wander up the forearm a little way above the wrist.

Tingling is not due to a return of blood to the vessels of the parts in which it is felt. Observations show that it is not due to recovery from pressure on the nerves. Nor is it caused by a return of bloodflow to the nerve endings in the skin where it is felt, not to any other change in these.

It is caused by a condition developed in the main nerves during their recovery from loss of blood supply.

It is well known of peripheral neuritis arising out of various forms of poisoning, that the disturbances of sensation and the loss of power appear first in the distal parts of the limbs, that on the motor side the tendency is for the extensors to become affected before the flexors, and that the symptoms in

progressing invade more proximal parts of the limb and that the trunk remains relatively immune. In these forms of neuritis all parts of the body are exposed to a toxic agent but there is discrimination. The form of paralysis resembles in type the centripetal ischemic paralysis studied by the authors, and it is difficult to believe that they are brought about in ways that differ fundamentally. It is suggested that the common factor is increased susceptibility of the nerve fiber to certain forms of damage as it is traced away from its peripheral ending.

It is suggested further that it may be proper to regard numbness developing in the finger tips and weakness or paralysis of distal muscles in the limb more rigidly than these symptoms have been regarded hitherto, as evidences of an affection of the peripheral nerves.

The observations establish the time relations of numbness and other symptoms of nerve damage arising out of vascular obstruction upon a reasonable basis. If a blood ^{clot} lodges in the main artery of a limb, obstructing it, or if the main arteries of a finger or of a larger part of the limb enter into a spasm sufficiently intense to arrest the bloodflow; then sensory and sometimes motor disturbances occur in the corresponding territory. They are of the centripetal type and form an exact parallel to the paralysis of the authors' observations. It is important to understand that such disturbances do not develop at once, but after intervals of time that depend upon the length and temperature of the nerve that has lost its blood supply.

The view that in Maynaud's disease the fingers become white and numb at the time of loss of circulation and that this numbness is due to primary disturbance in the central nervous system is proved erroneous by the authors' observations.

The numbness is due to arrested bloodflow and occurring in cold fingers appears only after a very long delay.

(Since the paper was completed one of the authors by coincidence developed a brachial neuritis, associated with tingling of the type described. The tingling

is felt in the finger tips mostly and declines as it is traced into the palm; it is referred more to the palmar than to the dorsal surfaces of the fingers; it becomes exaggerated when tactile stimuli are applied to the finger tips. This the authors feel that their observations possess a real relevance to peripheral neuritis.)

In summarizing the authors state:

If the circulation to an arm is arrested, the limb after a time ceases to function owing to paralysis of its nerves. It is the nerve itself and not the ending that is affected. Loss of tactile sense and of sense of position is early; it begins distally and spreads centripetally. Appreciation of pain, heat and cold is maintained much longer than is the tactile sense. The motor apparatus is affected in centripetal order. Extensors suffer before flexors. The pilomotor nerves long retain their function. Recovery from ischemia is rapid and the order of recovery is the reverse of the order of involvement.

Evidence is presented to show that the nerves (sensory and motor) become more sensitive to ischemia as they are tracted back from their endings toward the central nervous system. No evidence has been obtained that ischemia produces conduction with decrement.

The rate at which given nerve fibers cease to function is affected by their temperature.

If nerve and muscle have been exposed equally to a toxic influence, and it is found that the muscle responds to direct stimulation but not to nerve stimulation, a conclusion that the neuromuscular junction is at fault is not justified. The fault may lie in the nerve trunk itself as ischemic paralysis illustrates.

It is suggested that centripetal paralysis is particularly correlated with peripheral nerve affections and that tingling of the type described may be a symptom characteristic of a specific type of change in the peripheral sensory nerve paths.

HOW TO PREVENT CONTAGION IN SCARLET FEVER.

BY KATE LINDSAY, M. D.

(Concluded)

WHEN preparing a room for a case of scarlet fever, it should not be forgotten that during the scaling time all things in the room are liable to be saturated by the infection; also that anything taken from the room is liable to carry with it the infection; therefore all clothing, bedding, dishes, wash-water, and slops from the room should be disinfected. If there is a fire in the room, in an open grate or a stove, all food left over, all dust and waste that is dry, should be burned at once. If possible, the sick-room should have an outside door, and the one which opens into the hall should have a sheet wet in a solution of bichlorid, 1-1000, hung over it, and all the cracks shut up by pasting paper over them. No carpet or any upholstered furniture should be left in the sick-room, as it can never be disinfected so as to be again made safe for use. The nurse should have two throat and nasal sprays, one for herself and one for the patient. The sick-room should never be swept with a dry broom, but the dust wiped from floor and furniture with a cloth wet in the disinfecting solution.

After the first case has appeared in a school or family, all the children who have been exposed to the contagion should be placed in quarantine for a week, away from the one already ill, and also away from others who have not been exposed. The temperature of each one should be taken three times a day, and their throats examined as often. If any child has a rise of temperature, or shows the slightest sign of sore throat, or complains of being ill in any way, it should

at once be put in a room by itself and carefully watched, and also examined by the doctor. With proper care in this respect no other members of the family need be infected. Other children in a family where one member is ill with scarlet fever should not attend school unless they have been taken away from the house, and kept in quarantine for ten days.

If an epidemic of the disease breaks out in a school, the schoolhouse should be shut up and thoroughly cleansed and fumigated before it is used any more. The walls and floors and all the furniture should be thoroughly cleansed. All slates, sponges, and books should be burned; it is cheaper to buy new ones than to spread the infection. Contagious disease often spreads in a school from the uncleanly habits of the scholars in chewing each other's gum, and in putting pencils and other things in their mouths which have been saturated with the saliva of others. No one should ever practise the disgusting habit of making the mouth a general catch-all for pins, needles, nails, tacks, buttons, and other such things. Silver money is another thing which is often put in the mouth; and when one thinks into how many dirty pockets and mouths it has been, it is not strange that it should be the means of spreading the infection of contagious diseases. Yet fathers will often give their little ones silver money as a plaything, and that without either disinfecting or washing it.

