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CLEAN CERTIFIED Vs DENATURED PASTEURIZED MILK

The importance of clean milk can scarcely be exaggerated and cannot be too strongly insisted upon. Notwithstanding all that has been spoken and written on this subject within the last 25 years, the apathy of the general public in reference to the character of the milk they use is truly amazing. This apathy and the ignorance of which it is the result are responsible for thousands of deaths annually and for an enormous amount of morbidity not only in infants but in older children and adults.

The importance of thorough cleanliness as a condition of healthy human life is only just coming to be appreciated. During the long ages of savagery from which the human race has only recently begun to emerge, we acquired a great number of filthy practices which as yet we have only in part eliminated. In the savage state our vital resistance was so high we were able to maintain good health notwithstanding our intimate contact with pernicious bacteria of various sorts because of the high resistance of our tissues; but under the conditions imposed by civilized life, especially house dwelling and pernicious habits in eating, drinking, etc., our vital resistance has been greatly reduced so we have become a prey to a great number of micro-organisms which to our tougher forebears of prehistoric times were innocuous.

In very recent times we have learned the importance of clean water, and by applying this knowledge we have practically eliminated typhoid fever and other water-borne diseases from the mortality tables. The slightest taint or odor in water or the slightest suspicion of filth contamination leads to an appeal to the health authorities, and

a report that the water submitted for examination contains one or two hundred colon bacteria per cubic centimeter will lead to its prompt condemnation as unfit for use.

No one has ever offered any reason for believing that colon germs in milk are any less unwholesome than in water; and yet average commercial milk contains a hundred times as many bacteria as would be regarded as sufficient to condemn water as quite unfit for use.

The pasteurizing and sterilizing of milk certainly mitigates the evils of unclean milk to some degree; but it is a mistake to accept pasteurization as the solution of the clean milk problem. Pasteurization lessens the liability of tuberculous infection, but this is about the only real service it renders and in this it is by no means 100 per cent, efficient. Dr. Schloss of the Harvard Medical School from a very extended experience in connection with the infants' hospital, insists that ordinary pasteurization does not adequately protect against tuberculosis and requires that all milk given to infants and young children shall be boiled three minutes. Mr. C. W. Barron has also demonstrated the inefficiency of pasteurization as a protection to calves. The only real protection against tuberculosis must be sought in thorough and continuous testing and inspection of dairy cattle by qualified experts.

So far as typhoid is concerned, cases of this disease are now becoming so rare that protection against it is scarcely needed. About the only thing that pasteurization does is to destroy the bacteria which cause the souring of milk and so to increase its keeping properties. But even this has its disadvantages for Esty has shown that the mischievous *B. Welchii* which is generally found in market milk does not

germinate in raw milk but germinates rapidly in sterilized milk and sporulates in the intestine. Within two days after giving a guinea pig milk infected with *B. Welchii* spores were found in the feces.

It is evident, then, that aside from partial protection against *B. tuberculosis*, pasteurization affords little advantage, from a hygienic standpoint, for ordinary milk-souring germs are not at all dangerous or even unwholesome, while, on the other hand, pasteurizing milk enables *B. Welchii* to germinate and multiply, and sometimes to such an extent as to make the milk a rich culture of this pathogenic organism.

It seems to the writer high time that more attention should be given to the character of the bacteria of milk, rather than to mere numbers. The millions of acid-forming organisms in buttermilk are harmless, whereas a few thousand *B. Welchii* are not only an evidence of gross contamination but also a menace to health since this organism easily becomes domiciled in the intestine and flourishes amazingly under the anerobic conditions found in the colon, producing spores as well as vegetative forms.

The dangerous character of this organism has unfortunately not been fully appreciated until recently. Wright, West and others had erroneously concluded that *B. Welchii* produces no toxin, either exo- or endo-, and this led to its being grouped among harmless organisms; but the researches of Bull and Pritchett in 1917 and the later study of the pathogenicity of the organism by Esty (1920), have clearly shown the older views to be erroneous, and it is now well established that *B. Welchii* is highly pathogenic, although non-virulent strains are often met.

Bull and Pritchett showed that *B. Welchii* produces a specific bacterial toxin which may be separated from the bacteria. This highly virulent toxin Esty has shown to be similar to the toxin of the

diphtheria bacillus.

The highly dangerous character of Welch's bacillus will be recognized when it is recalled that this organism is the cause of gas gangrene, one of the most formidable complications of wounds with which the military surgeon has to contend. Experimentally, the organism shows itself to be highly active. So small a quantity of culture as 2 c.c. injected into the abdomen of a guinea-pig causes death from gas gangrene in 12 to 30 hours. A still smaller dose, 0.25 c.c. (four minims), injected into the peritoneal cavity, caused the death of a 607-gram guinea-pig (Esty), and 0.1 c.c. killed a 400-gram guinea-pig.

As already noted, some strains of *B. Welchii* are not virulent. This fact was first pointed out by Herter who noted that strains of *B. Welchii* obtained from the droppings of cows were less virulent than those from meat eating animals. Esty found of 9 strains obtained from human sources, all were pathogenic. Of 10 strains from the cow, 40 per cent. were pathogenic, and of 11 strains from milk 8, or 72.7 per cent, were pathogenic. The conditions found in the colon of a meat eater or a mixed feeder, such as man, are particularly favorable for the development of *B. Welchii*.

Observations made by Esty as regards the effects of heat upon *B. Welchii* showed that some strains survive 100° C. (211° F.) for 30 to 40 minutes. Roderick has confirmed these results.

These facts show most conclusively the utter futility of pasteurization which seldom exceeds 160° F., as a means of rendering safe, unclean milk.

In view of these facts it is evidently important that milk inspection should take account of the frequency and extent of infection with *B. Welchii*. Esty found *B. Welchii* in nearly every sample of pasteurized milk examined in Providence, R. I. Roderick found *B. Welchii* present in 54

per cent. of 470 samples of market milk examined in Battle Creek. The organism is never found in freshly drawn milk protected from contamination. Its presence is wholly the result of lack of cleanliness. Most dairies are badly infected with *B. Welchii*. Esty found the organism everywhere not only on all parts of the cow, but on the walls, ceiling and floor of barns, in the milk pails and containers, in the stable air and barn dust and even on the milker's hands. That milk may by sufficient care be kept free from *B. Welchii* has been many times demonstrated. It is only a matter of pain taking cleanliness as has been abundantly shown in the experience of the Battle Creek Sanitarium dairy.

The number of *Welchii* present in raw milk may be considered, then, as a measure of the amount of filth contamination, while the total bacteria count is more an indicator of the rate at which the milk was cooled and the temperature at which it has been kept. Certainly it is much more important to determine the extent of filth contamination than of the heat exposure for the reason that the bacteria which grow in raw milk are acid formers and not of the dangerous sort.

The examination of milk for the presence of *B. Welchii* is not a difficult procedure. The test is a simple one. A portion of milk is boiled in a test tube with a little litmus solution and incubated at 37° C. for 24 to 48 hours. When *B. Welchii* is present a stormy fermentation occurs. Gas bubbles rise to the top of the tube, separating the masses of curd. The litmus is reddened and a strong odor of butyric acid is present.

The presence of *B. Welchii* always means filth and should lead to prompt inspection of dairies, creameries and handlers and prohibition of sale if the contamination is not eliminated. That such elimination is possible is proven by the fact that this organism is rarely found in

certified milk and then only when the count has suddenly gone up through some accident or neglect. It must be remembered, however, that neglect of prompt cooling will not increase the number of *B. Welchii* for the reason that practically only spores are found in milk and these do not grow in raw milk, the organism being an obligate anaerobe.

Interest in clean milk is heightened by the importance now being attached to changing the intestinal flora. As pointed out some years ago by Burnett, in the war against pernicious intestinal bacteria, the chief enemy to be overcome is *B. Welchii*. This organism is always found more or less abundant in proportion to the intensity of the toxemia. As pointed out by Herter many years ago, there are two types of intestinal toxemia; the "indolic type" in which the dominant organism is *B. putrificus* and the "butyric type," in which *B. Welchii* is dominant. In the most severe cases, both organisms are present, forming a third or mixed type.

At the outset of its independent life, nature supplies every mammal with a stock of acidophile organisms to keep its alimentary canal free from putrefactive processes and the resulting toxic products. So long as an infant receives only mother's milk, it usually remains in health. Its stools are frequent, of slightly acid odor, free from mucus, and yellowish in color. Soon after weaning, infants fed cow's milk begin to show symptoms of disturbance. The stools are less frequent. They often become foul smelling, dark colored, and show more or less mucus. These are the first evidences of infection with *B. Welchii* and allied organisms. If nothing is done to change the situation, the infection will steadily increase from year to year, giving rise to a succession of maladies and miseries of which constipation, headaches, nervous prostration, insomnia, skin disorders, colitis, appendicitis, rheumatism, Bright's disease, arteriosclerosis, so-called neuritis (neuralgia), with manic depressive insanity, are only a few common examples.

There is no way in which intestinal toxemia with all its dire consequences can be successfully combated except by changing the intestinal flora, that is by getting rid of *B. Welchii* and establishing the dominance of acidophile organisms (*B. acidophilus*). This cannot be done efficiently so long as fresh importations of *B. Welchii* are being constantly made with the food intake.

It is of especial importance that sick infants and children that depend much upon cow's milk as well as adults who take the "milk cure", must be provided with milk free from *B. Welchii*.

Practically the whole population, not only of the United States, but of every civilized country is suffering from the use of unclean milk. The bacteriologists have shown us the facts, and it is now the duty of the Boards of Health and Milk commissions to inform the people by a campaign of education which will open their eyes to the necessity for using more milk as well as cleaner milk.

Just now (1923) there is special need for activity in this direction. The Chicago packers, finding their dividends dwindling through the declining demand for meat, have been for the last two years carrying on a vigorous "eat more meat campaign," in which they have enlisted the Agricultural Department at Washington. Their slogan is, "eat more meat to aid the live-stock industry." All modern physiologists are agreed that owing to general lime starvation it is more milk, and not more meat that the people need. Even in its most unclean commercial form milk is preferable to meat, because it is a better balanced food and is freer from pernicious bacteria, particularly *B. Welchii* which is always found in fresh meats and in dominating numbers.

Many specious and misleading statements about meat are being broadcasted by the Packers' Institute with headquarters in Chicago. This pernicious propoganda should be met by an organized nation-wide effort to interest both the dairy interests and the general public in clean milk as a source of protein in place of beef and other meats. Sherman of Columbia has clearly demonstrated the fact that one pint of milk a day will so completely supplement the proteins of a cereal diet that the protein requirements of the body will be fully met. And McCollum of Johns Hopkins has repeatedly called attention to the importance of lessening the consumption of meat and increasing the use of milk. The people have a right to know the facts and should not be left to suffer from the cupidity of unscrupulous "big business."

A recent bacteriological examination of market meats made by Roderick of the Battle Creek Sanitarium bacteriological laboratory, showed that all meats are rich cultures of the colon group of bacteria.

Roderick found in apparently fresh beefsteak, 1,500,000 bacteria per gram; in corn beef 31,000,000; in Hamburger steak 75,000,000 and in pork liver 95,400,000. Examination of the droppings of calves, cows, goats and horses showed 15,000,000 to 30,000,000 bacteria of the same sort found in meat. That is, some meats actually contain more manure germs than does fresh manure.

In view of these facts, the producer of the dirtiest milk may feel proud of his product as compared with that of the butcher and the packer. The conditions under which the dirtiest milk is produced are clean compared with those which exist in the average slaughter house. In the process of slaughtering all meats are freely infected with manure germs and within twenty-four hours every carcass is swarming with *B. Welchii* and other putrefactive organisms, and the bacteria increase continually even in cold storage until the meat is eaten.

The dairy industry rather than the packing industry needs encouragement. A milch cow returns a pound of milk solids for every 5 pounds of dry digestible food she eats, while the steer returns only one pound for every 30 pounds of food. That is, the cow gives six times as large a return of transformed food as does the steer, and a product which is acknowledged to be in every way superior to meat. There is no other essential American industry so poorly paid and so much in need of and deserving of encouragement as the dairy industry. The country's great food need at the present time is more milk and cleaner milk. As soon as the public become convinced of these facts, they will be quite willing to pay the higher price which clean milk will cost. Clean milk at a dollar a quart would be preferable to beefsteak at ten cents a pound.

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DIET IN RELATION TO THE TEETH

The rapid increase of dental caries in modern times is a matter of far greater significance than is generally recognized. Dental decay is only a local expression of a general deterioration which is a part of the race degeneracy evidences of which appear in scores of other forms of decay, physical, mental, moral and social. So pronounced have these evidences of race degeneracy become in recent times, most scientific men who have studied the subject have abandoned all hope for the human race. Said Professor Davenport, of the Carnegie Institution, head of the eugenics movement in this country, in an address at the World's Eugenics Congress held in New York a few months ago, "Of course we all know the human race will ultimately perish, but if we will give attention to eugenics, the catastrophe may be postponed somewhat." And said the venerable Major Darwin, a world famous economist, the son of Charles Darwin, "If our present civilization survives, and I fear it will not, it will have to be the United States that saves it." Not one dissenting voice was raised against these melancholy forecasts. The daily press said that the congress was pervaded by a very pessimistic note, which was certainly true.

Personally, I hold to a more optimistic view. The facts of general race degeneracy cannot be disputed. The race has undoubtedly reached the lowest level, biologically, in its long history, and we are rapidly going down toward race extinction. Henry Fairfield Osborn, President of the National Museum of Natural History, New York City, tells us in "Science" that we have lost 2½ inches in stature since the Civil War. The draft examinations showed the intelligence of the average American to be only

that of a thirteen year old boy, in other words, that of a high grade moron, thus confirming the dictum of the late Professor Galton that "the general standard of man is but little above the grade of trained idiocy."

Recent revelations show that already more than 3 per cent. of our population must be classed as mentally defective to a serious degree and more than half of all adults have the minds of children. Cancer, Bright's disease, diseases of the heart and blood-vessels and all degenerative diseases are increasing year by year and at a very rapid rate. The mortality from these disorders has more than doubled within thirty years. The general mortality rate is lowering but only because of the lower death rate from acute diseases. Numerous statisticians have shown that the death rate after 50 years is rising in this country. The birth rate is falling so rapidly that Professor Willcox estimates that if the present rate of fall continues no children will be born in the year 2000.

Evidently, the race is becoming senile, is running out.

The outlook is certainly bad enough, but there is a potent remedy, even a panacea for all our racial maladies, by the application of which the impending catastrophe may be averted. The fountain of youth by which race rejuvenation may be accomplished is to be found in a return to the biologic life of our ancestors.

Decay of the teeth is only one of the stigmata of race degeneracy. The remedy for this local expression of systemic deterioration is not to be found in toothbrushes and dentifrices, nor will the combined efforts of dentists and physicians stay the process of edentulation that is making us a toothless race. All these things are necessary to mitigate the evils of

dental decay. But the real remedy must strike deeper. The whole body, not the mouth alone, must be raised to a higher level of resistance.

The anthropologists tell us that in the hundreds of skulls in our museums of persons who lived in the Neolithic Age, at least seven or eight thousand years ago, not one decayed tooth is to be found. I have in my possession two skulls of old mound builder Indians found on an island in San Francisco Bay, which possess full sets of teeth, worn nearly to the gum, but absolutely free from caries as shown by X-ray and careful dental examination. The skulls of children found in old Egyptian tombs never show any evidence of decay. Old British skulls are almost wholly free from dental caries.

Dr. Butler of the U. S. Public Health Service found only one decayed tooth in a careful study of several hundred children's skulls. The skulls were between two hundred and three hundred years old and represented many different tribes covering a territory reaching from the Arctic region to South America and the South Sea Islands.

I present herewith a model of the lower jaw of a man who is believed to have lived at least two hundred thousand years ago, the so-called "Heidelberg jaw." All the teeth are present and well developed, and show no evidence of decay. Two or three teeth were broken off in detaching a pebble.

Dr. Moodie, geologist of the University of Illinois, tells us that "Disease was not present in the earliest times of the earth's history, and it did not become very active until the present age of the earth had been attained by nearly three-quarters of its duration. That is, disease has only been active during the last quarter of the earth's history, so far as

animals and birds are concerned." and that "The early animals were so highly immune to attack by bacterial organisms that it was only after the race of animals began to grow weaker through age that disease was able to make any headway."

Decay of the teeth is therefore a local expression of a general, even a racial, disorder and must be combated not only by such local measures as are now in general use, but by such remedies as will effect beneficially the general conditions of which it is a part.

The causes to which decay of the teeth is directly due are of two sorts,

1. Conditions of the tooth itself--defective structure, lack of density or compactness of the enamel covering.

2. Conditions of the saliva, which bathes the teeth,--such as scantiness in amount, a viscid condition, deficiency of lime, possibly deficiency of digestive enzymes, of sozins, opsonins or of leucocytes, and the presence in the saliva and on the tongue of pernicious bacteria which are capable of causing destruction of tissue and decay.

All these morbid conditions, both of the teeth and of the saliva, are the result of malnutrition and in large part of wrong feeding, together with numerous other perversions of our modern life. Unfortunately, in our eagerness to reach the greatest possible heights in intellectual attainments, we have neglected the physical side of development, and as a result, our modern civilization, with its infinitely precious gifts to the human race, has not proved itself to be a permanent attainment. To make its triumphs complete and to establish them on a lasting foundation, civilization must do for the man physically what it has done for him intellectually and ethically.

of a primitive environment and a natural diet.

The teeth of a modern man are almost altogether deprived of these natural protective influences. Fruits are eaten as a luxury rather than as a substantial part of the diet, and many people eat no fruit at all. By milling and cooking processes the cellulose and other resisting structures of the food are so broken up that the grinding function of the teeth becomes superfluous and the mouth becomes simply a port of entry for foodstuffs and palate-ticklers, its use as a digestive laboratory being almost wholly suspended.

Some 25 years ago, I read before the State Dental Association of Michigan a paper in which I maintained that decay of the teeth was not due to local causes alone but was associated with general conditions of deterioration. I reported the results of the study of 100 cases in which the condition of the teeth had been noted in connection with an examination of the stomach fluids obtained after a test meal. Of the 100 cases only two had perfectly sound teeth, and of persons suffering from a deficiency of gastric acid, about half the total number of cases studied, the average number of sound teeth was only 10, whereas in the less advanced cases the average number of sound teeth found was 20. Of the persons suffering from acid dyspepsia none had been compelled to resort to the use of artificial teeth, whereas among the 51 persons suffering from a deficiency of gastric acid, 12 were dependent upon artificial teeth. Among the persons suffering from bacterial infection of the stomach, the number of sound teeth was only one-half as many as in persons not so infected.

In cases in which achylia existed, few or no teeth were left in the mouth. The writer was at this time convinced that decay of the teeth is an expression of the general condition rather than of a local breakdown. Numerous clinical observations and laboratory researches made in recent years have supplied such an array of facts in support of this view that it seems not unfair to claim it to be now fairly well established.

Wild animals and wild men living under conditions more nearly like those which constitute the environment of primitive man, seldom suffer from dental decay and are in other respects equally superior in physical vigor and endurance to the modern, civilized man.

It seems more than probable that the causes which lead to normal vulnerability of the teeth to disease through defective structure, begin very early in life. Numerous investigators have shown that a deficiency of vitamin A causes failure not only in the general development of the bone and cartilage but also of the teeth through disturbance of calcium metabolism. Mellanby has definitely shown a close relation between defective teeth and rickets, which is also due to a lack of vitamin A. Howe, Silva, Wells and other observers have clearly demonstrated the relation between defective teeth and scurvy resulting from a deficiency of vitamin C.

It is evident, also, that the lack of vitamin D through loss of appetite and consequent nutritional failure may be a cause of defective dental development. Hess has recently shown that sub-acute, or infantile scurvy, is an exceedingly common condition as the result of errors in the feeding of infants, and Broderick has demonstrated the relation between

dental decay and endocrine insufficiency, a condition which has been clearly shown to be closely associated with dietetic errors, leading to intestinal toxemia.

To insure good development of the teeth, then, the dietary must furnish not only an ample supply of fats, carbohydrates and proteins in proper proportion, but also adequate quantities of the various food salts and the several vitamins, together with an abundance of roughage to insure prompt disposal of food residues and body wastes. Of the three chief food principles, carbohydrates and proteins appear to be most important. Fats seem to be most essential as a vehicle for vitamin A, since Hindhede maintained a subject in fine physical condition for nearly two years upon a diet consisting exclusively of bread, potatoes and greens. He informs me, however, that he found it very necessary to include in the dietary a large quantity of greens. This was doubtless due to the fact that the greens were the only source of vitamin A.

Protein in sufficient amount is essential for repair of the soft tissues and to promote growth in the young, but an excess of protein is highly injurious because of the damage to the endocrine structures which results from high protein feeding. The explanation is simple. The endocrine structures include in their manifold actions a poison-destroying function. Dogs that have been deprived of their thyroid glands die quickly on a meat diet, but often survive and even thrive on a diet of bread and milk. Crile has often called attention to the importance of eliminating meat from the dietary of patients after operations upon the thyroid.

In my experience, many cases of thyroid disease may be cured without operation by means of rest and a low protein dietary; that is, the elimination of meats, with plenty of roughage to secure three daily evacuations of

the colon.

The chief harm from the use of meat seems to arise from the putrefaction of the 10 per cent. of undigested residues left in the colon. The poisons resulting from these putrefactive changes overwhelm and wear out the internal glands and thus become a cause of endocrine insufficiency and dental decay.

Lime starvation is unquestionably an active cause in promoting teeth decay. J. C. Turner, of the Royal College of Surgeons, of London, has called attention to the fact that British skulls dating before the last century, when bread was made of coarsely ground meal and cane sugar was very little used, show very little evidence of dental caries or pyorrhea.

The Scotch Highlanders, whose diet consists chiefly of oatmeal, buttermilk and potatoes, have excellent teeth, while the Scotch who live in the lowlands and have largely abandoned the simple life of their ancestors, have very defective teeth. Oatmeal and milk are rich in lime, while fine flour and many of the breakfast foods, together with rice, potatoes, cane sugar, with meats of all sorts, are very deficient in lime.

It is worthy of note that within the last century, during which time there has been observed a very marked increase in the prevalence of dental caries, the use of butcher meat has likewise increased. According to the best authorities, the per capita consumption of meat at the present time is nearly four times the amount consumed one hundred years ago.

Calcium is essential for all the tissues of the body, but especially for the bones, which contain 99 per cent. of all the calcium found in the body. The teeth, being the densest structures in the body, are evidently more dependent upon lime than are any other structure, and more likely than other structures to be affected by an disturbance of the calcium metabolism.

The ordinary tissue activities upon which life is dependent result in the daily loss of two-thirds of a gram or more of lime. To replace this and prevent a gradual diminution of the body store of lime which for a man of medium weight, say 150 pounds, is only 4.0 pounds, it is necessary that the average daily ration should contain from two to two and one-half grams of lime, since, according to Forster, only 60 per cent. of the lime of the food is absorbed. This amount of lime, 30 to 35 grains, is by no means always found in the regulation bill of fare. Indeed, the amount is usually less than half the actual requirement.

The lime content of foods varies greatly. Some of our staple food-stuffs contain practically no lime at all. A pound of wheat or graham flour contains four grains of lime; a pound of fine flour but one grain; a pound of meat, half a grain; a pound of potatoes, a grain or less; a pound of sugar none at all. A pint of milk contains fourteen grains of lime; a pint of cream three-fourths as much; butter almost none at all. Peas and beans contain fifteen grains of lime to the pound.

It is evident that sugar, though a carbohydrate, is no proper substitute for the carbohydrate of cereals; and lean meat, though rich in protein, is not a proper substitute for the protein of vegetables; because in both instances the lime which is in man's natural diet associated with the carbohydrates and proteins in the proper proportion, has been separated, in one case by an artificial process and in the other by a vital process.

The corn which the hog eats contains an abundance of lime, but, when assimilated, the lime is separated, going to the bones. When the hog is eaten, the bones are left behind, and the lime with it. In grains, legumes and milk, the lime is associated with the protein, while in the protein of

meats there is practically no lime for the reason given.

The annual average per capita consumption of meat in the United States, including fish and fowl, is 190 pounds or half a pound a day for each man, woman and child. The per capita consumption of sugar is over 90 pounds or four ounces a day. With the addition of butter and other foods, these items furnish three-fourths of the nourishment of the average citizen of the United States, and yet supply practically no lime. Here is abundant reason for decay of the teeth, and the depreciation of stature, through the lack of bone and teeth making material.

Suppose, for example, a day's ration should be made up of the following: Meat, three-fourths pound; bread, one-half pound; butter, three ounces; rice, two ounces; corn meal or corn flakes, two ounces; sugar, two ounces; potatoes, one-half pound; a total of about 2,500 calories. The total amount of lime supplied by such a diet would be less than two and one-fifth grains or only about one-fifteenth of the amount of lime required. Millions of people in the United States are living on a diet which is still more deficient in lime. Invalids, for example, are often fed for quite long periods on tea and toast with some appetizing adjuvant. The intake of lime under such circumstances would be scarcely one grain, or about one-thirtieth the amount required.

Since the body of a man weighing 150 pounds contains only four pounds of lime, a daily deficiency of twenty grains of lime would result in a loss of more than one pound of lime in the course of a year or twenty-five per cent. of the total lime content of the body.

Von Wendt made extensive experiments on the influence of various dietaries on the calcium balance and found on a diet consisting of bread,

butter, sugar and egg white, the loss of lime the first day was 2 grains, the second day 10 grains, and the third day 12 grains. On a diet consisting of bread, butter, meat, cheese, tea and sugar, the loss reached on the fourth day was 14 grains. At this rate the body would in less than three years lose half its lime with consequent softening of the bones and deterioration of the teeth.

Since eating habits are very often quite fixed and uniform during long periods, it is evident that the danger from this source is very much greater than has been appreciated. Sherman found in his experiments that the skull of a monkey deprived of lime became so soft that it could be easily crushed with the fingers.

Another important point closely associated with that of lime starvation is the question of relative acidosis. The fluids of the body are alkaline. Roger and other physiologists have clearly shown the importance of maintaining this alkalinity of the tissue fluids. When the alkalinity is diminished, oxidation is seriously interfered with, the resistance of the tissues is lowered and all the bodily functions are disturbed.

Bunge some years ago called attention to the fact that in certain of our common foodstuffs acids are so predominant that the result of the metabolism of such foods in the body tends to lower the alkalinity and produces a state of relative acidosis. Cereals contain a considerable excess of acids although only about one-fourth as much as do flesh meats which supply a very great excess of acids. It is evident that the bread or cereal and meat diet in such general use in this country tends to cause relative acidosis and consequent loss of lime.

This condition is often produced in children by an excess of fat which forms butyric acid in the intestines, and thus robs the body of lime. This condition is much less frequently met with in adults, but it is well known that in diabetes there is a greatly accelerated loss of lime due to the state of acidosis arising from the disturbed carbohydrate metabolism. In either true or relative acidosis the body loses lime and the teeth must suffer injury; hence it is highly important to see that the bill of fare is so arranged as to supply an abundance, not only of lime, but of other alkaline salts. Fortunately, foods rich in potash and other alkaline salts are very abundant. Practically all fruits and vegetables contain considerable amounts of potash and soda in the form of acid salts. The organic acids, chiefly citric and malic acids, which are combined with alkalies, are readily burned in the body, leaving a residue of carbonates of potash and soda which neutralize tissue acids and maintain the normal alkalinity of the body fluids.

Within the last half century, meat and cereals have come to constitute more and more the chief staples of the American bill of fare. The over saturation of the body fluids with an excess of acids derived from this bread and meat diet is without doubt in part, at least, responsible for the increasing tendency to dental caries. Cereals are deficient in lime, while meats are almost wholly lacking in lime, hence a bread and meat diet not only fails to supply the body with the daily quota of lime needed to replace that which is lost through the excretions but by the excess of acids present increases the loss. The writer is quite in accord with McCollum, who for several years has been calling attention to the evils which result from a bread and meat diet. McCollum's contention that milk may be advantageously substituted for meat is fully sustained by the researches of

Professor Sherman, of Columbia University, which show that even with a moderate allowance of milk, half a pint to a pint, daily, a diet from which meats are wholly excluded is wholly adequate to meet all the nutritive needs of the body.

The freer use of fruits and green vegetables must be encouraged. The orange, the lemon, the grapefruit and other citrus fruits should be given a larger place in the national bill of fare.

Hindhede, of Copenhagen, who has made an extensive study of this subject, has shown that the neutralizing power of the potato is so great that the urine of a patient subsisting chiefly upon potatoes dissolves forty to fifty times as much uric acid as will be dissolved by that of a person taking an ordinary mixed diet. We should eat more potatoes and less bread.

A research conducted in the laboratories of the Battle Creek Sanitarium in the summer of 1913 by Mr. Blatherwick, an assistant of Dr. Mendel of the Yale laboratory, showed that the tomato as well as the orange and the potato has a remarkable influence in alkalizing the body fluids; but the most active of all common foodstuffs was found to be the cantaloupe. It was surprising to note how quickly an alkaline state of the urine might be induced by eating freely of this delicious vegetable fruit.

Hart and Steenback showed that milch cows require food containing a large amount of lime. If such food is not supplied their bones are robbed of lime. Nature takes care to see that milk, the sole food of the very young animal, contains an adequate amount of lime, even at the expense of the mother.

This observation explains the fact that rapid decay of the teeth is so frequent in expectant mothers, especially during the latter months

of gestation.

Infants and young children require two or three times as much lime in proportion to their weight as do adults, since they need lime for building up and solidifying the skeleton as well as for making good the daily waste. A young nursing infant gets daily in its mother's milk more than three grains of lime, or one-fifth as much as the daily requirement for an adult weighing ten to fifteen times as much.

The wonderful care which Nature takes to supply the young animal with an abundance of lime for building its skeleton is well illustrated in the interesting case of the egg. Before incubating, the contents of an egg contain one-half grain of lime. During incubation, the amount steadily increases until when hatched the body of the chick contains three grains, or six times as much lime as the embryo contained. The growing chick has in some mysterious way, not yet determined, managed to steal from the shell the needed lime for stiffening its slender leg bones so as to enable them to support its body as soon as it emerges from its calcareous cell. It thus appears that the egg shell is not simply a container but also serves as a store house of lime to be drawn upon by the developing chick.

The bones and teeth likewise serve in a storage capacity and are drawn upon, as shown by Voit's experiments, confirmed by Sherman, and when the supply of lime in the diet is inadequate, the teeth and other hard parts are robbed to supply other parts in which a more urgent need exists.

The great inadequacy of the ordinary diet to supply the needs of the growing child was demonstrated by Hertz, who showed that between the ages of 6 to 14 boys require three or four times as much lime in proportion to their weight as do adults, since they must store up in their growing bones, 3 to 6 grains of lime daily.

The supply of lime in the diet should be increased by the free use of milk, and other foods rich in lime. The amount of milk produced annually in this country is about 31,000,000,000 quarts. This is sufficient to supply nearly a quart of milk for every man, woman and child and would insure an adequate supply of lime, which should in time unquestionably increase the stature and greatly improve the quality of the teeth of the average American. Unfortunately, half of the milk produced is thrown away or fed to animals, and the result is not only an enormous economic loss but a physical damage to the American people which amounts to a national calamity. The American farmer needs to be shown that when he empties his cans of skim milk into the sewer or the pig trough, he is pouring out not only a by-product of his dairy but the teeth, bones, even the racial stamina of his countrymen.

The housewife needs to be taught the importance of the addition to the daily bill of fare of liberal quantities of greens. She needs to be acquainted with the valuable properties of the purslane, dock, pig weed and other garden weeds rich in lime which are either carelessly destroyed or fed to cattle.

The free use of wheat bran is another means of re-enforcing the lime content of the dietary. An ounce of bran contains more lime than a pound of tenderloin beef and more than half a pound of white bread. The manufacture of white flour and of white bread should be prohibited by law. A single ounce of cottage cheese contains more lime than the whole day's bill of fare eaten by many persons, furnishing as much of this essential element as three pound loaves of ordinary bread or eight pounds of loin steak, as purchased at the butcher's.

Figs, dates and raisins are rich in lime and should be largely substituted for cane sugar, which is wholly lacking in lime. Malt sugar, molasses and maple sirup are also rich in lime and hence better sorts of sweets than cane sugar. The almond, hazelnut, walnut and even the humble peanut are rich in lime salts as well as in other choice food essentials.

Not less essential than lime is food iron, which is essential for the maintenance of the blood. The body loses one-fifth of a grain daily, a significant loss when it is remembered that the total iron of the body is only about 40 grains. When the daily loss of iron is not made good by the food intake, the blood rapidly deteriorates. Even the hemoglobin content falls first, and then the blood count.

There is evidence that nearly the whole population of the United States is anemic. In connection with the first Chicago Exhibition, the writer by request of the committee of arrangements organized a race betterment exhibit, one feature of which was an examination of the blood for hemoglobin. Great interest was shown in this feature of the exhibit and about six thousand persons were tested. The average hemoglobin content was found to be 80 per cent.--the women 79 per cent. and the men 81 per cent. Very few approached the normal 100 per cent.