The open water-pail and common drinking-cup at school are another source of danger, not only for spreading acute

so foolish as to argue that unremitting work—work beyond the strength, work unrelieved by proper diversions—could prove of benefit. But properly limited, it is the salvation of man. To find one's

work is the first duty of life, and to throw his whole heart into it is the second. He is the happy man who works. He is the successful man who works best.—*Minneapolis Times*.

A Manual Training-School for Women.—There has just been established in the city of New York a manual training-school for women and girls, the first school of its kind, so far as known. No fees are to be charged where applicants are in needy circumstances. The *Outlook* makes the following comment on the idea of manual training for women:—

“This [school] meets one of the greatest needs of the young women of New York. It is interesting to note that the leading instructors in manual training for women lay stress more and more, as the years go by, on the moral effects of such training. It is difficult to make the general public realize this great fact. The hand cannot lie. Recently the head of the Domestic Art department at Pratt Institute made this statement with regard to instruction in millinery: ‘The milliner must make her design clear to herself before beginning, either by imagination, by a sketch, or by a model; sometimes by all three. She must have the manual dexterity so to cut, make, and design her materials as to express this idea the first time she tries. This requires a quick eye, a firm, delicate touch, and decision of character.’

“Of the use of a sewing-machine the rector said: ‘It teaches a girl self control, a steady, firm touch, ingenuity, and some knowledge of machinery.’ It is not merely for skill or wage-earning that manual training is designed. It has in it all that is necessary to train the whole nature, and this is its chief value; it is a promise of higher citizenship and better homes.”

Hard Work Does Not Kill.—Edward W. Bok says to young men: “Don’t get the notion that hard work kills. It doesn’t; it can’t. Work may tire, but that is all. Then you must rest. What good, hard work does is to make solid men. The healthiest men in the world are the men who work hardest. It gives them appetite for their meals, and brings refreshing sleep. Work all you like and can, only don’t worry, and don’t keep late hours. It is in the latter two points that danger lies; not in work.”

No organ of the body should be strained to its utmost. There should be always kept on hand some “reserve force” for every power. This is true especially of the vocal organs. A good voice has been utterly ruined by one effort to reach the extreme limit of its capacity. Many a man has ruined a good physical constitution by a desperate effort to outdo everybody else.

IF we look down, then our shoulders stoop. If our thoughts look down, our character bends. It is only when we hold our heads up that the body becomes erect. It is only when our thoughts go up that our life becomes erect.—*Alexander McKenzie, D. D.*

MISS CHRISTIAN E. YATES, of Oakland, Cal., is probably the oldest woman who rides a wheel. She is eighty years old; and although she has learned to ride within a year, is already a skilful bicyclist, and can cover a long distance without fatigue.

Horace Greeley

"I recall his telling that the word 'intoxication' came from the Greek word that meant 'poison'; that when the Greeks saw one of their number reeling down the street they cried, 'Toxicon'--'Poison, poison! He's poisoned'--and Greeley continued shouting the word 'poison' until it became a shrill word of admonition to his hearers. He told them that he had taken the pledge in the year 1824, when he was thirteen years old; also how in those days the good clergymen used to make twenty calls a day and take a drink at each stopping place; how the entire community got drunk when one pastor was installed, and how everybody chided a poverty-stricken fellow who did not furnish drinks at his child's funeral. At this his listeners laughed, and Greeley told them in all seriousness that it was no laughing matter."

Chester S. Lord, Member of the Sun's Staff for Thirty-Two Years,
in The Saturday Evening Post, July 30, 1921.

WHY I WON THE RACE IN THE ENDURING WALKING MATCH
FROM DRESDEN TO BERLIN.

Karl Mann.

I will speak in another article of how I perfected the technique of my gait so as to use the minimum amount of energy. Prof. Zuntz who is one of the foremost leaders in physiological research, was astonished by my method of utilizing the trunk muscles in walking. Boege and I had practiced this in the rehearsal march for the purpose of testing breathing, etc. He regarded my gait, which is somewhat military with a long stride and a slight bending and falling forward of the limb as it takes the stride, as very well adapted to the purpose, and gave me a satisfactory explanation for the superiority of this technique in covering great distances rapidly and uninterruptedly without taxing the muscles or the lungs and heart.

Indeed I am sure today that I could walk from Berlin to Vienna a distance of 580 km. (360 miles) in at least 5 days, taking 6 hours for rest every 24 as prescribed, and could probably make it in the race in 4 days. In regard to the two vegetarians who won the race in 1893, walking from Dresden to Berlin in 7 days without practicing this technique, it was a remarkable feat. I would consider it unnecessary extortion to walk a distance of over 100 km (62 miles) in the unnatural, forced English gait, i.e. with legs almost stiff and arms swinging high at the sides. There is not the least common-sense or advantage in it. Even the best walker can not cover a distance of ~~km~~ 50 km. (31 miles) in my time limit, without the exertion of his full strength if indeed he be able to accomplish it at all, while with the more military gait that distance is easily covered.

To preserve freshness and vigor throughout a long race, massage the limbs every 50 km. This suffices to keep the muscles in good re-

pair and prevents cramp and stiffness.

It is important also to have perviously hardened the feet by going barefoot, daily, bathing them in cold water, taking various exercises to develop the muscles, and not forgetting the special care of the nails.

According to my experience, the shoes must have the exact shape of the foot and must be very porous. I always wear a coarse knotted mesh shoe made of hemp and having strong soles of elastic leather with thick rubber heels.

The socks are better too narrow than too wide to avoid blisters caused by the presence of folds, they should be porous, nothing is worse than when the skin of the heated feet becomes soft and almost spongy, because the ventilation is not good. My feet were in as good a condition at the end as at the start of the race.