Most children under 5 years of age are anemic because their diet, largely white bread and milk, is almost wholly lacking in iron. To supply a growing child with the amount of iron needed for one day would require over two pounds of white bread and four quarts of milk, so deficient are these foodstuffs in food iron. Graham bread furnishes nearly three times as much iron as does white bread. Raisins supply more than double the amount of iron furnished by white bread, and dates or figs more than three

times as much. Purees of spinach and other greens, peas and lentils in the form of soup, almonds, hazlenuts, walnuts, pecans and peanuts, are most excellent sources of iron. Meat juice and meats are worse than useless as nutrients for young children.

It is a mistaken notion that rare beefsteak is a choice source of food iron. Ordinary molasses contains more than double as much iron as does tenderloin, and the amount of iron supplied by the choicest steak is exceeded by the iron content of oatmeal, mustard greens, spinach, lima beans and numerous other foods.

Peas and the whole egg supply twice as much iron as does the same weight of beef, while lentils and egg yolks supply three times as much, and even such humble foodstuffs as rye flour, graham flour, dried figs and dates, oatmeal and dried sweet corn supply as much or more food iron as does beef, and iron which, according to Sherman of Columbia, is of better quality.

The same dietetic errors which lead to deterioration of the teeth cause depreciation in the quantity and quality of the saliva, which is the natural protector of the teeth and of the mouth. Neglect to make proper use of the teeth by the chewing of dry food and food hard enough to bring the jaw muscles into active play is unquestionably a cause of the deterioration of the dental structures. Jaw work is necessary not only for the development but for the preservation of the teeth. Bernard showed that during the mastication of food the amount of blood passing through the chief muscle of mastication in the horse was 30 times the amount supplied to the muscle during rest. The jaw and the teeth are supplied by the same bloodvessels which irrigate the muscles of mastication. Neglect to use the jaw muscles

naturally diminishes the blood supply to the teeth and so impairs the nutrition and lessens their resistance.

Black, Cannon and others, have shown the amazing power which well developed chewing muscles are capable of exerting, the maximum in a thousand persons being 275 pounds; the minimum, 25 pounds. In persons accustomed to the use of soft food, the force of bite was found to approach a minimum, being only 50 pounds or less.

The enormous development shown in both teeth and jaw in the Heidelberg relic is good evidence that our prehistoric ancestors ate food which required vigorous use of their jaws. We have given so much attention to making our food palatable and easily digestible that we have not left enough work for the organs of mastication to keep them functionally intact and so they are obeying the great biologic law which exterminates organs which cease to functionate.

Some 23 years ago, I undertook a series of experiments to determine the effect of chewing in conditions which promote the flow of saliva.

Each substance used in making the test was in each case one ounce. The food, whether solid or fluid, was taken into the mouth in small portions and chewed for a few seconds, then, being ejected from the mouth, it was received into a small vessel for weighing. The length of the experiment with each substance was exactly five minutes. The difference in weight between the substance before chewing and after represents the amount of saliva which had been added to it during mastication.

EXPERIMENTAL STUDIES OF THE SALIVARY SECRETION

One ounce of dry wheat flakes increased in weight 59.79 grams.

One ounce of wheat flakes with two grams of common salt increased

in weight 58.8 grams.

One ounce of wheat flakes sprinkled with pepper increased in weight 59.1 grams.

One ounce of wheat flakes with five c.c. of strong cider vinegar increased in weight 55.9 grams.

One ounce of moist bread increased in weight 31.1 grams.

One ounce of raw apple increased in weight 38.1 grams.

One ounce of water increased in weight 2.92 grams.

One ounce of milk increased in weight 3.82 grams.

One ounce of pea soup increased in weight 5.82 grams.

Paraffin chewed for five minutes produced 20 grams of saliva.

These results clearly indicate that dryness is the property which stimulates the flow of saliva more than any other. An ounce of dried wheat flakes increased in weight two ounces or 200 per cent. The addition of salt, pepper or vinegar to the wheat flakes did not increase the flow of saliva. The weight of moist bread was increased half as much, whereas the weight of water, milk and soup increased only ten to twenty per cent. I called attention to these facts in a paper read before the Michigan State Dental Association at its meeting in 1897.

The results obtained by Pavlov by his classical experiments on dogs, published a few years later, clearly demonstrates the same fact. A marble placed in the mouth of the dog produced little or no flow of saliva; but when the same marble was crushed to a powder and placed in the dog's mouth, an abundant flow of saliva occurred.

It seems that dryness rather than hardness is the element which increases the flow of the saliva, although both dryness and hardness increase the blood by encouraging the activity of the jaw muscles. I

think it is generally conceded that the saliva is a natural and potential mouth wash superior to all dentifrices, but in order that it shall be effective it must be abundant and limpid, rich in lime and in the germicidal or germ-inhibiting substances which it derives from normal blood serum.

The exceedingly common American habit of hasty eating must be regarded as a potent cause of dental disease. The habit of thorough mastication should be formed when the child is weaned. Training in proper chewing of the food should begin at least as early as training in walking and should be continued by teachers as well as parents and nurses until it becomes fixed and automatic. The chewing of dry food is necessary. To promote thorough mastication was my purpose in the invention of the process of producing cornflakes and other cereal flakes. It was my intention that the flakes should be eaten dry, and they were so used for years by the patients of the Battle Creek Sanitarium. The suggestion of the necessity for the invention came from the jocular demand of a patient that I should pay for the repair of her artificial teeth which she had broken in an attempt to chew the dry zwieback which was a part of my diet prescription.

When the condition of the blood and tissue fluid is such that the tongue becomes coated and the breath foul, the saliva is deteriorated to such a degree that it ceases to furnish the normal protection to the teeth. The mouth becomes foul because the bacteria with which it is constantly being infected are permitted to develop. The mouth cavity normally a place in which bacteria cannot readily grow and develop, becomes a veritable incubator of pernicious, parasitic organisms, and caries and pyorrhea are the natural results of this condition of low resistance.

Probably the most important of the causes which lead to this unclean condition of the mouth is the chronic intestinal stasis which is almost universal among civilized people. Modern physiology, and especially X-ray studies of the colon, have shown that the colon normally evacuates its contents of food residues and body wastes three times every twenty-four hours. Under normal conditions, an evacuation usually occurs after each meal. By extensive inquiry of medical men who have lived long among primitive and semi-civilized people, I have learned that the three-a-day plan of colon evacuation is practically universal among people who have not been house-broken and perverted by close contact with civilization. I am informed by my friend, Professor Hornaday, of the Bronx Museum, that the keepers of the big apes, the chimpanzees, orang-utans, and gorillas, take care to see that their charges move their bowels not less than three times a day. The keeper of the big apes of the London Zoo informed me that in their collection the rule is four bowel movements daily, and the keeper in charge of the fine chimpanzee, Ko-Ko, of the National Zoological Gardens at Washington, D. C., tells me when this animal is in perfect health, its bowels move four to six times daily, and that when they move less frequently, the animal is dumpish, inactive and shows signs of being ill. An increased amount of laxative food brings prompt relief from these symptoms. When the colon is thoroughly evacuated three times a day, little opportunity is left for the putrefaction of food residues, and the result is the absence of putrefactive poisons in the intestine, a condition recognized by physiologists as being the normal; but when the bowels move but once a day or less frequently, food residues are retained for two days or more, and putrefaction

reaches a very advanced stage with the production of enormous quantities of highly poisonous products.

The importance of suppressing the growth of putrefactive bacteria in the colon is emphasized by the observations of Grützner, Boas and others, who have shown that bacteria may be transported from the colon to the mouth by a reversed movement. These observers showed that bacteria of easily distinguishable species, as well as charcoal and raw starch, when injected into the rectum of a dog, appeared in the mouth or stomach within four to six hours, every precaution being taken to prevent entrance by any other means.

It is clearly evident, then, that protection of the teeth requires the maintenance of a sanitary condition in the colon, both to prevent putrefactive changes and also to prevent the exaggeration of antiperistalsis by which putrefactive organisms in the lower bowel may be carried upward, infecting the whole 30 feet of alimentary tract and even reaching the mouth. Carnivorous animals suffer much from decayed teeth, even in the wild state, because of the intense intestinal toxemia to which their diet subjects them. Sportsmen report that lions are often shot that have lost nearly all their teeth by decay. The teeth of dogs are often found badly decayed at the age of 8 or 10 years, while the teeth of horses two or three times as old are still sound.

Putrefaction in the intestine promotes decay of the teeth both by lowering the general vital resistance, even, as has been shown, by direct infection of the mouth. I have been convinced for many years that intestinal toxemia is probably the most active of all causes of dental decay and hence a cause to combat which our most earnest efforts should be

directed. The mineral water, pills and other similar measures which have long been so extensively used for combating constipation, have not proved efficient for, while they afford temporary relief, they damage the intestine, producing colitis and encouraging through infections the absorption of toxins from the intestine.

The rational remedy is to be found in changing the intestinal flora and so far as possible restoring the normal functioning of the colon. Changing of the intestinal flora consists in the suppression of putrefactive changes in the intestine. This is accomplished by proper regulation of the diet, and such great progress has been made in recent years in the treatment of constipation by attacking the causes of this condition, that it may be said with confidence that practically every case of constipation is curable. It is necessary, of course, to study each case with such care that the obstacle to normal functioning present in the particular case may be discovered and removed. In the great majority of cases, it is only necessary to supply to the intestine a sufficient amount of roughage, with proper lubrication. Fresh fruits, greenstuffs and coarse vegetables, supplemented by ordinary bran, will afford ample bulk to stimulate the colon to activity, and paraffin oil in some form supplies the requisite lubrication.

For the change of the intestinal flora, that is, the prevention of putrefaction, it is necessary that the dietary should include a sufficient amount of carbohydrates to maintain an acid fermentation. Meat will not decay in sour milk. Fifteen years ago I immersed a beefsteak in buttermilk. The meat, which was at the time slightly putrescent, soon lost its putrid odor and still remains perfectly sweet. The carbohydrates which are most efficient in forming bacteria in the colon are lactose and dextrine.

By the free use of these special carbohydrates putrefactive changes in the colon can be quickly lessened and may in most cases be wholly suppressed within a short time.

Summary.--The essentials of dental hygiene as relates to diet may be thus summarized.

1. Early training of children in the fine art of chewing.
 2. The use of dry food to ensure cleansing of the teeth and a good blood supply.
 3. The use of milk, greens, foods rich in food lime, iron and other food salts.
 4. The free use of dates, figs, and raisins instead of sugar and confectionery, and the use of maple sugar, molasses, sorghum, malt sugar and milk sugar instead of refined cane sugar.
 5. A diminished use of protein, especially of meat proteins for the reason that these proteins promote putrefaction in the intestine and in the mouth, especially because of the fact that they are practically always in a state of fairly well advanced putrefaction when eaten, containing many millions of putrefactive organisms in every morsel.
 6. Prompt disposal of the putrescible food residues and body wastes by three or four evacuations daily, so as to maintain cleanliness of the blood and tissue fluids.
 7. Change of the intestinal flora by the use of lactose and dextrine to promote the growth of the *B. acidophilus*, the normal protective organism of the colon, the dominance of which prevents putrefaction.
 8. The maintenance of high vital resistance by biologic living.
- In concluding this paper, I desire to emphasize the fact that the

saving of our teeth is only one of the problems of race decay with which we have to deal, and that the only true solution of this form of degeneracy, as well as of all others, will be found in biologic living; that is, we must apply to ourselves with the same rigor that we now apply to our domestic animals, our horses, cows, pigs, and chickens the principles of physiology and biology which apply to human life.

We must provide compensations for the departure from primitive and normal conditions of life which civilization necessarily involves. We need not return to savagery to be healthy, but we must see that the air we breathe is as clean as that which the savage breathes, that the food we eat is as wholesome and pure as the water we drink. We must encourage out-of-door living and sleeping. We must provide in every city out-of-door gymnasiums with swimming pools for boys and girls. We must inculcate respect for the body and appreciation of the value of physical fitness. We must give our pale skins more contact with the sun and air and we must keep the inside of our bodies as clean as the outside. We must cultivate clean blood. Society must establish laws and sanctions which will check the operation of heredity in the multiplication of the unfit. Eugenics and eugenics must become dominant matters of study and concern. Thus and thus only may we hope to check the mad rush of the race down the hill of decadence and slowly climb back and up toward the proud eminence where man as the handiwork of God and the masterpiece of creation, by the aid of his unapproached intelligence and through implicit obedience to biologic laws, may defy the ravages of time and the perturbations of cosmic forces, and endure forever, the one indestructible and triumphant of the millions of animal forms now living and their predecessors buried in the crust of the earth.

THE DIFFERENCE

There are hospitals and hospitals. Great hospitals, little hospitals,--good, bad and indifferent. This one is different. Every nurse who has seen service in another hospital after having been trained in the surgical wards of the Battle Creek Sanitarium, knows the difference; but the best judge of the difference is the patient who has had experience both in the wards of the modest structure shown on the opposite page and in the spacious wards of some palatial metropolitan hospital.

Said a patient to me who after having made a good recovery after a capital operation here had undergone an operation for acute appendicitis elsewhere, "Oh! how I did long for those lovely fomentations which drove away the nagging pain in my back and the hot foot bath that sent me off to sleep without the hypodermic that always spoils my appetite and makes my headache in the morning, and those lovely cushions for the back and the nest of sand bags to lean against, and the refreshing cool towel rubs and soothing frictions, and "hot and cold" when I had a sinking spell and thought I was going out, and the electric pack and the photophore, and the chest pack to stop my cough when I got a cold, and the lovely airings and sunbaths and the bed exercises to music, and the weekly "movies," and the food trays that came down from the kitchen on the top floor laden with savory, attractive and strength-building dainties, and the fresh air of the corridors,--no stale kitchen odors, no tobacco smoke, no "hospital smells",--and when I got able to sit up, how greatly I missed the lovely trees and the long stretches of rolling landscapes so restful to the eyes and spirits. My, I would have given almost anything

if I could have been transported to Battle Creek by wireless or airplane or any other way."

There is a very good reason why the methods of this hospital are different. It is this. The Battle Creek Training School of Nursing was not an offshoot from any other school, but was a new development. The development began as far back as 1876, when only three or four training schools had been started in this country, and it was many years before any nurse who had been trained in any other hospital was associated with the school or the hospital. And so the methods of dealing with surgical cases were original, and were naturally modelled upon the same general principles which characterize what has become very widely known as the "Battle Creek Sanitarium System," which now included the best features of other schools and leading hospitals, while many of the methods which originated here are now in use in many other hospitals in all parts of the world.

Personally, I feel that the best feature of all in our hospital is the superior type of young women who form our corps of nurses. Hundreds of patients have borne testimony to their unusual excellence in womanly and professional bearing and in sympathetic and intelligent care of their charges, as well as in the possession of an extraordinary fund of resources for meeting the various needs of surgical cases. No trifling, no shirking, no neglect, no scolding, no improprieties, no flavor of cigarettes. Said a patient who had been fairly "snatched from the very jaws of death by the vigilant care of a faithful nurse," "She is an angel. There is a heavenly benediction in her smile and I always see a halo about her head."

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(A paper by John Harvey Kellogg read before the Rotary Club at Albany, Georgia, June 12, 1923).

Food

THE PECAN A MEAT-BEARING TREE

Our remote ancestors gathered their meat from trees instead of seeking it in shambles and butcher-shops. Holy Writ bears evidence to this fact in the very first chapter of Genesis, where we read, "And God said, 'Behold I have given you every herb bearing seed, which is upon the face of all the earth, and every tree, in the which is the fruit of a tree yielding seed; to you it shall be for meat.'" The earliest traditions of all of the great nations of antiquity picture early man as living in a ^{meatless} Golden Age. Said Pythagoras, the first of the Grecian philosophers who lived three centuries before Christ,--

"Oh, impious use! to nature's laws opposed,
Where bowels are in other bowels closed;
Where, fattened by their fellows' fat, they thrive;
Maintained by murder and by death, they live.
'Tis then for naught that mother earth provides
The stores of all she shows, and all she hides,
If men with fleshy morsels must be fed,
And chaw with bloody teeth the breathing bread;
What else is this but to devour our guests,
And barb'rously renew Cyclopean feasts?"

.....

"Not so the golden age, who fed on fruit,
Nor durst with bloody meals their mouths pollute.
Then birds in airy space might safely move,
And timorous hares on heaths securely rove;
Nor needed fish the guileful hooks to fear,
For all was peaceful; and that peace sincere."