It is hardly necessary to state that the less clothing one wears the better. The head should be bare, a coarse net shirt without sleeves and gauze-like knee pants are sufficient.

I took nourishment a little at a time, something every two hours, with lemonade or diluted fruit juice every hour. The 7 1/2 pounds that I lost ~~were~~ on this march were regained in two days. Because of its scientific value I confined myself to quite a strict fruit diet, beginning in January, avoiding pulse, eggs, cheese, milk, butter, and cocoa, and in the place of this very nutritious diet I used nut preparations--that is so-called nut butter prepared by a mechanical process of grinding, from peanuts, hazelnuts, almonds, etc. after Kellogg's method. This product is very rich in albumin and fats and easily digested and economical. Because fresh fruits were not plentiful in April, I took unfermented grape juice and other fruit juices as these represent fruit in a liquid form. Dried fruits I used very seldom.

In conclusion, I wish to state that my ideal of physical and intellectual perfection, toward which I aspire as a man of culture and progression, is not that of strength alone but strength combined with an average amount of endurance, which ought to be increased without the use of stimulants; such rapidity as is required in a 400 m. race; the swiftness and alertness necessary for a sudden start on a 100 m. race or in a match game like tennis; complete control of the various parts of the body and a feeling of confidence in the ability to accomplish the feat undertaken.

We must strive to reach a high standard of physical and intellectual ability. Every man can do this for himself, although a very busy person. He need not be a Rentier. The preservation of strength depends upon the proper use of each part of the body. If one part is less strong than another, the whole body may be saved from suffering by the exertion of strong will power in such a manner that the maximum strength of the healthy organs may be utilized. Simple sportive ambition to the detriment of bodily health is not to be encouraged. The goal must be set high, for it is only then that it is worth running for.

ARTICLE IN SCIENCE, Jan. 8, 1937, by Ira A. Manville
"THE INTERRELATIONSHIP OF VITAMIN A AND GLUCURONIC ACID IN MUCINE METABOLISM"

A deficiency of Vitamin A is known to produce metaplastic changes in the mucous epithelium. A reduction in the amount of mucus exposes the lining of the stomach, pylorus and large intestine, especially, to injuries produced by the solid components of the food or feces. Results in capillary bleeding, hence blood in stools. Occult blood in feces is earliest evidence obtainable of vitamin A deficiency.

Portion of mucin molecule is glycuronic acid. In vitamin A deficiency lack of adequate mucus due to insufficiency of glycuronic acid as well as lack of protein. Two sources of glycuronic acid (a) endogenous sources synthesized from glycogenic amino-acids (b) exogenous sources in food material. Very great importance in these exogenous sources in vitamin A deficiency and lack of mucus cases.

Experimental animals with lack of glycuronic acid showed ulcerations in stomach, pylorus, gall bladder, small and large intestine. These ulcers showed marked resemblance to those occurring in vitamin A deficiency.

Seems probable that an ulcerative condition in the gastro-intestinal tract is due to toxins in body which can only be detoxicated by conjugation with glycuronic acid. Vitamin A involved somehow in his mechanism. Vitamin A deficient animals benefited by being fed whole apple, but benefit may not be altogether due to Vitamin A alone.

It appears that Ira A. Manville, of the Medical School University of Oregon, has done considerable research in the Vitamin A potency of apples. I would suggest that you write him.

ARTICLE IN "AMERICAN JOURNAL OF NURSING," July 1934, by Jean L. Rowley, R.N.
"RAW APPLE DIET IN TREATMENT OF DIARRHEA"

Value of raw apple in diarrhea first noted in Germany. In World War German army camp ravaged with epidemic of dysentery. Soldiers went into nearby orchard and ate apples. Those eating apples had much shorter and milder cases of dysentery than did non-apple eaters.

Raw scraped apple (500 - 1,500 grams daily) has proven most efficacious in stopping diarrhea in infants and children. Apples can be put thru meat grinder or fine grater.

- Result:
1. Mucus disappears in 24 - 60 hours.
 2. Pain not increased, usually disappeared completely.
 3. Toxicity cleared up in 24 - 36 hours.
 4. Stools in 24 hours or less.
 5. Temperature normal in average time of 48 hours.

Apple diet especially good in cases of enteritis, diarrhea due to parenteral infection, diarrhea due to dietetic causes, and subacute colitis.

Theory behind apple diet: Apple pulp not irritating to intestines; is absorbent in intestines; efficaciousness may be due to antiseptic value of malic acid; (Skin must be included in diet) pectin's colloidal property has power of absorbing poisons; its magnesium and calcium content act as inhibitor of peristalsis.

Apple diet for diarrhea cases not used much in United States, much more in Europe.

ARTICLE IN "AMERICAN JOURNAL OF DISEASES OF CHILDREN," Jan. 1933, by Tobias L. Birnberg, M.D., St. Paul.

"RAW APPLE DIET IN THE TREATMENT OF DIARRHEAL CONDITIONS IN CHILDREN"

Long been used by pediatricians in Germany with uniform beneficial results.

Birnberg used apple treatment for diarrhea in 70 cases. Patients ranged

from 9 months to 11½ years of age.

Types of diarrhea present in these 70 cases were enteritis, parenteral dyspepsia of dietetic origin, and subacute colitis.

Predominating symptoms noted in group were fever, frequent loose stools, abdominal pain, toxicosis and convulsions.

Effect of apple diet: Fever reduced, number of stools reduced, formed instead of loose stools, disappearance of mucus, prompt reduction of pain, disappearance of toxicity.

Authorities differ as to the why of these benefits. In addition to claimed benefits of malic acid, tannic acid, pectin, etc., there may be unknown physiologicochemical processes involved, but whatever the reasons the results are undeniably and demonstrably beneficial.

Birnberg says: "The introduction of grated apple pulp represents a valuable addition to the armamentarium in the treatment of diarrheal conditions in children. Its action is not empiric, but involves a number of mechanical, physiologic and chemical principles. The ability to inhibit intestinal peristalsis accounts, in part, for the prompt response following its administration. Of marked importance are its maintenance of nutritional requirements and its power of preventing serious loss of water, which is so much desired in the treatment of diarrhea."

IN "AMERICAN JOURNAL OF DISEASES IN CHILDREN", Jan. 1932, Katharine Dodd, M.D., et al., of Nashville, Tenn., tells of great epidemic of children's diarrhea in Tennessee in summer of 1930.

Says medical profession in Nashville quite helpless before this epidemic, for ordinary measures did not work. Says injections of calcium gluconate (intramuscularly) proved best in the cases treated in her clinic.

No mention of apples or other dietetic measures.

In "Journal of the American Medical Association, September 28, 1935, in section, "Queries and Minor Notes," this reply is made to a doctor asking for methods of preparing the raw apple diet for children with diarrhea:

"More (1929, 1931), who established the raw apple diet as a means of treating diarrhea, used thoroughly ripe, peeled and cored apples and converted them into a reddish brown pulp by rubbing them on a grater. From one to four tablespoonfuls or more of this pulp was given every hour or two, the average quantity administered in the twenty-four hours being thirty tablespoonfuls. For forty-eight hours no other food or medicine was given; excepting that a little water or weak tea was allowed if the patient was thirsty. If the patient was dehydrated, physiologic solution of sodium chloride with or without dextrose was administered. Banana pulp may be added to the apple, if the latter is refused. It makes the apple pulp more palatable. After the third day a transitional diet is used by adding toast, cereal and potato gruel, scraped meat and cocoa."

The Garra's Assam

A Talk at the Sanatarium Parlor, Battle Creek, Mich.

Sabbath, Feb. 17, 1912, at 4 P.M.

by

Rev. Walter C. Mason

In the time allotted to me this afternoon, dear friends, I want to introduce to you a corner of the earth that I fear many of you do not know, because India is a land of many nations and many peoples, and you really must know the condition of each locality if you are to understand. You heard last Tuesday from the missionary here from Rajputana. I came from Assam, away in the northeast corner. The Brahmaputra River flows through and empties into Bengal. In that province of Assam, there are estimated to be forty different languages. That is one of the great obstacles of mission work, especially educational work.

I work among the very small people there, and so before telling of them I want to specify still farther, for in the words of the scientist, to focus your attention to a very minute corner of the earth and to the people of this great empire. That is, I am not going to speak even about the people of Assam, because they number about ten million at the present time, and these Hill people number only about one hundred thousand. They are entirely different in race, social customs and in religion. The Assamese people number probably eight or nine million, are of Aryan stock, mostly Hindoo in religion and are related thoroughly with the peoples of Central and Southern India, and with the great majority of the people of India, but to the north in this province the Assamese in the mountains that run eastward through the northern part of Burma, and also through into West China, you will find a great number of Hill tribes. These are of ~~the~~ Mongolian descent. They are not Hindoos at all, except a few on the edges of the country who have come in ~~with~~ ~~the~~ ~~Hindoo~~ ~~religion~~. They are known as Spirit worshipers. The Garras among whom it has been our privilege to labor are western-

most of these Hill tribes. They are located right in the bend of the Brahmaputra as it turns from flowing westward to southward into the bay. It is a tribe numbering about ~~150,000~~ one hundred and fifty thousand, and this district known as the Garra Hills is about the size of the State of Rhode Island, so what I say about the Garras does not apply at all to the Assames, much less to the peoples of India, because if I had the time I should like to tell you something about their social customs to show you that they are as different from the Assames and the India people in their way as we are.

I might mention that the Garras are one of only two tribes in all of India, so I think I am safe in saying in all the world, that have the matriarchal system, that is, the woman is the head of the family. I made this statement about a year ago, and I was very much amused later to see it reported in the State papers in glaring head lines that here was a man who came from the land of the suffragette, and it is not untrue, in a way, when I tell you that the woman holds the property. No man can hold property except in the name of his wife. The children are named from the mother, so the genealogy is traced from the mother's side. The husband's relatives count for nothing, whatever, and although this pertains, and you might think the woman would have the ruling voice in the ~~house~~ family, this is not the case. It is one of those paradoxes which everyone who has lived in the east is perfectly familiar with, because if the wife does not choose to obey the injunctions of her husband, he does not hesitate to beat the life nearly out of her, and you would think she would make some very material remonstrance, having charge of the purse strings, but she does not. I want to tell you about these people because I believe that nowhere in mission history will you find a chapter of the ~~of the~~ working of God's Spirit among human hearts that is more interesting. These people are people chosen of God, and among whom the work was begun by his own spirit, I might say, without human help, outside of themselves, but before I tell of that I want to tell you in a few words, their condition before any christian work was begun there,

a sight showing the spirit worshipers are animistic as they are technically called; that is, they worship evil spirits. If you ask them if they do not believe that there is a good God somewhere, they will say "Oh yes, yes. He created the world; He created us; He gives us our crops; He gives us ^{the} sunshine and the rain; He wants us to be healthy and happy; in fact He gives us all the blessings of life", but somehow they do not know how He has become detached from his creatures. His power has been usurped by a large multitude of spirits whose only ambition and desire is to bring plague and pestilence and calamity of all kinds upon mankind, and so it is that their religion consists entirely of sacrificing these evil spirits, and you can readily see the natural condition from that. When the ~~family~~ crops are fine, when the family or the villages are in good health, and everything is prosperous, religion is below par, but when there is a great deal of disease, when perhaps there is a famine or a drouth, then religion is at the maximum and everybody is very religious, and the way they will sacrifice regardless of their own ability is something astounding, for, while there is no actual slavery there, we have many times seen men and families that have been held really in slavery by the credit system. They have borrowed far more than they were able to repay and the interest required by the creditors in India is so great that they cannot begin to pay the interest to say nothing of the principal, so they are embondaged to the creditor for life.