"O mortals, from your fellows' blood abstain,
 Nor taint your bodies with a food profane,
 While corn and pulse by nature are bestowed,
 And planted orchards bend their willing load;
 While labored gardens wholesome herbs produce,
 And teeming vines afford their generous juice."

All scientific men are now agreed that nuts were the chief staple in the diet of primitive man. Meat was not eaten ^{by him}, for man is a primate, and primates are not meat eaters. A horse eating beefsteaks, ham and sausage, would be ^{no} more out of joint with his physiological antecedents than is man consuming the same comestibles. Professor ^{Elliot} Elliot, one of our most eminent authorities on the life and habits of prehistoric man, tells us that when the human race was first making its appearance, ^{man} he was strictly non-carnivorous, and that nature had made ample provision for his sustenance by covering the earth with forests of nut trees. According to Professor Elliot, "In the temperate brushwood and on the river-sides, acorns, hazelnuts, hawthorn, sloe, cherry, and plum might be found. Here and there he might alight upon a walnut or almond; figs also of one kind or another seem to have been common. Palm trees existed, and some of them were of enormous size."

Professor Ami, of Montreal, one of the most modern of paleontologists, tells us that man did not become a flesh eater until after the Glacial Period, and suggests that the great falling off in the consumption of meat in the United States since 1902 has amounted to a decrease of fifty-five pounds, or twenty-four per cent annual per capita. The amount of meat eaten is due to "a tendency to return to the natural and primitive diet."

The reason for this disuse of meat is not an economic one as the packers are finding out to their sorrow. The American people are ^{learning} ~~finding~~ out meat is not only unnecessary but that its free use is decidedly harmful, and are becoming more intelligent respecting the value of other foodstuffs which possess all the good qualities of meat, with none of its objectionable features.

While less meat is being eaten, more milk is being consumed, largely the result of the excellent instruction sent out during the war from the U.S. Agricultural Department, calling attention to the need of eating less meat and more milk as a means of promoting health and development. This wise instruction has doubtless resulted in the saving of many thousands of lives. The death rate during this period of lessened consumption of meat has fallen to the lowest point ever reached in the history of our country.

The present effort of the meat packers to induce the American people to return to their former habits of excessive meat eating are not likely to succeed, notwithstanding the efforts which the Agricultural Department is making to assist them by the issuance of posters and the publication of interviews. If the full facts respecting meat were known, a large proportion of the American people would at once renounce its use. The writer presents with this paper a leaflet which ^{shows} ~~presents~~ both the misleading poster of the Agricultural Department, which makes the broad and very misleading statement that meat is wholesome, and also presents the other side of the picture, which shows most conclusively that meat in its ordinary form is most unwholesome and even dangerous. As shown by the leaflet referred to, ordinary meats, as offered

in the market, are swarming with the same sort of germs that are found in the most loathsome filth. All meat is infected with filth germs in the process of slaughtering; and within forty-eight hours of the time of killing, the carcass of every slaughtered animal is swarming with the same sort of germs which are found in a dead rat in a closet or the reeking body of a decaying animal in a fence corner. The best of ordinary beefsteak as purchased in the market, contains 500-1000 times as many colon germs as are found in sewage, and many of the meats sold in our meat shops contain more manure germs than the fresh droppings of animals.

The discoveries of Metchnikoff and other modern investigators have shown the importance of keeping the interior of the body in a clean and wholesome condition. It is, indeed, far more important to keep the inside of the body clean than the outside. The majority of chronic invalids, those who suffer from Bright's disease, headaches, so-called "nervous exhaustion," high blood pressure, premature old age, even many cases of insanity and other ailments are ill because of the fact that the interior of their bodies, especially the colon, harbors putrefying residues which produce highly virulent poisons which overwhelm the liver, kidneys and other organs whose duty it is to protect the blood and tissue fluids from noxious elements.

Thousands of physicians are learning that the first thing to be done for the average patient is to forbid the use of meat. This is the first important step required for changing the intestinal flora, now known to be one of the most important measures which can be taken for the promotion of the health of all well persons, as well as those who are ill.

By changing the intestinal flora is meant to regulate the diet so that the food residues, while lying in the colon, will be of such a character that

that there will be no putrefaction, hence no production of poisons. The stools of such a person have little or no odor, while those of a meat eater are always putrescent because of the putrefaction of the undigested residues of meat lying in the colon.

The use of meat by encouraging putrefaction, also encourages constipation, one of the most universal of human diseases and the mother of a thousand other maladies and miseries. To get rid of these intestinal putrefactions while making use of meat as an article of food, is practically impossible. Tissier, the eminent French scientist of the Pasteur Institute, showed many years ago that plant proteins do not undergo putrefaction readily, as do animal proteins, while being wholly free from the horrible putrefactive germs with which meat is always swarming.

Professor Torrey, of Cornell University, changed the flora in a dog, apparently suppressing putrefaction altogether with plant proteins. The proteins of milk are also superior in this respect to those of meat, and milk has a further advantage that while it often contains many hundreds of thousands of germs, even the worst milk is incomparably better than ordinary meat, for the germs found in milk are for the most part harmless, sour milk germs, while the germs of meat are always of a pernicious sort. The terrible Welch's bacillus produces gas gangrene in wounds and is one of the most deadly of ordinary germs. It is always found in fresh meats, and is naturally found in great numbers in the stools of meat eaters. So the exchange of meat for milk, as recommended by the Agricultural Department during the war, is a great improvement; but it is important that the public should be shown that nuts are in many respects even superior to milk. It is practically impossible to obtain milk free from contamination. Even the terrible Welch's bacillus is usually found in commercial milk, and this germ is not killed by pasteurization, as is generally supposed,

nor even by boiling it. In fact, Welch's bacillus will not grow in raw milk but grows rapidly in pasteurized milk, so unless used quickly after pasteurizing, pasteurized milk may be less wholesome even than ordinary raw, commercial milk.

Nuts are always sweet, pure and unadulterated. They are the very quintessence of food excellence. They are worthy of being made the chief staple in the modern bill of fare, as they were in the diet of prehistoric man. The chief obstacle in the way is their deficient supply. If the whole population should become interested in nuts as a staple food, the world's stock of nuts would be exhausted in less than twenty-four hours. There is not the slightest room to question that the nut is coming into its own. Nuts of various sorts will be the meat of the future.

The chief constituents of nuts are protein and fats, the same as those of meat. The researches of Cajori, Osborne and other recent investigators, have shown that the proteins of nuts are fully equal to those of meat and milk, and it has long been known that the fats of nuts are far more digestible than those of beef, mutton and many other meats.

But there are other important advantages of nuts which are of primary consequence. Nuts are wholly free from the poisonous waste products which are found in all meats and which are so abundant in even the best of meats that a quart of beef tea contains enough poison to destroy the lives of six guinea pigs, as has been shown by actual experiment. Besides, meat is lacking in lime; although it contains a sufficient amount of iron, the iron is of poor quality, whereas, nuts furnish an abundance of lime and are also rich in iron of the finest quality. Besides, nuts are absolutely free from the filthy germs which abound in all fresh, smoked and salted meats and which are only in part destroyed by cooking.

The nut is likewise equal to milk in nutritive value and, indeed, is superior in the fact that while containing a rich supply of lime, it is also richly supplied with iron, which is deficient in milk. The pecan, with other nuts, may thus be regarded as a substitute for both meat and milk. It is, indeed, vegetable meat and milk combined.

Sturtevant tells that ^{us} "The pecan was eaten by the Indians and called by them pecaunes, and an oil expressed from it was used by the natives of Louisiana to season their food. Its use at or near Madrid on the Mississippi by the Indians is mentioned in the Portuguese Relation of De Soto's expedition."

The pecan bids fair to prove itself one of the most valuable foods contributed by America to the world's bill of fare. Its richness in oil of the finest quality entitles it to displace the hog as a source of fat. The "pork tree" might not be an inappropriate name for a tree which can produce yearly during a century or more on an average more than the equivalent of a very fat hog. The equivalent of twenty hogs to the acre, with no expense except the harvest, would certainly be very profitable farming.

The most important thing which nut growers can do for the promotion of their industry is to aid in getting before the American people the facts relating to the superior quality of nuts as food, as compared with meats. The present pernicious propaganda of the packers should be met by a vigorous campaign setting forth the good qualities of nuts.

For fifty years, nuts have been freely used at the Battle Creek Sanitarium, and nuts and nut preparations in this institution wholly take the place of meats on the bill of fare; and this dietary has proved to be so satisfactory it has been widely adopted in numerous other institutions.

The managers of the Beth Isreal Hospital of New York announced that ^{last year} _^

with the opening of their new three-million-dollar building next fall, meats will be discarded from their bill of fare. They made the decision to adopt a meatless dietary after consultation with a half dozen of the leading physiologists of the United States. In the report of these physiologists, every one approved of the plan.

Said Dr. P. G. Benedict, director of the Carnegie Institution Nutrition Laboratory, Boston, Mass.:

"My good friends at the Battle Creek Sanitarium would, I am sure, assure you that your project is hygienically and physiologically sound. Looking out for the food accessory substances, I should be quite inclined to feel that your plan was a safe one."

Said Dr. Lafayette B. Mendel, Sheffield Laboratory of Physiological Chemistry, Yale University:

"If you have ever visited the Battle Creek Sanitarium, you have noted that life is possible and good health is maintained without the use of meat."

Nut growers and the advocates of the meatless diet have no reason to be discouraged. The world is rapidly coming our way. Twenty years from now the owners of large orchards bearing nut trees will be the most fortunate of investors.

Address by Dr. John Harvey Kellogg in the Sanitarium Gymnasium, Field Day,
October 10, 1923.

(The first few minutes of this address were not taken)

Well, our ancestors who enslaved the aborigines soon themselves became enslaved. They captured the Indians and made slaves of them. What do you suppose they did it for? It was not to raise corn, it was not to raise potatoes, squashes, pumpkins and other American food plants which they encountered for the first time, but they enslaved the Indians to raise tobacco. They were captured and made slaves by tobacco, and in order to cultivate their plantations they enslaved all the Indians they could. When they could get no more Indians they went to the West Indian Islands and actually depopulated some of them to such an extent that you can not find a single representative of most of the West Indian Islands like Porto Rico and Jamaica. There is not a single pure blooded descendant of the original inhabitants there. They became enslaved to tobacco and tobacco was carried to Europe and enslaved Europe.

Slavery to tobacco has become almost universal in civilized countries. As a result of this slavery to tobacco two billions of dollars are thrown away every year, more than all the money expended for churches, missions and education. There is almost no one single expenditure so great as that of tobacco with the exception of expenditures for food.

Now, because of this great slavery to tobacco we are cursed with a lot of diseases we need not have. There are also other things. Alcohol is another form of slavery which the American people are subjected to. Still another form of slavery, which I think is doing as much harm as

any other, is slavery to bad habits of various sorts. The average man does not know what to eat.

I went down to Chicago to-day. I was summoned down there by the Federal Trade Commission. People from all over the United States have been complaining because I have been publishing what is to be found in beefsteak. I have been telling the world about the germs there are to be found in beefsteak and they thought I ought to be stopped, that I should be prohibited from sending this information through the mails because people are finding out there are more germs in beefsteak than in some of the worst filth you can find. There are more germs in meat than there are in sewage and the same kind of germs. They don't like the flavor of that kind of talk. I persuaded the authorities that I was not telling the truth half as bad as it really is and I suggested that the proper thing to do would be to get me right up before the Commission and compel me to testify so I would have an opportunity to tell a whole lot more things I have not told yet.

These men are enslaved. They think they have got to eat meat in order to live and in order to make money. Think of the millions of families that are enslaved! Now, the slavery of man to man is a terrible thing, but the slavery of animals to man is not a simple thing. It is not a nice thing at all to raise in this country so many millions of animals simply to cut their throats, kill them and eat their carcasses. This is not a nice thing at all unless it is necessary. Because of this slavery to meat-eating the country is subjected to enormous losses. It costs three times as much to feed animals as it does to feed human beings. When they feed one hundred pounds of food to an animal, then kill that animal and eat it, they only get back three pounds of the original food fed to the animal. If one hundred pounds of corn is fed to an ox and the ox killed, the food you get back is

only equivalent to three pounds of corn. It has not quite so much value in it. Well, that is a fact everybody knows that knows anything about economics. It is published in all the books on animal feeding and animal nutrition.

So it is a terrible slavery. It is the foundation of the high cost of living, because when so much is thrown away, so much time and money, the loss entailed is something enormous. Well, because of these bad habits and others I might mention to you, we are ridden by disease; we have become slaves to disease. Tuberculosis, for example, carries off one hundred thousand people every year. Another class of diseases-- diseases of the heart and bloodvessels--carries off more than one hundred thousand people every year, and these diseases are largely the result of wrong habits of life. There is cancer, a horrible disease, which carries off 75,000 people every year and each year a few more than the year before. Altogether these various maladies carry off a million and a half of our citizens. At least two-thirds of them ought not to die of these diseases. Professor Irving Fisher and others who have made a careful study of this subject tell us three quarters of these diseases are unnecessary and can be easily prevented if you will apply the knowledge the world possesses at the present time.

Now, how are we going to get rid of these different forms of slavery? How are we going to get real freedom? There is only one way and that is by right living. We have been making headway in finding out the right way to live but little progress has been made in applying this scientific knowledge in actual every day human life.

A little less than a hundred years ago there was a wise man in New England, a man who had a university education, educated for the ministry and law, a thorough scholar and great thinker, and I think an inspired man

whose name was Sylvester Graham. This man had a vision. He set out to preach this gospel of right living, the religion of the body, to the world. He came through here to Michigan, which was a wilderness then. My father was a pioneer here almost one hundred years ago the very year he came here. This man followed the pioneers clear out to the frontier. This was the frontier at that time. He preached his gospel all over the United States. Various little colonies sprang up all over the country to carry out this idea of biologic living. There was a settlement at Northampton, Mass. and Cleveland, Ohio and also at Oberlin, Ohio. A little group of men, some of whom had been invalids, became acquainted with this man Sylvester Graham and they established a sanitarium at Oberlin which was the foundation of Oberlin College. One of these men was Father Shipherd. He came up here because his colleagues did not fully support him. He came out to Michigan to found a real health college. He wandered around through the woods north of here about 25 miles from this place. One day he kept wandering around in a circle and he always came back to the same spot. Three different times this occurred and he finally concluded that the hilltop where he returned to would be the site of the college. That was the beginning of Olivet College. Unfortunately he died six months later. He died of malaria fever. In those days malaria was all about here. Down in Indianapolis malaria was so common they used to put quinine on the table with the pepper box and the sugar bowl so people could help themselves and eat it with the food. This was a malaria infested region at that time. It was no wonder the poor man died because at that time they did not know anything about treating this disease.

The other day I went to Olivet. I went over there to tell them they had lost their ideal and I came to bring it back to them. I said if it were true that the spirit of Father Shipherd was hovering over that place, as

so many believed, I knew he was shedding tears because they had lost his ideals and it was about time to turn over a new leaf. They are introducing health ideas as rapidly as they can. I would not be surprised if they would not sometime get back to Father Shipherds ideals.

There was another start made at St. Mary's Lake. About 20 years later an institution was started there and that failed. All these various institutions I have been telling you about, all the various centers, are all dead to-day.

A colony was started here. Some men got inspired with this ideal of Sylvester Graham. They had read his books and became possessed with the idea that there was a better way to live and that that was the only way to get freedom from disease. These men established this sanitarium here in 1866. I had the good fortune to be here on the opening day. My father was one of the founders. Forty-seven years ago when I took charge there were a dozen patients in this institution. During the 50 years I have been here I have seen this work grow up from that little beginning with only a dozen or two people until now we have in the summer season of the year two or three thousand people. This institution is representing the original ideal of biologic living as the real way to freedom--physical, mental and moral freedom.

Freedom of the body from disease is the foundation of health and efficiency, for mental efficiency as well as for physical efficiency.

The reason why this institution is here is not because of anything I have done here personally but because of the teamwork we have been doing, because of the loyalty of the people in those early days--still here some of them to these principles. I might mention the names of many who have been here many years. There is scarcely one among the leading people of this institution who has not been here for 20 years or more. Dr. Stewart has been here more

30 years. Drs. Mortensen, Eggleston, Martin and Colver on the platform here, Mrs. Foy, Mr. Murphy, Mr. Wentworth--all these people have been here more than a score of years. It is because they have stood staunchly for this work, for this institution, for this work and its principles, that we are here.