I have to show you just a little of their lives. Of course, they are without very much apparel, it being a very hot climate. It is really in ~~the~~ the ~~southern~~ north temperate zone, but on account of the Himalaya mountains, we get the torrid climate entirely, and it is as Elder Tenney said this morning, the province which has the greatest rainfall in the world. There is a rainfall, I believe, of 300 or 400 inches in a year. That province is next to us on the east. We have quite a sufficiency of rain, as we can testify from experience, as we have 150 inches, most of which comes in four months, and when the temperature reaches 90 or 100 degrees and over, you can imagine the humidity and the difficulty of trying to do housekeeping, to say nothing of other things we would like to do. These people, as I said, are practically without clothes, and yet they are very

partial to jewelry, at least the women. I have here the only curio that I carry with me usually, a bunch of earings weighing nearly two pounds, and I present this not merely as a curio to show what they wear but also because it has a religious significance. These are brass and there are about twenty-seven ^{rings} ~~links~~ there all told. When I tell you how they are worn, I hope you will get the figures correct, and will not doubt my veracity. I have scarcely ever spoken to an audience but what someone has really, I think, ~~knocked~~ down deep in their heart questioned the veracity of my statements. They seem so impossible. Everyone of those brass ~~links~~ ^{rings} passes through the lobe of the ear and this is the bunch for one ear only. Now, you may say that is a physical impossibility. Of course, to carry that weight would be a physical impossibility, but to assist the ear they have a piece of cloth going through the bunch and over the head, through the bunch on the opposite side, so the head really carries the weight except when they sag down on the shoulders. On the christian woman, you will find the lobes of the ear sagging nearly down to the shoulder, and I have not infrequently seen ears with holes large enough to put my fist through them, although I have not actually tried it. This is a very small bunch. Some five or six years ago when Mrs. Mason came home she bought two bunches of a woman and that woman gave her eighty rings in the two bunches so she had forty in each ear. The interesting part of this is its religious meaning. Among the spirits which they worship is one, the greatest of all, which they claim is really the mother of their life, their existence. They claim that this spirit stands opposite the road to the spiritual world so that after the person dies and goes to the spirit world and has to pass along this road; (this evil spirit which is also ~~linked~~ by the way the one who swallows the moon occasionally and of course, for that reason is very much dreaded by them) when they come to the spirit they must resort to some stratagem because, if the spirit succeeds in swallowing them it means extinction, and they are no more desirous of that than others, so they resort to these rings, and the more rings—they wear the better, and as they come up to this great spirit they pluck these rings from their ears, and throw them on the ground in front of the

spirit and of course, the rings scatter hither and yon, and while the spirit is busy gathering them up, they skip by, and that, dear friends, is the crude essence of their religion. Some of you smile, but when you take a second thought, is not that rather shocking to think that that is the sum and substance of their idea of religion, that they look forward to death and a life after death and the only chance to gain which is the use of these material things? It is because of that, I believe, and also because they have been trained by this worship of spirits without any material representation that they are so ready for the gospel, the good news, as we translate that word, because I think that is one of God's remarkable provinces that, unlike all the other peoples of India, these people worship absolutely nothing material. They have no temples, no idols, nothing to hinder the transference of their allegiance from the evil to the good in the way of a material object, so that when we preach to them about praying to the outside God, it is no new thing to them and they are ready to do that as easily as we are. They understand. There is no material thing standing in the way and for these two reasons these people are accepting the good news with wonderful rapidity. Before the work began, these people were known as head hunters because they were in very truth thrust out there in their mountain fastnesses with the Indian civilization on the north and on the west and on the south. They were so warlike that constantly not satisfied with their internal warfare they would swoop down on the plains and village, and wipe out villages, taking home the women and children perhaps, or taking home the booty, and killing all, as their caprice might dictate, and so it became a matter of great concern to the British government what they would do with these people because they became a great terror to everybody. Finally a rule was made by the government to take them and since the early part of 1903, they have been under the British rule, and they have been a peaceable, industrious people, as I shall mention a few moments later, but really before the British government began work, God was moving in the hearts of these people in a wonderful way, and it is of this that I want to tell you this afternoon, as well as to mention briefly some of the work as I have seen it in my brief experience.

It was probably away along the middle of the last century when, according to the customs of his forefathers, a little boy, probably nine or ten years old, would go out into the jungle and shoot some small game, or possibly take out with him some peasants or chickens, and sacrifice to these evil spirits, and every time he would sacrifice to the evil spirits he would make this prayer: "The God of Light, if there is such, lead us to thy self." How true that little child shall lead them. He waited and watched and prayed, and it was some months after that that the British government decided on a course of action, that they would civilize these people by educating them free of charge. This little fellow heard that, and he asked his father if he could not go to school, and his father promptly said "No, you will have to stay here and help us to support the family", because they had a large family, so the door was closed in his face, but he did not give up hope. He continued to pray and not long after that, ~~fall~~^{falling} from a tree, he broke his right arm, and as an agriculturist, of course, especially in the very crude manner in which they cultivate, he was a useless member of the family because of the absence of hospitals and surgeons, his arm remained broken, and he was a cripple for life, and his father looked at him in a very different light, having to eat his two meals a day without doing anything to fill the family bin, so he said "Yes, you can go to school." So the little boy, with an uncle about his own age, went to school. At that time there was no written language at all for his people, so when he went to school he went to study in a foreign language, the Assamese, and you can imagine how difficult his progress was. It would be similar to our children going to study in French or German, because the Assamese language is very difficult. So he went to this school, and while he learned the A B C's and the fundamentals, he was looking for his answer to that prayer, and he tried Hinduism and Buddhism, and others, and every time in the end, he found his disappointment the keener until at last after he had finished school, he was living in a house with an Assamese who had entered government service as a civil police and he noticed a little leaflet in Assamese in the corner and he could not understand it very well, but he read it, and reread it, and he asked the Assamese to explain it to him, and he did the best he could, and finally he said

"Where did this come from?" They said "Oh, it came from a missionary away up the province" and that young man and his uncle decided to go up there. They did so and there they met one of the first missionaries of Assam, and they were converted and baptised in 1863. We sometimes read, you know, in the public print that the Oriental is a rice christian, and we who live with them all summer and winter have reason to think differently. What did these young men do? Did they accept christianity for what they could get out of it? What did they get out of it? They left government employ on a good salary with the prospect of a pension in old age, and went back to their native hills to preach the gospel, with no society, no individual, absolutely no human agency behind them. They opened up the jungle in a tract of land about their villages, and started to preach- not even together, that they might have the friendship of one another, but they started into different villages, and what did they get for it? They got what Christ said they would get, persecution. They preached for a few months, and they were driven out, then leaving their villages, they established themselves by the road where hundreds and thousands come to and from the weekly market, putting up their little huts all along, and clearing the ground so they might, by cultivation, make a living and preach, and after three years they had enough young people about them wishing to become christians so that they wrote up to this missionary asking him to come down and examine them, and he did so, and he found them thorough christians in spirit and in outward life, and he baptized them, and the first churches were formed in the Garro Hills.

You remember that as yet no white man had entered that country except that one lone missionary who went to reap the harvest of those young men. Those two churches were formed, and purely as the result of the working of God's Spirit through those young men.


Another very remarkable answer to prayer in the life of that young man came during those early years before he had reaped any harvest at all. When he would

was preaching in the market place, he would go out about a mile and a half from the market into the dense jungle, and there kneeling apart from all human habitation, he offered this prayer: "Oh Lord, if it is thy will, establish on this spot a christian village to be a light unto these people", and on that very spot today stands the church edifice of the largest Garro church, a church numbering over one thousand members, with a Sunday School of over three hundred children, the children supporting two day schools, one pastor and two or three evangelists. So that it is not human instrumentality, but through God's Spirit, I believe, that this has been wrought in these thirty-five years.

The establishment of those two agencies in 1867 was the call to our people here at home, and they sent out missionaries who labored six or seven years, but on account of the climate had to return, and when they returned two other young men were sent out. These were my father and my uncle, who went out in 1874, and established themselves on the outskirts where this government school was first established, because the government would not allow white people to go into the district, and there they labored for one and one-half years, and then asked permission to go in and the government still refused, saying the people were too untrustworthy, and they could not be responsible for their lives, and it was not until three years after they had gone to the foreign field that they were finally allowed to go right into the heart of the Hills where the mission church is now located and where the work has grown from none to over one hundred, where we now have a training school for the training of teachers, pastors and preachers, numbering from two hundred and fifty to three hundred. There were then no books, whatever. We have now the New Testament and Genesis translated into their language. I have a copy of this here. We have a Hymn Book of over three hundred hymns of our own familiar tunes, and in addition we have text books, readers, and a small monthly periodical, a copy of which I have here. It does not compare favorably with ^{world's work} or the Ladies Home Journal, or some of our best illustrated magazines, but it is the best

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we can give for fifteen cents a year, and through that little medium we try to influence the lives of ^{these} people and give them something of an idea of the things that are going on in the great world about them. So this, in very brief outline, is what has been done in these thirty-five years that have elapsed since the establishing of those two churches.

I want in the time that is left me to tell you somewhat of my experience because it has been my privilege, and a privilege it is, indeed, to be at the head of this ^{station, a} School of between ^{and} two hundred fifty ~~or~~ three hundred boys. I would that I could tell you of all of the encouraging things that we have there, to be not only a preacher -I love to preach- but to be right with the people, to try to apply the life and the love of one who can stay  and abide closer than a brother is a privilege than which there is none greater in all creation. These young men come to us without a cent, most of them. They are very poor. They are not supported by their parents because their parents do not want them to be educated. They come to us for work, and we give them such work as we can in Public Works; that is, making and repairing roads, putting up buildings, and anything we can give them, and by working four hours a day they earn their support and training. \$1.50 to \$1.75 a month will buy their clothes, and books, and everything except the roof over their head, which we give them. In that way, they have developed a strong self-reliance, which is of the greatest promise to the work. I confess to you, dear friends, there is a great, almost inestimable difference between the boys we used to turn out when we gave them the money out of hand- we had to do that to begin with. In the very beginning, we had to pay them right out- money out of hand- and they came and sat around, and we tried to teach them what we could. It was somewhat of a joke when some of them would pass by and say "How much are you getting?" "So much". "Oh, I wouldn't stay for that. Make them pay you more." That was ridiculous, really, but nowadays, the boys come there, three hundred or four hundred of them, and we cannot begin to give them enough work, so we take them in and do the best we can, keep them as long as we can- maybe for one or two months, maybe for longer, and if they have

got perseverance enough they may stick through the year.

I wish I had the time to tell you of an experiment I tried the last year I was there in 1909, of self government- the first thing of the kind I ever saw tried among such boys. There was, of course, among them petty thieving, and lots of rule breaking. We tried not to have any more rules than necessary, but we had to have some, and one was that there could be no smoking in the dormitories, because the dormitories were not fire-proof. They are built of thatch and bamboo, and are very combustible, so for self protection, we had to make that rule, and yet I could not force it to save my life. Then along with that, there came some petty thieving, and I wanted to stop that, but I knew not how to get at it, because my teachers were all married, with families, and they did not wish to live in dormitories, and how I could solve the problem I did not know. After consulting with them and some of the leading boys, I thought I would try a scheme which is being tried in this country, I believe in the George Junior Republic and elsewhere, and when I first broached the proposition of a little self-government they almost caught their breath, and they said "that would never work here, you know." Well, it was a new process, but it worked out among the leaders. I had a meeting one Saturday night when the chapel was packed to the doors. Everybody knew that something new was on tap and they wanted to hear about it, and I let those boys argue it out for two solid hours, and the motion was almost unanimously lost when I asked them a few very pertinent questions as to their abilities and disabilities, and what they wanted me to think about them, and the tide soon changed and they voted unanimously to ~~struggle~~ try it, with the result that after two weeks of trial -of course, there were many details to be attended to in the form of a court of judges; there were no policemen; everybody was to be a policeman- after two weeks of trial, there were two boys who insisted upon smoking in the dormitory, and they were sent to the cook house about seventy-five feet lower down in a very undesirable spot where they did their cooking and eating, and it was a very poor place to sleep, but that was their punishment; it was the boys' own choice. Then other boys were expelled from the school and so on, and the whole thing was cleaned up beautifully.