I suppose the majority of you thoroughly believe in the principles of the Battle Creek Sanitarium, the principles we are upholding, the principles of biologic living. These principles are here and this institution is here and ^{ing} grow because these principles are everlastingly true; they are eternally true. They have been true ever since the human race has existed. These principles have their roots away back in the ages, and the thing that has made the human race what it is is the adherence of our forefathers to these principles of simple living. It is this thing that has made the human race the hardiest and most wonderful thing in all God's creation. It is simply these principles of right living. But in modern times these principles have been departed from. We can see evidence of a growing interest in these principles.† When I look back 50 years I recall many wonderful things which have been accomplished. There is prohibition which was started in those days. This institution has always stood for prohibition. We were laughed at because we did not give alcohol to our patients. For more than half a century we have carried on a medical institution without using alcohol as a tonic, as a stimulant or as a remedy. We have not used it and our patients have gotten well. The institution has profited sufficiently so that we have grown up from that small beginning with a very small investment of ten thousand dollars until to-day we have property here worth--the associated interests here would not be inventoried at less than five million dollars.

It is not the result of gifts but the result of its own work, largely the result of the contributions of the workers themselves who have worked for

small pay and made sacrifices and have contributed their services, some of them almost lifelong. It is contributions of this sort which have made the institution what it is.

Now, as I have said, some of these great causes of reform which this institution has stood for are winning their way in the world. Prohibition has come at last and is winning its way. Opponents of tobacco are springing up all over the country. Anti-tobacco societies are being organized. A year ago we had a film made showing up the evils of the tobacco habit. We had made a dozen duplicates of that film and they are busy all the time all over the United States. Opposition is growing to all of these evil things. A society has been organized to find out the reason for this growing increase of diseases of the heart and bloodvessels. They are going to find out that tobacco is one of the things which is the cause of it. Another society has been organized to find out what is the cause of cancer. Health organizations of various sorts are at work to try to show people the way out of disease.

This institution is here as a city upon a hill, as a lighthouse that holds up ideals and standards that can be safely followed. The whole world is looking this way for help. Now, my friends, when they look this way it is my hope and prayer the world will see a body of men and women who are standing together and are loyal to these principles. I daresay there is not a person in this room who would like this institution to change its practice and put beefsteak on the table. How many are there in this audience who believe it would be better for the institution and better for the world if this institution would change its practice and serve meat upon its table? (No hands were raised). How many think it would be a disastrous thing to do and a wrong thing to do? Please say "no." (Almost the entire audience said "NO").

I would like to hear everybody say "no." It would sound first rate to hear you all say it together. (The entire audience said "NO.") Thank you very much.

Some of you when you go out I suppose fall into temptation occasionally. People get to hankering after the flesh pots of Egypt. Of course, if you do, you have to take the punishment for it. When people see you do that they say, "I don't know whether that man believes what he professes to believe or not." So your influence may be on the wrong side. We haven't any rules here that nobody should eat meat. We simply hold up this ideal of sweet living, of biologic living, scientific living, of living in harmony with the great principles. We ask everybody to come just as near to it as he can. It is a great comfort you are willing to shout for it. If you all gradually bring yourselves, or as rapidly as you can, to live for it that would be the best kind of boost you could possibly give it.

(To be read at Lansing, Dec. 14, 1923, at the Third Annual Conference of Health Officers and Public Health Nurses, celebrating Semi-Centennial of Public Health Work in Michigan)

A little more than forty-five years ago, in the summer of 1878, when I was a boy of twenty-six, on an excursion with the American Association for the Advancement of Science, I received a telegram intimating to me that I had been summoned to appear before the Governor, at Lansing. I was considerably disturbed and wondered of what misdemeanor I was guilty that I should be sent for by the Chief Magistrate of the State. I hurried home, and when I reached home discovered, to my astonishment, that I had been made a member of the State Board of Health. Just how and why the Governor, with whom I was quite unacquainted, had selected me to succeed the Reverend Doctor Brigham, of Ann Arbor, who had recently died, I never learned.

A new governor came into office a few months later and appointed me for a term of six years, at the end of which another new governor appointed me for another term of six years. And twenty years later, I served a third term. There have been great changes in the work of the Board in the meantime.

Forty-five years ago the work of the Board consisted chiefly of looking after quarantine against smallpox, measles, scarlet fever and educating the people with reference to dangers from contaminated water supplies and proper ventilation of buildings. At that time, the germ theory was just coming into recognition. There was very little known about it. It was believed that typhoid fever was due to contaminated water. It was not known that tuberculosis was infectious or that diphtheria was contagious. The malarial parasite had not been discovered. Both malaria and diphtheria were regarded as filth diseases.

One of the first tasks assigned to me by the Board was to collect the opinions of authorities all over the world upon the question, "Does the eating of tomatoes cause cancer?" Being very fond of tomatoes, I was very glad to be able to report to the Board, after sending out several hundred copies of a questionnaire on the subject to prominent physicians of this country and Europe, that there were no signs or evidence of the eating of tomatoes causing cancer.

Another problem given me was respecting the cause of malarial fever. The information I collected showed that there was an association between ditches, drainage canals, newly cleared land, wooden sidewalks and pavements, with malaria. The supposition was that these various conditions favored certain sorts of organic decomposition, which polluted the air and thus produced malaria, although French and Italian observers produced such striking evidence respecting the presence of parasites in the blood that I, personally, became convinced that this was the cause of the disease, although most of the members of the Board were skeptical.

In 1882, Koch announced his discovery of the tubercle bacillus, which interested me so much that the next year I went to Vienna and studied the bacillus, under Kolisko. It was nearly twenty years before the views of Koch were fully accepted by the profession. It is only a little more than that since Doctor Gibbs, the professor of physiology at our State University, did not hesitate in his lectures to ridicule the views of Koch as absurd, claiming that the bacillus of Koch was a saprophytic organism and ~~not a~~ non-pathogenic.

(Stricker)

Another research I was asked to undertake was with reference to the contagiousness of diphtheria. I sent out a questionnaire to more than a thousand physicians in this country and Europe, asking their views respecting the cause of diphtheria and whether or not it was communicable. A large majority regarded the disease as incurable. A very considerable number scouted the idea of communicability as being ridiculous.

One Michigan doctor who was most disgusted with the notion that diphtheria could be contagious, and to show his utter disbelief in such a theory, he said in his letter that the day before he had seen a very bad case of diphtheria and removing a large piece of membrane, had put it in a box along with his chewing tobacco. I was neither disappointed nor distressed when, a week or two later, word was received that this doctor had died of diphtheria.

I think one of the most important things done by the State Board of Health in those early days was the organization and holding of Sanitary Conventions in different parts of the State. This work was carried on several years and was a valuable means of educating the people of the State in matters pertaining to public health. These conventions were particularly useful in educating the people in relation to the dangers of polluted water supplies. In those days dug wells were the principal source of the water supply of the State. Very few States were supplied with sewers. Plumbing was a luxury which could be afforded only by the very rich, and behind nearly every house was to be found three holes in the ground, usually not far apart. Two of these holes were receptacles for filth. The other was

the source of the family water supply. The filth which went into the cesspool and the vault filtered through the ^{porous} soil into the well. Typhoid fever was rife in every community. The mortality rate was
At present, the mortality rate is

In the early days one of the important lines carried on by the State Board of Health was metrological observations, one of the special features of which was a test for the ozone of the atmosphere, a theory that was held by several authorities, that pneumonia was caused by ozone, as ozone is most abundant in the coldest months of the year, when the air contains the least moisture, and since the number of deaths from pneumonia is greatest during this season, the conclusion was drawn that ozone must be the cause of pneumonia. This theory received a great set-back through an experiment on monkeys undertaken by the Board.

By the request of the Board, I obtained four Rhesus monkeys and sent them down to Doctor Vaughan, who subjected them for twenty-four hours or more to a blast of cold air. The poor monkeys shivered terribly, but although there was much ozone air at the time and the monkeys were severely chilled, not one of them contracted the disease.

(Possibly mention Dr.Vaughan's discovery of tyrotoxin.)

(Be sure to refer to Dr.Baker's self-sacrificing work for the Board).

(The high standing given the work of the Board through Dr.Vaughan's efforts.)

Dr. Kedzie?

The Board always suffered for lack of funds. I have always regretted that the health work of the State Board of Health was scattered. It seemed very reasonable that the food and drug commission, the livestock commission, the department of vital statistics, and everything else pertaining to the lives and health of the citizens of Michigan, should be brought together in one department, unified in the interest of efficiency and economy of administration.

One matter that began to give me great concern after I became a member of the Board was the discovery of the fact that insanity and other degenerative disorders of all sorts were rapidly increasing. Statistics showed that insanity was increasing at such a rate which, if continued, would make the whole population insane in less than three hundred years. I reached the conclusion that public health measures were, on the whole, detrimental to the best interests of the race unless in some way supplemented, for the reason that they render *inoperative* the law of the survival of the fittest, which resulted in keeping alive a great number of unfit persons, to the detriment of the race.

I am glad to know that in recent years the work of the Board has been broadened and extended in various directions and in lines calculated to result in race improvement through personal hygiene and in the education of the people in better habits of living.

Many eminent economists recognize that the human race is in a state of decadence and hastening toward race degeneracy and final extinction, a result which can only be prevented by education by health campaigns, such as the Michigan State Board of Health is carrying forward through its child welfare work, social hygiene work, and its various lines of practical, prophylactic activities.

*Typhoid 35 per 100,000 in 1900
now 5.6*

Something Every Hospital Needs

Physiotherapy Service May Be Rendered at Small Investment In Equipment; Knowledge of Subject Most Important

By John Harvey Kellogg, M.D., Superintendent, Battle Creek Sanitarium, Battle Creek, Mich.

A department devoted to physiotherapy may not be needed by every hospital, but every hospital needs physiotherapy. Every hospital does not need a dining-room, but every hospital needs food for its patients and a dietitian or nurses and physicians trained in the principles of nutrition and scientific feeding. So every hospital needs physiotherapy and a physiotherapist.

The modern general hospital is supposed to be a place where the sick may receive the benefit of every curative method and resource recognized by scientific medicine, and there seems to be no good reason why the modern general hospital should not realize this ideal in its equipment and the personnel of its staff of physicians and nurses.

LITTLE EXPENSE NECESSARY

If the question of expense is raised, the objection is easily answered by the fact that for a very efficient application of physiotherapy very little expensive or special equipment is actually required. The great essentials of physiotherapy, in addition to diet, are air and water—at different temperatures,—light and exercise—active and passive. These most potent of all means of modifying metabolism and nutrition may be applied in a thoroughly efficient manner and with most satisfactory results without the use of very expensive or elaborate apparatus. The most important part of a physiotherapeutic equipment is a thorough, theoretical and practical knowledge of physiotherapy. With this, great results may be attained with little or no special equipment; without it, the most elaborate equipment is useless.

Not so very long ago, I happened to visit a large hospital which possessed a most elaborate and up-to-date physiotherapeutic outfit. The hydriatic equipment was particularly elaborate and expensive. Said the nurse, "Do tell us how to use hydrotherapy. The doctors send us down patients every day with a prescription for hydrotherapy, but they don't tell us what to do."

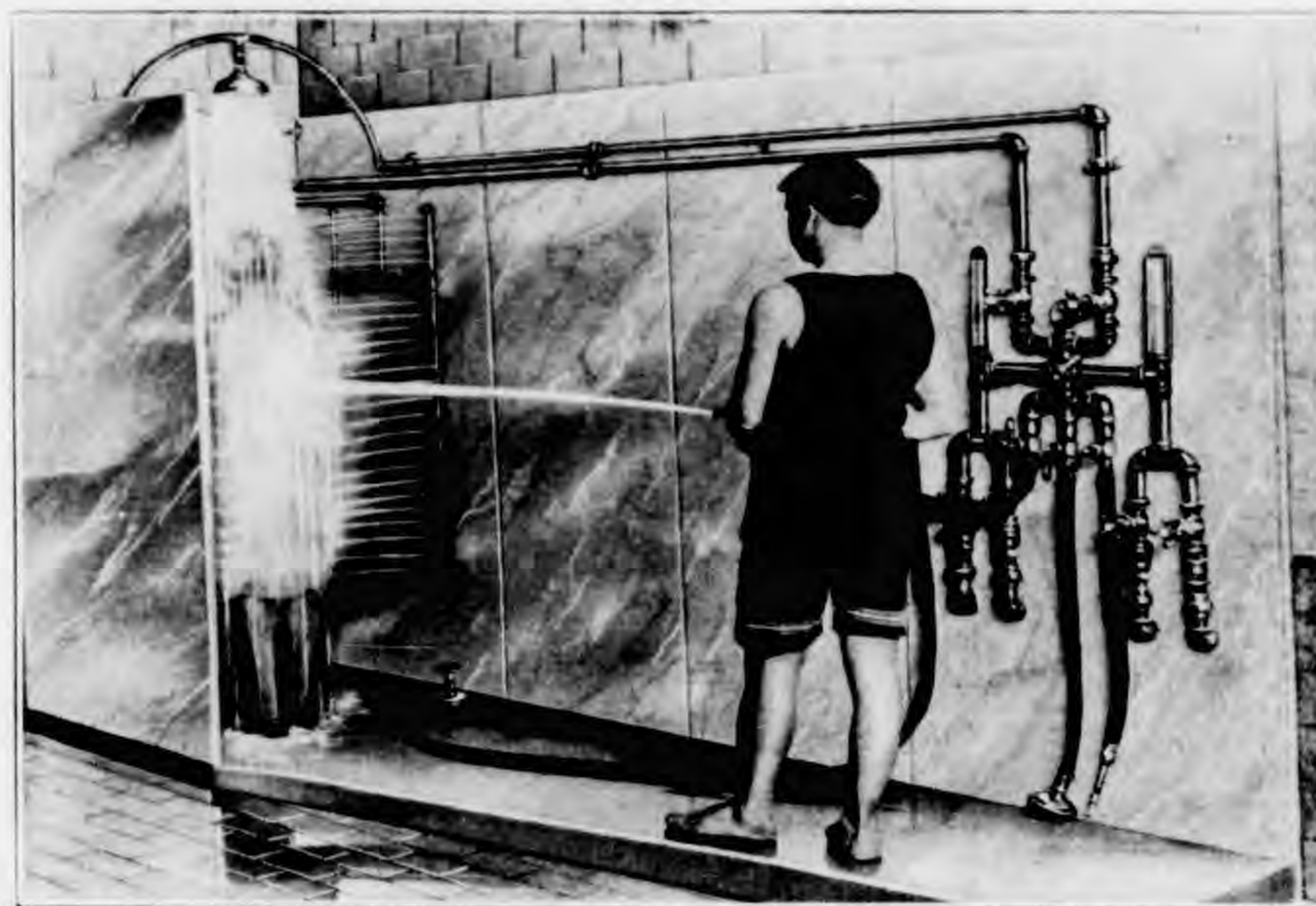
The doctors were not to be greatly blamed. The teaching of physiotherapy in our medical schools is still so inadequate and inefficient that the student has no opportunity to become sufficiently familiar with the technic to be able to make an intelligible prescription. Although now recognized as the biggest part of therapeutics, it receives the least attention. Very often the teachers are themselves little familiar with the subject. This neglect of physiological therapeutics by our medical schools is without doubt responsible for the existence of osteopathy, so-called chiropractic, and a dozen other medical cults.

KNOWLEDGE OF SUBJECT IMPORTANT

Water, as a means of producing thermic impressions and thereby influencing the vasomotor nerves and centers, is the most potent as well as the most

versatile of all curative agents. By its proper use, even with such simple means as a wet rag, it is possible to control almost at will the blood circulation of any vital organ, and thereby to produce therapeutic effects quite surprising to those who are not familiar with the results obtainable with this wonderful agent when skilfully applied even with the simplest means.

A room or series of rooms fitted up with expensive appliances makes a fine show in a hospital, and produces a great impression upon visitors and may be made of real and great service; but the thing really needed in the general hospital is such an intimate acquaintance with the resources of physiotherapy as



HYDROTHERAPY APPARATUS AT BATTLE CREEK

will in large measure eliminate the use of hypnotic drugs to produce sleep, of medicines and mineral waters to stimulate delinquent colons, and even of drugs for relief of pain.

The neutral bath and allied measures are so remarkably efficient in producing sleep that the use of sleep-producing drugs is rapidly becoming obsolete in the leading hospitals for the insane in this country as well as in France and in other European countries where they have been long employed.

The analgesic effects of heat are among the most remarkable of all therapeutic effects. Heat kills pain. Just how, nobody knows, as no one has yet explained the action of opium or of other pain-relieving drugs. Of course, heat is not a complete substitute for opiates, but it will relieve at least nine-tenths of all the pains for relief of which opiates are commonly given, and has the great advantage of being wholly free from the numerous dangers and disadvantages of opiates. Every hospital should be supplied with conveniences for quickly preparing fomentations, with thermophores and electric photophores, as well as hot water-bags and other convenient means of applying heat. These simple and inexpensive appliances are far more im-

portant than an elaborately appointed department filled with expensive apparatus.