Still when I left in December they were so pleased at how easily it ran and they had never heard of it before.

I want to tell you of some of the boys that go out from there, to show you not what education does, although I am an educational missionary, but I believe, dear friends, that it is the power of God in the human heart that really tells the story. I can only tell of one or two in the time that remains to me. I want especially to tell you of one boy with whom I came into particularly close touch because he worked with me in our own home, and I tell it to you not because he was a stupid boy, ^{but because} although he was a stupid boy, ~~but because~~ he did so much. You know we read in the first chapter of Paul's letter to the Corinthians that God often uses the weak things of the world to confound the strong, and the foolish things to confound the wise, and so on, and this boy worked in our garden for about two years, and when the boy that we employed in our house to do the various little household duties, and so on, left us, we thought we would try this boy in our house. He was so faithful and reliable, and I asked him to come in. It was a promotion in their estimation, although the boy got absolutely no more pay; he worked no more time than the garden boys, but because he lived in the house with a white man. That was a promotion, in their estimation so we let them consider it so, and we invited him in. Mrs. Mason taught him for a week, for two weeks and for three weeks and four weeks, and you know at the end of that time when he tried to make a bed just as likely as not the pillows would be at the foot. If he swept the room, there was a great deal more dirt when he got ~~thru~~ through than when he began. If he filled the lamps, the kerosene was all over the floor, a great deal more on the floor than inside of the lamp, and so on. He just seemed too stupid to do anything. That was along in July, and I had ~~much~~ against my inclinations, although in harmony with my better judgement- to tell him that his forte was not in housekeeping, that he had better go back to the garden. I tried to encourage him, because I know it would be a crisis, and he went back to the garden with a great deal of grace, worked with a great deal more grace than I would myself have shown in taking what I know everybody considered a downward step, and I knew he felt it in his heart, so I watched him,

and I knew that in the August examinations if he failed, according to the rule of the school, for he had already failed in May, he would have to go down one class. The August examinations came and he failed, and as soon as he heard his marks, he came to me on a Friday afternoon. He said "Sahib- they call the white people Sahib- I am going home. I knew why but I wanted him to tell me. I said "Why?" He said "Well, Sahib, I am such a fool I cannot learn anything. I have been here five years now, hoping that I could do something for my people when I was out, that I could ~~work~~ be a teacher, but it is all wasted. I cannot do anything at all. I cannot even do your housework that ordinary boys do, and the boys are all making fun of me, so I am going home. I said "Why, you cannot go." I said "There is a little head man right out here in the village, from a section of the country where there has never been a school of any kind. He has been asking us for a teacher for weeks, and I haven't been able to send one. Will you go?" "Why" he said "You would not think of sending me to teach school, would you, after I have done such wretched work?" I said "You can teach them to write and to read the A B C's, can't you?" "Well, yes. I guess I could do that" he said. I said "You can teach them the first four powers of arithmetic, can't you? You have studied that." "Well, yes, I guess I could do that." I said "More than that, you can teach them the way to live through Him who has loved you, can't you?" I knew he had the love of the Savior in his heart, and his eye brightened as he looked me in the eye. "Sahib, if you think I can, I will try." I gripped his hand. I wanted to hug him. I said "There he goes now. When he comes in and asks for a teacher, I am going to ~~send~~ tell him you will go." "All right", he said. The man came in and I said to him "Here is your teacher." He nearly danced for joy he was so happy, and the next morning I saw those two, the head man with almost no clothing on him and this poor boy leaving school under these circumstances that you know, with his clothes and books on his back. He went out with that man and what did he do? It was not to a fine christian community, ^{with} a christian advantages; there was not another christian in the village; he went there where there was drinking almost every night in the week, where there was carousing, where there was sacrificing- one lone, stupid boy. What was the result? About two months after

that, I think it was one Friday afternoon, I was sitting in my office and I looked out at that same gate through which the head man had come in, and what did I see? Coming in was this teacher, and behind him was the little head man, no longer in scarcity of clothing but dressed as a man ought to be dressed, and behind him men and boys ranging in age from nine to twenty-three, such a beautiful manly lot of fellows. They came up to my door, and he said "Is tomorrow covenant morning?" and I said "Yes". He said "Well, here are some people that want to give in their experiences" and I said "That is good". I wish I had the time this afternoon to tell you of that meeting, to show the working of God's power in the human heart. By the confession of the lips, we learned much that we in this country are not inclined often to tell, because religion seems to be a tabooed subject, but Oh, the work is of God's spirit in the heart ~~and~~ ^{of} that head man and his nine year old son, too, and I asked them afterwards- I said "What was it that lead you to become a christian? Was it his teaching?" "Well no; he does pretty well in school, but I could see that the man knew that the boys' deficiencies were in his intellect, that he could not teach very much, but "you know" he says somehow he lives a life that is so clean; and the student accepted those unanimously, and the boy is still there after five years, working away, leavening that place, and he has turned it so upside down that last year a heathen who did not like to see the progress of his work brought in a false charge of forgery and tried to get him imprisoned, but their faith was so perfectly false that it fell flat, and he still carries on his work.