Nevertheless, the physiotherapy department with especially trained persons in charge is just as essential for the complete equipment of a modern hospital as is an operating room, an examining room or a laboratory. In such a department should be found appliances for the efficient use of hydrotherapy, thermotherapy, phototherapy, mechano-therapy, electricity, corrective gymnastics, automatic exercise and indoor and outdoor gymnasiums. For many years I have made a close study of appliances adapted to physiotherapy and have tested every new apparatus that has become known to me and have selected out of a great number of more or less useful appliances those which have proven to be of real service. Chief among these I may mention the following, all of which are in use at the Battle Creek Sanitarium, most of them having been in practical use for many years:

HYDRIATIC APPARATUS

HYDRIATIC APPARATUS—The douche is useful, but by no means the most essential part of a hydrotherapy outfit, although so much emphasis has been given to douche apparatus in recent years that in the minds of many it seems to be regarded as the one thing needful for a complete equipment. Many of the newer hospitals are supplied with expensive douche appliances which are used scarcely more often than are the fire extinguishers. The fact is the douche is an appliance that requires more skill in its use and is less frequently called for in a general hospital than a large number of other much simpler and far less expensive appliances, such as sitz, leg, arm and foot baths, and full bath tubs adapted to the neutral bath. The simple shower and spray bath with a good thermostat will satisfactorily supply the needs of the ordinary hospital. The first douche apparatus ever used in a hospital consisted of a box with a perforated bottom which was supported over the patient while water was poured in. This mother of douches, used in a hospital in Edinburgh 200 years ago, though crude, was most efficient in combating fever.

So long as the idea prevails that an expensive douche apparatus is a whole hydrotherapeutic outfit, hydrotherapy will make little progress in hospital practice. The douche is exceedingly useful in certain classes of hospitals, particularly institutions for the insane and those that are especially devoted to nervous diseases and non-surgical or gastro-intestinal disorders. The investment required need not be great. A simple appliance which may be attached to a wall slab will accomplish everything that can be done with the most elaborate and expensive apparatus.

PHOTOTHERAPY AND AEROTHERAPY

PHOTOTHERAPY AND AEROTHERAPY—Light supplies not only heat, but other forms of radiant energy which are highly potent vital stimulants. When light rays fall upon the skin the chemical rays act upon the superficial layers producing, when very intense or long continued, an erythema. The luminous rays, however, penetrate deeper. As they penetrate an opaque substance, like human flesh, they meet with resistance and are converted into the longer, infra-red or heat rays which penetrate still farther. The electric light thus becomes next to sunlight, the most efficient means of applying heat since in the form of luminous heat rays a larger amount of radiant energy convertible into heat in the tissues may be therapeutically applied to a given surface, in a given length of time, than by any other known means.

A beam of light contains all the different forms of heat rays, luminous and non-luminous, from infra-red to the top of the gamut. This is clearly shown by the spectrum. However, it is to be remembered that when luminous rays enter the body, they are quickly converted into infra-red, so that all these rays in practical use become infra-red whether originally luminous or non-luminous.

The most valuable of all our phototherapeutic resources is sunlight. Every general hospital should be equipped with sun porches or an outdoor gymnasium for the warm season and sun rooms for use in cold weather. Unfortunately, in passing through ordinary glass, the actinic rays of sunlight

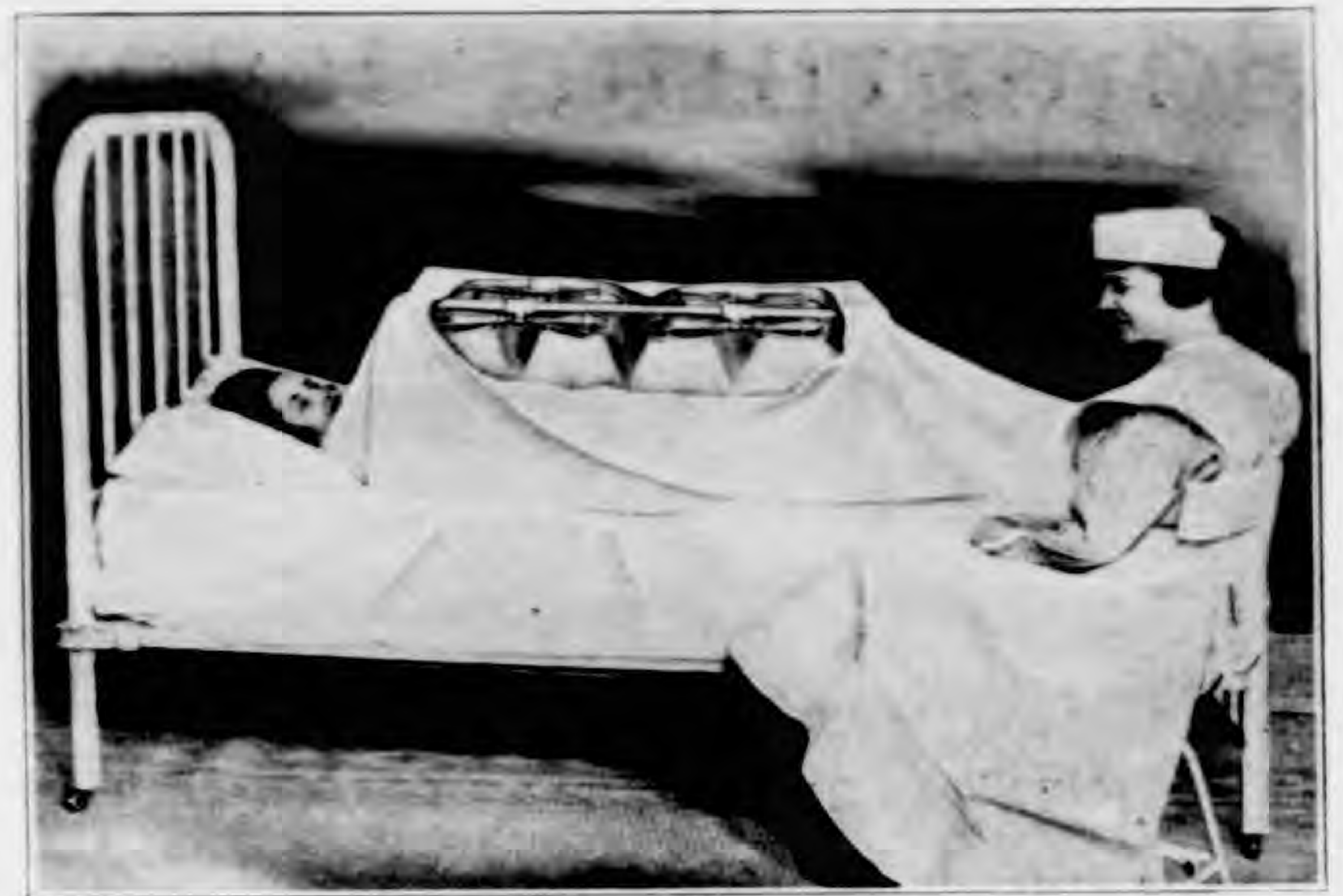


PHOTO-DIAGRAM OF "RADIANTOR"

are largely lost. It is hoped that quartz glass may sometime become available for use in connection with sun-baths in cold weather. I have made use of the sun-bath extensively for more than forty years, and have found it invaluable not only as a general vital stimulant, but as a means of promoting the healing of indolent wounds.

It is doubtless true, as Rollier has observed, that all the benefits of sun-bathing are not to be attributed to the actinic rays or to the effects of light, but are, in part, due to the thermic effects produced by contact with cool air. He finds, for example, that sun-baths are more efficient in the early part of the day, when the air is cool, than in the middle of the day, when the air has become heated. In the use of sun-baths in the outdoor gymnasium, I have, for many years, made use of the cool shower bath as a means of combating the depressing effects of excessive heat during hot weather. By alternating exposure to the sun's rays with short, cool baths, most powerful tonic effects may be produced.

Our long, cold season nearly half a year, and the large proportion of cloudy days, greatly lessens the value of sunlight in practical therapeutics; but, fortunately, most of the advantages of sunlight may be obtained by an efficient use of the electric light. For local effects, the photophore, in which the use of the incandescent lamp is a source of light and heat, and the arc light are most useful and efficient. Every hospital should be supplied with a number of these appliances which are now available in forms adapted to all sorts of medical and surgical cases in which the application of heat is desirable.

To obtain the general effects of light when sunlight is not available is a somewhat more difficult problem. By combining arc lights with Cooper-Hewitt tubes and the quartz light, all of the effects of sunlight may be readily secured. In a cabinet which, for convenience, I call "the sunlight bath," there are six arc lights, two Cooper-Hewitt tubes and one quartz lamp. By this combination, the effects of the most intense sunlight may be secured. In fact, it is even possible to produce in ten minutes a slight degree of erythema, if this is desirable.

ELECTROTHERAPY

ELECTROTHERAPY—While less widely applicable as a therapeutic means, is nevertheless a most important feature of a physiotherapeutic hospital outfit. Unfortunately, electrotherapy has always been more or less in disrepute. This highly useful agent has been discredited by the extravagant claims made for it by so-called electrotherapeutists and by the attempt to make it a panacea, whereas its useful application is really limited to certain classes of patients. It is true that electricity is useful as a general tonic, but for this purpose cold water, cold air and sunshine are so much more potent and practical that its value is overshadowed.

The most important use of electricity in connection with a hospital, outside of its diagnostic uses, is as a means of passive exercise. Two purposes are served, first, the development of weak or paralyzed muscles; and, second, stimulation of tissue change or metabolism. There is a great demand

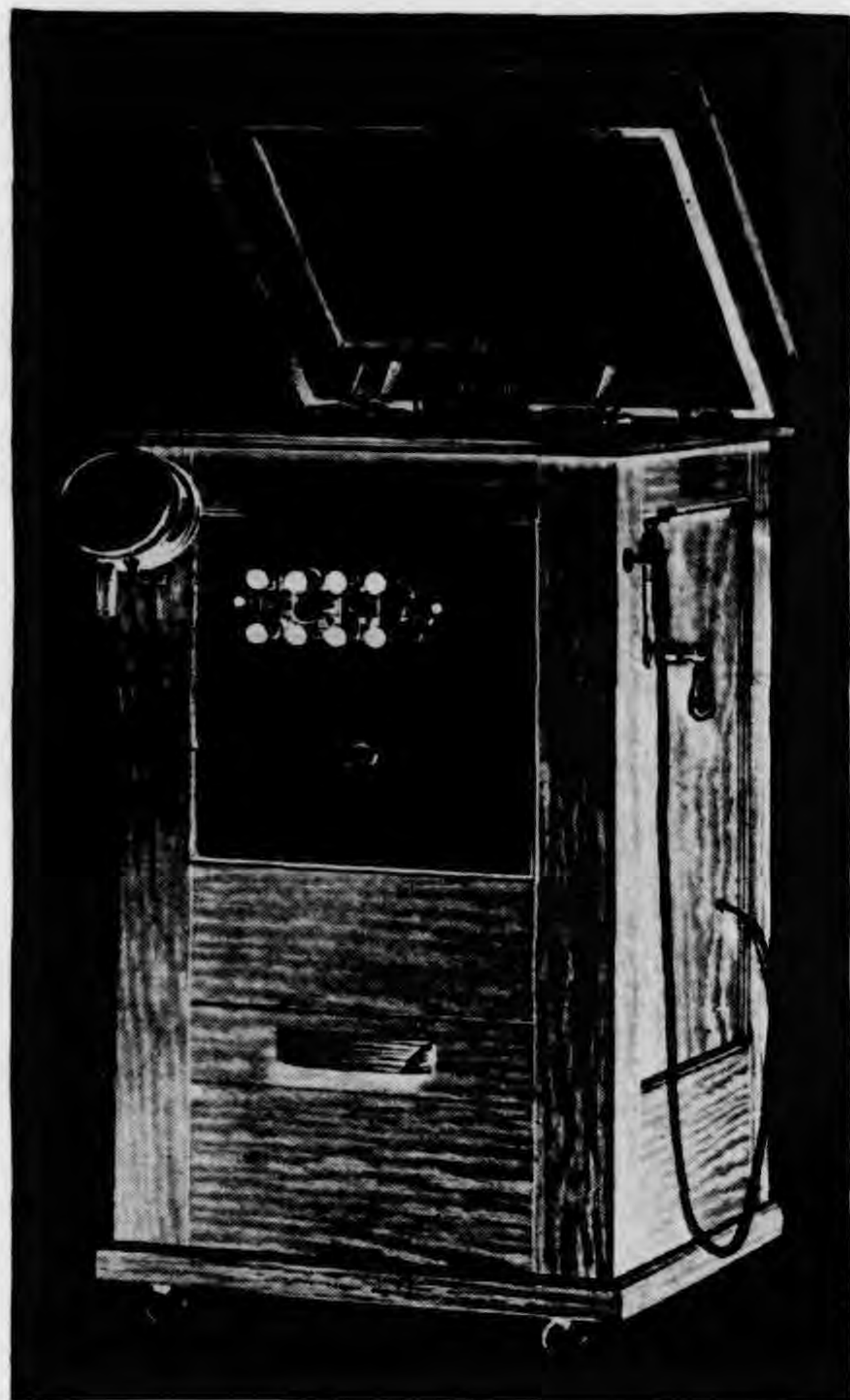
for the use of electricity for both of these purposes in hospital practice. Improved muscular development is required not only in cases of paralysis, but in a great number of cases in which the muscles are weak because of disuse through sedentary life, bad posture, etc.

As a means of increasing metabolic activity, suitable applications of electricity may be advantageously made in a very large number of hospital cases. We are, I believe, prone to forget that the confinement of a patient in bed produces nutritive disturbances which ought to be combated by suitable measures. Modern metabolism studies are also showing that there is a very considerable number of persons whose metabolic rate is below normal and requires stimulation. For all these cases, electricity is a most valuable resource. The best form of electrical current for this purpose is the sinusoidal. I had the good fortune to discover the value of this current as a mode of passive exercise nearly forty years ago. I was carrying on a series of experiments with electrical currents from all available sources and happened upon a form of current which produced vigorous and painless muscular contractions. I saw at once the value of this current for automatically introducing muscular exercise and have made extensive use of it ever since. A few years later, D'Arsonval, of Paris, in experimenting with high frequency currents, discovered a form of current which produced painless contractions and which, on investigation, I found to be identical in form with the current of which I had made use. The current is known as the sinusoidal current because of its form. Its painlessness is due to the fact that in the faradic current the change of direction occurs at the point of highest intensity.

The most efficient forms of the sinusoidal current for influencing metabolism are the sinusoidal bath, by which the metabolic rate may be easily doubled without the slightest discomfort to the patient, and the automatic exercise chair, by which the metabolic rate may be increased to any degree desired—from 100 per cent to 600 or 890 per cent.

THERMO-PENETRATION APPARATUS

Another electrical appliance of proven value is the diathermy, or thermo-penetration apparatus, a high tension apparatus which supplies the current which is practically identical with the so-called wireless current, but of much lower tension. In the passage of this current through the body, the electrical energy is converted into heat and thus by this means heat may be applied to any internal viscus with the same exactness as that with which heat may be applied by other means to the surface of the body. This agent is found exceedingly useful in making heat applications to deep-seated



MEDICAL DIATHERMY CABINET



AN AUTOMATIC EXERCISER

organs such as the lungs or heart and large nerve trunks and certain joints, and produces highly valuable results.