I would like to tell you about the boys that are teaching these one-hundred ~~my~~ schools. They are men perhaps not qualified intellectually as we would like to have them, but they are men in whose hearts God is working in a wonderful way and through these schools they are being lead out.

I would like to tell you of some of the other work there, the literary work, the evangelistic work. Referring again to the rice christians, ~~who are~~ ^{who are} ~~the~~ ^{the} evangelists and not with horses and carriages, automobiles or trolley cars, but on foot, rainy months and hot months, crossing streams where they have to jump as do the monkeys

and as did their ancestors, perhaps, from limb to limb across the stream. They will work for salaries ranging from \$3.00 to \$5.00 a month. I ought perhaps to make one word of explanation for those who do not know enough about missionary work, and they may suppose that we underpay them. We pay them according to the standards of the country, and dear friends, if there is one mistake a missionary can make it is to go there among these oriental peoples and give them the idea that you have the United States bank behind you. You can get all the persons you want at a snap of the finger if you do that, and they are not ~~worth~~ worth the snap of the finger when you get them. You have got to be there and work on their plane and work with them, get right into their lives and help them along their own standards of living, and let that rise, and they rise. I wish you could see that place, and these people. They are small; they are insignificant, and yet there comes a call from them, not for civilization, not for education- those things come in time-but for the putting of that into the human heart aside from which there is no power under heaven to save mankind. Mr. Hoffman said last Tuesday night that these Hindus admitted the power of the cross.

I want to quote in closing just one or two things that have come to my attention recently, and the first that I want to quote are the words of a Tamil poet. The Tamils are a great race in the central part of south India. This Tamil god lived about one thousand years ago and he wrote these words, which are just as true as day. "Lord, in the darkness I wander. Where is the light? Is there no light? Nothing know I but I wonder, ~~Where is the light?~~ Is there no light? Where is the light? Lord, in the vastness I wander. ~~is there no light~~ Where is the way? Is there no way? How may I reach thee, I wonder. Is there no way? Where is the way?"

Spoken about one thousand years after a certain One came to this earth and in almost those identical words said "I am the Way, the Truth and the Life." Oh, that those who, like that Tamil poet, are really looking for the Life might have the chance to find it, and we have it about us on all sides, and this is a quotation from a Hindu of a modern date, a college graduate, the ~~daughter~~ editor of the leading Arya-Samaj paper. The Arya-Samaj is one of the branches of Hinduism that is seeking to revive Hinduism and to give it a life

which it has not got. This is what he writes: "While the people of India increased from 1891 to 1901 at the rate of 2-1/2%, the native christians increased at the rate of 30%. It is high time for us to realize that the future of India lies in the hands, not of the higher classes, but of the low caste people." Ten years ago, you never, so far as I know, heard of a high caste man interested in the low caste people; new doctrine this; "and if we devote the best part of our energy to raising the status of the masses." Why, ten years ago I do not think that the Hindu Brahmin ever thought of the masses. "To raising the status of the masses, we can make every Indian household resound with the chanting of the Vedas at no distant date." And how does he end his editorial? "But what are the men; where is the sacrifice? Dear friends, however much or little you may take stock in missions, there is one thing that is everlastingly true, that One came to this earth 1900 years ago to interpret to us the Father and it is only as the light of his Life and his sacrifice has been shed abroad that we have what we have today, and it is only as you and I, as recipients of that light, as those who enjoy the blessings of the civilization founded thereon, enter into the sacrifice of Him that we can send the light to the uttermost corners and that we can show them. Is it a sacrifice to us? No, no, nothing is a sacrifice to Him. Do we call it a sacrifice when our country calls for duty? No. The love in our hearts for our great and beloved land counts no sacrifice. May each one of us be so filled with that love of His that there shall be no sacrifice, that there shall be nothing to count sacrifice when we give all that we have and are that these, this Tamil poet and those, who like that little boy prayed for the light, that we may give it to them.

THE ORIGIN OF MAN

Editorial from the N. Y. Medical Journal
August 23, 1919, page 332.

"Both Darwin and Huxley accustomed a reluctant world to the general proposition that man, instead of being a separate creation, was a descendant and collateral of the animals. A portion of their argument was based on a comparison between the structure and embryology of man and those of the highest apes, the gorilla, the orang-outang, and the chimpanzee. The subject was so fin de siècle that people were surprised to be told that the great apes, like man, had lost their tails. Neither author, in reality, maintained that man had arisen from any of the existing apes. To the popular mind, nevertheless, it appeared an inevitable inference that man must have come from the highest of the apes if he came from any kind of ape. The schematic dogmatism of Haeckel confirmed the popular judgment. He invented theoretical creatures to take the place of the links supposed to be missing.

"The tendency of modern physiological research has, on the whole, supported the supposition of a closer affinity between man and the great apes than between man and any other animal. This has appeared particularly evident in investigations of the properties of the blood, and in the fact that it has been found possible to communicate some characteristically human diseases to great apes and to no other animals. Anatomical and paleontological work has tended to oppose the earlier view. Comparative anatomy has failed to recognize the existence of a linear chain stretching from lemurs, through South American monkeys, old world monkeys, and the great apes to man. At the present time it is even doubted if the lemurs have a place in human ancestry. In many respects the great apes are more closely allied to the South American monkeys than to any old world types. Many features in human anatomy and embryology suggest that

man is an extremely primitive creature and that he arose as a separate branch of the mammals, close to the monkey stem but quite distinct from it. There have been many startling discoveries of human remains, such, for example, as the Piltdown skull from Sussex, England, so different from the modern type that some of our paleontologists have declared the inferior maxillary to be that of a chimpanzee, although the assumption involves the almost miraculous coincidence of a single fragment of a chimpanzee and of a human being occurring together in a locality and a geological horizon where neither had ever been found before.

"Two facts, however, are unquestionably certain; man is much more ancient than has hitherto been suspected, and the early remains show that in a very remote geological epoch there were human types so distinct that they must be looked upon as belonging to different genera."

L. B. D.