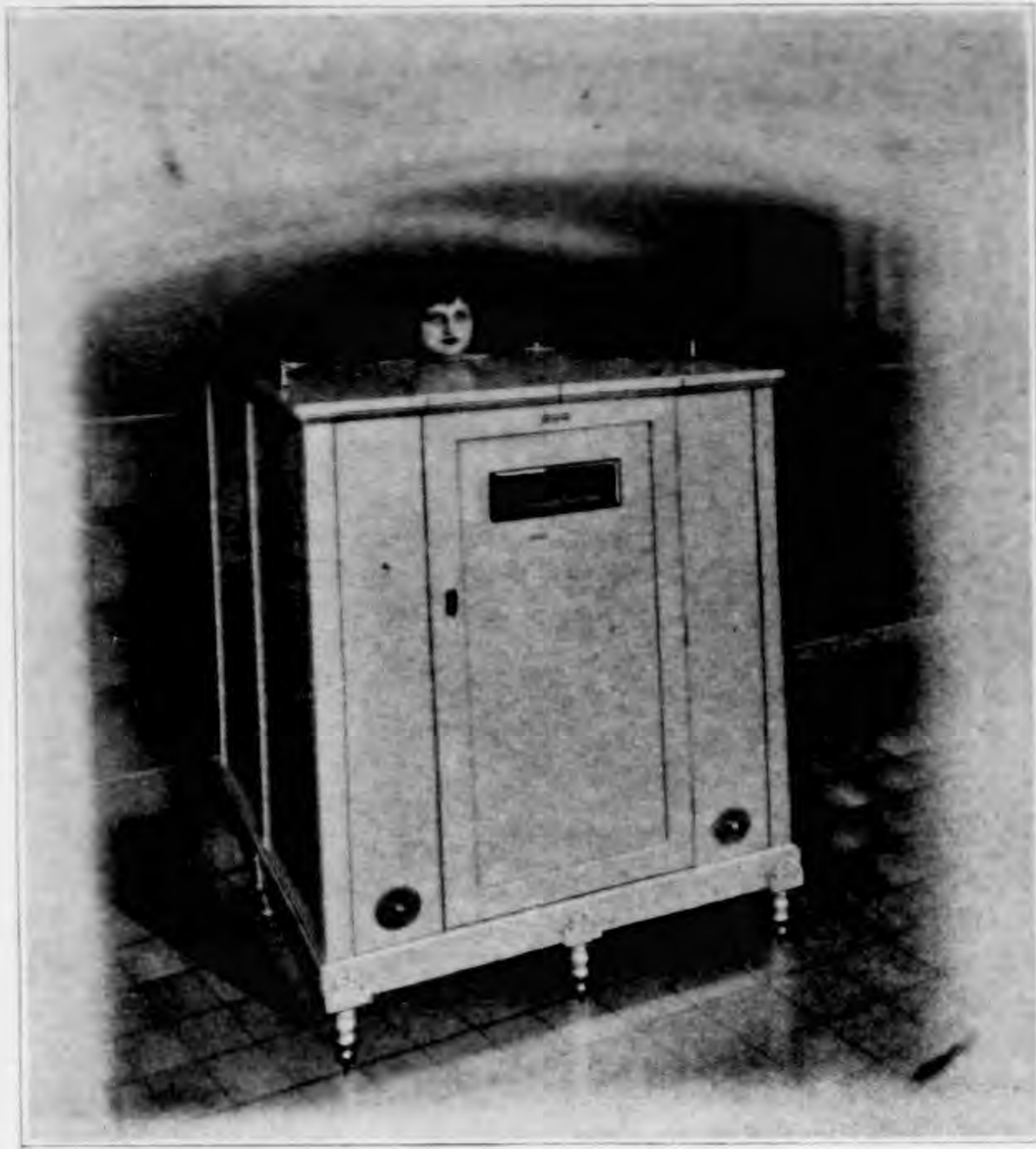
No general hospital should be regarded as properly equipped without these useful electrical appliances.

MECHANOTHERAPY

MECHANOTHERAPY—Mechanotherapy, like electrotherapy, has been greatly discredited by the excessive claims made for it in the attempt of the partisans of this method to accomplish by mechanical means results which are much more efficiently obtained by hydrotherapy or electrotherapy. After careful study of all the various forms of apparatus which have been produced in this country and in Europe for use in mechanotherapy, and after an experience of more than forty years with this line of therapeutics, I am thoroughly confirmed in the opinion that certain results may be accomplished more efficiently by suitable mechanical appliances than by any other means and that at least a few of these appliances might be advantageously added to the equipment of the average general hospital.

Perhaps the most useful of these appliances are means for applying a kneading movement to various parts. By means of a simple device, the oscillo-manipulator, kneading movements may be applied to any part of the body and the movements may be graduated from the most gentle application to the most vigorous and thorough-going. Applications of this sort are highly valuable for patients subjected to long confinement to bed as the result of traumatism or after serious operations, in cases of paralysis and in the wasting of muscles which results from chronic joint diseases. Mechanical kneading is also most useful in connection with the rest cure, in convalescing cases and in all cases in which it is desirable to promote local or general nutrition. Mechanical massage, as well as manual, has the advantage that it promotes anabolism, or constructive metabolism, without materially increasing catabolism, or destructive tissue change. Exercise promotes constructive metabolism, but at the same time enormously increases destructive metabolism. Hence, in cases in which it is desirable to promote tissue-building and an increase of fat and blood, passive exercise and massage render invaluable service. The average patient cannot afford to pay for the services of a trained manipulator. This opens a wide field for the mechanical manipulator, which is in practical use for securing the general systemic effects of massage fully as thorough-going and efficient as is manual massage. Mechanical massage has the advantage that it may be applied by the patient himself or by an ordinary attendant and thus may be utilized in a great number of cases which might not be able to afford the expense of manual massage.

A large general hospital should provide a variety of mechanical appliances for administering passive movements for the mobilization of the joints and appliances for promoting exercise, such as pulley weights, the riding horse, the stationary bicycle, rowing machines, etc. For the efficient use of exercise as a therapeutic measure, a suitable means should be provided for obtaining accurate information regarding the patient's muscular system. A thoroughly scientific method requires the testing of the strength of each of the larger groups of muscles and comparison of the results with normal standards. This is best done by making a graph, which will



ELECTRIC LIGHT BATH CABINET

show at a glance the defective groups of muscles and the degree of deficiency in strength. This method, which has been in use at the Battle Creek Sanitarium for nearly forty years, was adopted many years ago by the Government military schools at Annapolis and West Point. Every cadet who enters Annapolis is examined by this method and required to bring up the strength of all the weak muscles to the 100 per cent line before he is allowed to spend any time watching the ball games and other competitive sports.

Attention must be given, also, to posture. This applies to bed patients as well as ambulant cases. The study of the outlines of the body are often highly suggestive of deeply-seated morbid conditions to which attention should be given. For example, a round back and a protruding abdomen always indicate a low-standing diaphragm. Since the pericardium is attached to the diaphragm, when the diaphragm is dragged down, the heart is dragged down with it, and with every heart beat the heart muscle is compelled to do, in addition to its normal work, a large amount of unnecessary and unnatural

work in lifting the diaphragm and the heavy viscera which are attached to its under surface.

AID TO PATIENTS

These patients with flat chests, round backs and prominent bellies, have no endurance when they are on their feet and quickly get out of breath when they undertake exercise of any sort because of the extra work required of the heart. These patients are also very likely to suffer from the strain upon the sacro-iliac and intervertebral articulations, especially of the lumbar region, which is the natural consequence of a position in sitting or lying which puts these joints under undue strains. These strains often give rise to severe back-ache, the cause of which is frequently not suspected. Hospital patients often suffer greatly from this cause. Such patients may be almost instantly relieved by simply propping up the hollow of the back with sandbags or cushions. The backs of seats and rolling chairs provided for convalescing patients in hospitals as well as the seats in ordinary use in home, churches and theaters and elsewhere, almost invariably ignore the natural requirements of the contour of the body and, affording no support for the lower part of the back, compel the feeble patient to crumple up in order to secure the support which his lack of strength requires.

The shadow-graph affords a convenient means for the study of the outlines of the body, and is an aid to diagnosis, and is especially useful as a means of demonstrating to the patient himself the necessity for observing correct posture in sitting and lying as well as in exercise and work.

From the writer's standpoint, physiotherapy is by far the greater part of therapy, and hence methods and appliances for employing the various physical agents by which the body functions may be influenced should constitute the major part of the hospital equipment and organization. I see no reason why the general hospital should not provide its patients with the same advantages which are afforded by the up-to-date sanitarium.

In conclusion, I will call attention to what may be termed prophylactic physiotherapy, which I consider as important as any, if not the most important of all. This consists in the systematic education of the patient while under treatment, in right habits of living. While the medical or surgical care of the patient must, of course, be the first and principal aim of the hospital, the proper education of the patient during the period of his hospitalization, so that he may be so far as possible insured against the necessity of again seeking hospital care, should be made a regular part of the work. The opportunity is one which should not be neglected. Every general hospital ought to have associated with its physiotherapy department a health director capable of instructing patients in an entertaining and convincing way, so that when the sick man leaves the hospital he may carry home with him not only a body which has been improved by the treatment which he has received, but, through the teaching and training which have been given him, a new set of habits through which he may not only maintain the improvement made, but may for a long time afterwards continue to improve in bodily fitness and efficiency.

Mar. 25/24

A New Method of Studying Posture and Development

A New Method of analyzing and defining the posture of the body in the vertical station.

More than 50 years ago, through the study of the Swedish System of gymnastics, I became interested in the question of posture, especially in the standing and sitting positions.

I devised an instrument for making outlines of the human figure and made a study of some hundreds of such outlines, the purpose being (1) to determine the form and poise of the normal human figure, and (2) to discover any possible relation between the external contour of the body and the position and mode of functioning of the heart and lungs and other vital organs within the cavities of the trunk.

I prepared and published a series of charts showing some of the results of my studies, some of the figures of which are shown herewith.

In the studies of the standing posture, I have always met with two embarrassing difficulties, (1) the absence of clearly defined standards, and (2) the absence of terms and exact descriptions of postures and contours believed to be departures from the normal.

During 50 years in which I have been engaged in the practice of medicine, I have given constant attention to the question of posture and have become convinced, on one hand, that bad postures are a much more important factor in the production of grave disabilities and even diseased conditions, than is generally supposed; while, on the other hand, training in proper bodily carriage and the correction of physical defects and deformities due to bad postures, are means which can not be safely overlooked in dealing with cases of chronic disease.

In an effort to determine the normal contour of the body, I made quite an extended study of women who had grown up under natural conditions. Among these were a number of American women who had had special opportunities for athletic training and had escaped the damaging effects of restricting clothing.

I visited the Yuma Indians, at that time still living in their primitive simplicity, the men being clad only in G strings and the women in small bark aprons.

I found these primitive people splendidly developed. The men were veritable Apollos in physique and several women that I measured had very nearly the proportions of Venus de Milo.

I also studied native Mexican women and native Chinese women who had never worn civilized dress. I made studies, also, of a considerable number of ancient Grecian models of men and women. I made the interesting observation that women have a larger waist than men. Comparing the waist measurement, taken at the narrowest part of the trunk, with the height, I found the proportion to be 47.6 per cent for women, and 45.4 per cent for men.

I later (1899) confirmed my observations by studies of French peasant women and of native women from the upper Nile region, whom I had an opportunity to study during a visit to Cairo some twenty-five years ago.

I think this is a matter of considerable importance for not only women but men have, through the vicious influence of the fashion plates, formed a false ideal of the contour of the human female figure.

It is necessary that women should have a larger waist than men for the reason that the stomach, liver, spleen, kidneys and colon, -all organs which lie in the trunk at the level of the waist, are larger in proportion to body and weight than in men, and so long as women resort to mechanical means to reduce their waist measurement, there will be

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no hope for securing for them the vigorous, muscular development necessary for the maintenance of correct bodily poise.

Another study which I began many years ago (1883), which I may briefly mention as of interest in this connection, was the testing of various groups of muscles of the body, including those of the trunk, and a comparative study of the results in men and women. These results are summed up in the accompanying table, which I first presented in a paper read before the British Association for the Advancement of Science, at its meeting at

These studies made by means of the Universal Dynamometer, which I devised for the purpose, brought out in a very strong light the fact that in persons whose posture is habitually bad, the three great groups of trunk muscles, anterior, posterior and lateral, are disproportionately weak. This is clearly shown in ^{the} graphs which I will throw upon the screen.

While I first became interested in the subject of posture in connection with changes in position of the pelvic viscera, I very soon became convinced that bad postures are a serious factor in many diseased conditions, and that training and proper bodily carriage, ^{and} the correction of the bodily defects and deformities due to bad postures, are measures which should receive great attention, both as means of prevention of bodily disease and as therapeutic means in a very large class of chronic invalids.

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a stagnant pool in which a great portion of the blood is withdrawn from the circulation, thus diminishing the vital efficiency of other parts while hampering the functions of the abdominal organs through accumulation of venous blood.

The evil effects of this accumulation of blood in the ventral region is well shown by Hill's experiment in which a rabbit died in a few hours when supported in a vertical position. Hill showed, however, that the experiment succeeded only in the case of tame rabbits. Wild rabbits survived because of the possession of stronger abdominal muscles.

It is evident from the above that so long as the body is in an upright position its several parts, roughly speaking, the head, shoulders, chest and hips, must be maintained in proper relation to one another. This may be accomplished either by energized muscles, as in forcible standing or sitting, or by the aid of a proper support, as when sitting in a chair with a suitably constructed back. The construction of most chairs is such as to make relaxation of the muscles of the trunk unsafe, even dangerous, because of the mal positions into which the trunk is forced by gravity and the resulting effects upon the heart, lungs, diaphragm and other viscera and the grave disturbance of the functions of respiration and circulation.

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One of the chief benefits derived from play, from breathing exercises, and exercises of all sorts which excite the activity of the muscles of the trunk is due to the fact that such bodily movements serve to drain ^{the splanchic area} this pool of stagnating blood, while increasing the blood supply of the brain, muscles and other vital parts. It should be regarded as much a part of the teacher's duty to train the student by constant admonitions and example in correcting poise as in the correct use of language.

When spending a little time many years ago in Syria, I was particularly impressed with the universally erect carriage of the native Arabs at all ages and under all circumstances; whether swaying back and forth upon a camel's back, keeping time with the rolling movement of the awkward beast, running along beside a train of camels or laden donkeys, or sitting upon a rock eating his dinner of dates, black bread, and dried cheese, the Arab always holds his trunk erect, as straight as a pine. Remarking ^{this} the fact to ~~my friend~~, an intelligent American gentleman who has lived for a third of a century among the Arabs, I was informed that the straight carriage of the Arab is the result of the most careful training from early childhood. Said he, "In an Arab

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encampment in the twilight when the families are gathered in their tents, one may often hear father or mother exclaiming, 'Abraham, sit up straight; you look like a fool doubled up so, ^{Sit up.}'"

Another, and perhaps one of the most serious of all effects of the relaxed posture, is its influence upon the diaphragm. As pointed out by Eppinger, the low-standing diaphragm results in a displacement of the heart. The pericardium is attached to the great vessels of the upper chest and to the trachea above, and to the diaphragm below. The apex of the heart normally rests upon the diaphragm and is supported by it. When the diaphragm is dragged down by the descent of the liver, stomach and other heavy viscera which are attached to its under side, because of a relaxed condition of the abdominal muscles, the heart is pulled down into a vertical position and under a strain, so that, in the words of Eppinger, "during each contraction the heart has to pull itself up." The proof of this extraordinary strain upon the heart is found in a slight up and down motion of the pharynx, the so-called Oliver-Cardarelli's symptom. This symptom was first pointed out by the eminent Professor Wenckebach, of Vienna, ^{some} a few years ago. It may be noticed, even in mild cases of low-standing diaphragm during inspiration. It is evident that a heart which is compelled to do this enormous amount of ^{extra} work at each beat will sooner become exhausted than a heart working free under normal conditions. For this reason, persons with flat chests and rounded backs have little endurance.

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by a line passing from the pubis to the promontory of the sacrum.
With the aid of the X-ray I have found that if this line is extended
backward it touches the tip of the third lumbar vertebra. The Vertical
Axis of the body in the erect position passes through the center of
this line.

The Chest Ratio (C R)

The Chest Ratio expresses the relation between that portion of
the chest which is in front of the Vertical Axis and that portion
which is behind this line. The relation is determined thus: A line
is drawn from the intersection of the Vertical Axis with the plane of
the pelvis and the lower end of the sternum, which is normally the
most prominent portion of the chest. Another line is drawn from the
same starting point to a point at the back of the chest just opposite
the lower end of the sternum. The two angles thus formed are measured
and the anterior is divided by the posterior. Normally, the anterior
angle is always larger than the posterior, never smaller. The differ-
ence is 10 to 20 or even more degrees, so the normal Chest Ratio may
be said to be about 120 degrees.

In the study of individual cases this angle is found to be ex-
ceedingly variable. It is modified by almost any change from the normal
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If the upper part of the trunk is moved backward in relation to the vertical
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The Head Angle (H A)

The angle formed by the chin with the Vertical Axis is measured by a line passing from the chin through the upper end of the sternum

to the Vertical Axis. This measures the degree of forward carriage of the head. A large head angle is associated with an exaggerated posterior cervico-dorsal curve. It is very likely to be found in persons with long necks. The Head Angle has a considerable range of variation. ~~I think~~ ^{appears to be} the normal, ~~is somewhere~~ about 18 to 25 degrees.

In order to make an exact study of posture it is necessary to have an exact outline of the subject. It is desirable to have the front profile as well as the side, although the side profile is most important. There are various means of accomplishing this. The most convenient and exact I find to be what may be somewhat inaccurately termed a shadowgraph, or rather a photograph of the shadow of the subject. The subject stands, either nude or clothed in a thin, tightly fitting undergarment, in front of and close to a muslin screen. A shadow is cast upon the screen by a strong light placed opposite the middle of the subject at a distance of 16 feet. A photograph of the shadow is made by a camera placed behind the screen. With the apparatus which I employ an exposure of about eight seconds is required. The negative shows a white figure on a black background. The negative itself is used for study and record. Positive prints can be made for record if desired. When duplicates are wanted, two or more negatives may be made.

To insure accuracy in the analysis of the shadowgraph the various points of reference must be fixed by markers, which should be placed at the following points: The pubis, the tip of the spine of the lumbar vertebra, the extreme lower end of the sternum, a point on the back opposite the lower end of the sternum and the upper end of the sternum.

The Head Angle (H A)

The angle formed by the chin with the Vertical Axis is measured by a line passing from the chin through the upper end of the sternum to the Vertical Axis. This measures the degree of forward carriage of the head. A large head angle is associated with an exaggerated posterior cervico-dorsal curve. It is very likely to be found in persons with long necks. The Head Angle has a considerable range of variation. The normal appears to be about 18 to 25 degrees.

In order to make an exact study of posture it is necessary to have an exact outline of the subject. It is desirable to have the front profile as well as the side, although the side profile is most important. There are various means of accomplishing this. The most convenient and exact I find to be what may be somewhat inaccurately termed a shadowgraph, or rather a photograph of the shadow of the subject. The subject stands, either nude or clothed in a thin, tightly fitting undergarment, in front of and close to a muslin screen. A shadow is cast upon the screen by a strong light placed opposite the middle of the subject at a distance of 16 feet. A photograph of the shadow is made by a camera placed behind the screen. With the apparatus which I employ an exposure of about eight seconds is required. The negative shows a white figure on a black background. The negative itself is used for study and record. Positive prints can be made for record if desired. When duplicates are wanted, two or more negatives may be made.

To insure accuracy in the analysis of the shadowgraph the various points of reference must be fixed by markers, which should be placed at the following points: The pubis, the tip of the spine of the lumbar vertebra, the extreme lower end of the sternum, a point on the back opposite the lower end of the sternum and the upper end of the sternum.

If desirable, the opening of the ear may also be indicated. 74

The marker employed consists of ^{aluminum} ~~plastic~~ wire bent to an acute angle. The wire is attached at the angle to a thin strip of ^{aluminum} ~~plastic~~ which is fastened to the skin by adhesive straps.

In locating points on the shadowgraph it is only necessary to extend the ~~shadows of the marker~~ ^{lines shown in the shadow} to the point of intersection, which point will of course mark the surface of the body.

In studying the shadowgraph the first step is to connect the markers which locate the plane of the pelvis by means of which the plane of the brim of the pelvis is indicated. The inclination of this line from the horizontal measures the obliquity of the pelvis.

~~the Pelvic Obliquity may be measured.~~ The center of this line is found and a dot made.

^(the Vertical Axis, VA)
A vertical line passing the whole length of the shadowgraph is drawn through this point. Next a line is drawn from the same point to each of the two chest markers, anterior and posterior.

Another line is drawn from the tip of the chin through the marker at the upper end of the sternum to the Vertical Axis.

The angles formed by these several lines with the Vertical Axis are now measured and the results recorded. The measurements are made with an ordinary draftsman's compass.

It should be noted that the angle of the Pelvic Obliquity is measured from the horizontal while all the other angles are measured from the vertical.

It may be remarked that a very useful analysis of a shadowgraph may be made in the manner above indicated without the aid of the markers after one has become somewhat accustomed to studying shadowgraphs by this method. The several lines can be drawn with approximate accuracy even without the aid of the markers.

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15

Simple inspection of the shadowgraph after the Pelvic Obliquity line and the Vertical Axis have been drawn will show clearly at once the several defects which exist. If the Pelvic Obliquity falls below 50 degrees the effect will readily appear in a flattening of the lumbar curve and depression of the chest, and this abnormality will be shown in a diminished Chest Ratio. The lower abdomen will be abnormally prominent, the upper back will be rounded and the shoulders pushed forward. While the Pelvic Obliquity varies less than does the Chest Ratio, being often found normal notwithstanding the presence of marked deviations from normal in the upper torso, figures as low as 40 and even sometimes less are occasionally met, and 45 to 48 is very common.

An exaggerated Pelvic Obliquity, or lordosis, is seldom seen. I am even skeptical as to whether lordosis occurs at all except ~~in cases of deformity~~ as the result of a diseased condition of the bones as in rickets or tuberculosis. In the condition which by many physical directors is regarded as lordosis. I found no increase in the Pelvic Obliquity. The exaggerated curve is due to the fact that the shoulders are carried too far back, the result of a sagging of the trunk through weakness of the back muscles and forward carriage of the head. In such cases when the shoulders are pushed forward and the chest raised so as to give it normal prominence, the so-called lordosis disappears. In making a correction of this sort the Pelvic Obliquity does not change, hence lordosis cannot be present.

It is evident, then, that in corrective work for these cases the effort should not be to flatten the lumbar spine, which is often done, but to get the chest and shoulders forward by proper exercises and especially strengthening the muscles of the trunk.

A low P O is generally found in women suffering from ~~retroversion~~ *pelvic displacement* of the uterus. A pronounced P O is necessary to protect the pelvic floor against excessive strain. This is especially true in women. When a normal degree of pelvic obliquity is maintained, the weight of the abdominal viscera is carried, not by the pelvic floor, but by the pubic

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Fatigue

WHAT MAKES THE TIRED BUSINESS MAN TIRED?

The tired business man is sometimes tired because he works too hard, but I think that is rather a rare circumstance. As a matter of fact very few of us work any harder than we could work without being exhausted or being particularly tired if we lived right in ^{all} other particulars. The trouble is we handicap our bodies so badly that they are not able to do easily the work which otherwise would really be no task at all. I have talked to a great many men who thought they were terribly overworked and thought they were broken down from overwork. As a matter of fact when they told me what they did, the various things they were trying to do, it looked to me as if they had a pretty easy job. I often have said, "I would like to swap jobs with you very much and I should think I was having a vacation if I did not have any more to do than you are doing." As a matter of fact the average person

does not work any harder than he could work easily without feeling that he was burdened at all, without overexerting himself at all, provided he gave himself a fair chance.

Now, if you found a poor donkey struggling up a hill loaded down with sand bags and trying to pull a heavily loaded cart with the brakes on the cart, you would be rather sorry for the poor animal; and if the man was complaining that his poor donkey had to work too hard, what would you suggest to him? First you would suggest that he throw off the sand bags, for they were doing no good; they were simply a burden, a mere handicap. Then you would probably tell him to release the brakes on his cart. ~~That would be another thing.~~ Instead of setting the brakes against the donkey when he was dragging the load up hill, you would release the brakes and perhaps grease the wheels a little. Probably the third thing you would tell him would be to get out and *go behind and* push a little.

heavy
We shall think of the body as a poor struggling *overloaded* animal, for the body is an animal, or we shall *may* think of it as a machine. Think of the body as a machine that is loaded down,

that is hindered and handicapped in a great variety of ways, then you will have in your mind the real situation of the average business man and of the average business woman. The things that make us tired are really not the things we do with our muscles and brains. The things that make us tired are other things that are far more exhausting and that are a far greater burden than our ordinary work. Why, work is healthful and delightful. Brain work is not enervating, it is not exhausting. As a matter of fact when you put a man in a box and shut it up tight and analyze the air that he breathes and the heat that escapes from his body and so measure exactly the amount of energy which is used by the body, or which is consumed by the body in work, you will be amazed to find how little energy the body actually uses in mental work, for example. In muscular work ^{we} you do use a good deal of energy. A man that is running or climbing is really working because he is using his muscles and he is consuming energy, but when a man is simply thinking, no matter how hard he is thinking, when he is using his brain, the energy consumed by his brain is really very small indeed. It is possible, of course,

that a man may be so excited when he is using his brain that his muscles will work as well as his brain, and in that way he will be using a good deal of energy. For instance, if a person is frightened very much he may tremble, his muscles may get to working so hard they will make him shake. Some of you have perhaps had the experience *of this* many years ago when malaria fever was more common than it is now, *or* some of you who have lived down in the South where the anopheles mosquito *is* still rampant, *perhaps* some of you have had the experience of having *an ague* and a chill. You remember how tired you were after you had been shaking for ten or fifteen minutes. One gets terribly tired from shivering. It is really exercise.

Lord Somebody tells us in his interesting account of his travels in the arctic that one day when he was very cold and the wind was blowing a hurricane he sat down on a block of ice and shivered himself warm. There is a good hint in that. The next time you think you are going to take cold sitting in church do not sit there and get cold but just set yourself to shivering. Do not wait until you begin to shiver, but shiver before you shiver,

and in that way, in spite of shivering, you will not take cold because the purpose of shivering is to warm you up. Shivering is high tension. A person shivering fifteen or twenty minutes does as much work as a person running a mile or two or doing a great deal of hard gymnastic work.

Now, as I began to say a little while ago, the tired business man is sometimes tired because he has been at work, but really that is a rather rare thing. The tired business man is not usually working his muscles very hard but he is working his brain. Working one's brain does not make a man tired; it does not exhaust a man. It does not make a man tired in such a way that when he has had a good night's sleep he is still tired. The trouble with the tired business man is he wakes up tired in the morning. Nobody complains of being tired after a day's work. When a man works hard all day he feels he is tired at night. He does not think that is strange. He does not think of hunting up a doctor so he won't be tired. The thing that worries the tired business man is he is tired when he has not worked; he is tired

when he gets up in the morning; he is tired when he knows he ought not to be tired; and that is the sort of weariness that is pathological. That is not normal weariness. That is the kind of tiredness that needs attention. That is something that really one may properly feel anxious about. When one finds himself tired when he ought to be rested, tired when he ought to be fresh, that is the thing to be concerned about. That is what we are talking about tonight.

Just one word more. Work may make a man tired if he works hard enough, but sleep will cure the effects of work. A good night's sleep will rest a man. If he is tired, naturally, normally tired, physically tired as a result of work, when he goes to sleep and sleeps eight to ten hours he ought to wake up refreshed. He generally will sleep until he is rested. If a man sleeps until he gets through sleeping, until he is no longer sleepy, he will at the same time find himself rested when he awakes because nature will keep him asleep until he is rested from his work. That is what sleep is for. Sleep is nature's sweet restorer. When a man

is tired as the result of work and lies down and goes to sleep nature will keep him asleep until he has rested. When he awakes from his sleep he will be rested and refreshed and ready to work again.

That is not true of some other kinds of tiredness, the tiredness of which the business man complains. It is not tiredness that comes from work, it comes from other causes. There is something that is interfering with his machinery in such a way that he is tired when he has not worked.

You know the most tired people I have ever known in my life are people who have never done anything for months. The most tired man I ever saw in my life was a man who had been in bed eight years. He was a big, robust fellow from down in Indiana somewhere. He had been sheriff of the town. He got sick and went to bed and had been there for eight years. His fellow townsmen got together and sent him up here. They put him aboard a train and sent him up here (I think they wanted to get him off their hands) and told me to put him on his feet. After he had been here a few

days I went to see him.

"Doctor," he said, "I am so tired, let me have a little longer rest."

After a day or two I called again.

"Now, Doctor," he said, "I can't work, I am so tired. Let me have a couple of weeks more to rest and then I think I will make an effort to get on my feet and walk."

He had been resting now for eight years steadily, never having taken a step, and he wanted to rest a little longer.

Well, now, I knew that man could walk if he only thought so. He felt tired but he was not tired. A great many people feel tired when they are not tired at all. How do we know that? Here are some soldiers marching all day. They think they are very tired, but the band begins to play and they forget about it. They only think they are tired. We are often deceived about things. The band begins to play and the soldiers go off with vigor. They are in that case somewhat weary, but when the band begins to play they forget about it and find they are not weary

after all.

I got this man on his feet. I played a trick on him. It is not a nice thing for doctors to play tricks on patients, but once in a while we get to the end of our rope and do not know what else to do and we have to do something. I coaxed this man one day out in a wheel chair and told him I was going to give him a little ride, and I took him to the operating room and wheeled him into the operating room to have a little chat. I did not tell him where I was going. In the operating room I happened to have a skeleton right behind the door. Of course we sometimes have to refer to bones in performing operations. In the operating room I had a skeleton very handy right behind the door, and as one went in the door opened in such a way that it hid the skeleton. After we got inside I got him out of the wheel chair and put him in a nice easy chair, and we chatted for a few moments. Then I happened to think of something I needed to do right away, so I hopped up and slipped the wheel chair out with me and shut the door and took the chair away. I took occasion about an hour afterwards to be in that vicinity, and I heard somebody calling, and I

looked down the hall and saw this man coming. When he saw me he released one hand from the wall and menaced me very vigorously. I of course apologized very profusely for having forgotten him and took him in the wheel chair and wheeled him home. I said nothing at all about it. He had walked about four rods in getting down the hall in endeavoring to escape from the operating room and the skeleton.

The next day as I was going up the street I heard somebody shouting at me and I looked up. This man was on the south porch. He was parading up and down there with long strides to show me how he could walk. He had been thinking it over and had made up his mind he was not tired after all. Some people think they are tired when they are not tired at all. They only fancy they are tired.

There is really something good in Christian Science, and I think we ought to appreciate it more than we do. The philosophy is all wrong, but, as a matter of fact, the practice is pretty good, and so I do not attack Christian Science because I really think it is doing a great deal of good to a great many folks because it gets out of the mind of sick people certain ideas that have gotten

settled there and that the remedies the doctors use do not relieve them of.

What makes the business man tired when he is tired all the time but has not been doing anything to make him tired? The people who are the most tired, the people that complain the most are those who are doing nothing at all, but they are so tired they cannot do anything. Now, when a person is really tired from work, as I said before, rest will cure him. That is the test question I always ask people who complain of being tired. I say to them, "Are you tired all the time?"

"Yes, I am tired all the time."

"Are you tired when you first awaken in the morning?"

"Yes, I am more tired then than at any other time."

When I receive those replies then I know that I have just the sort of case to deal with that we are talking about tonight.

Well, now, let us see what are some of the things that make the tired business man tired and the tired business woman tired, the tired dilettante tired, the tired bedridden patient tired. What

are the things that make these people tired? One thing that makes the business man tired is bad posture in sitting. You know, it is a very curious thing when I said posture a whole lot of people began to get uneasy and began to squirm a little bit. That is a very good symptom. I am glad to see my colleagues are not forgetting that important point. One of the most important things any of you can learn in this institution is how to take a correct posture. There is hardly any one thing more important than that. It is a very important thing. The business man is tired because of his bad posture about his work. I have labored with a great many business men about that.

I remember a business man from Boston who came here nearly 45 years ago. He was one of our early patients. I remember he said he had been traveling everywhere to get relief, but he got no better, and finally he came here. He was tired all the time. What do you think his business was? His business was sitting in an office (his father had died and left him very rich) cutting off coupons and signing receipts and things of that sort. He had nothing else

in the world to do. I shall never forget how he looked. His head was hanging forward and he was very round shouldered. He carried his hips forward when he walked. When he sat down in a chair he slumped. When he sat down in a chair he sat after this fashion (illustrating), and naturally when he got up he had the same shape because when one sits for hours in a chair the chair becomes a sort of mold into which the body is shaped like a cucumber growing in a bottle. Have you ever tried that experiment? By and by you have a square cucumber. So we acquire the shape of the posture we assume as we sit about our work.

One of the most lamentable things I know is what happens to our boys and girls in the public schools, boys and girls with beautiful figures, graceful figures, beautiful, graceful creatures, as beautiful and graceful in their movements as a gazelle or a faun as they play about the lawn. These beautiful creatures go to school and they study in the primary school and then the intermediate school and the high school for twelve years and when they come out you hardly find one of them that has a good figure.

Some time ago I remember attending a college commencement exercise--it was not Battle Creek College--and as the students came in line one after the other to get their diplomas, it was really pitiful to see the poor stooped, collapsed figures. The student's stoop was almost universal. Once in a while there was a boy that played baseball who carried his head up in the air, but the girls all had this poor flat chested figure and were anything but graceful in their form.

You remember Aristotle said that beauty consists of symmetry of figure. Beauty of form is more to be desired than beauty of face. Real beauty is the beauty of form and poise. That is real beauty--symmetry. Everybody might be beautiful in that way if he simply takes the pains to think about it. That is a psychologic question.

Well, this business man had this awfully ugly figure I was telling you about. He spent three months with us and got some benefit learning how to eat and some other things, but he was

still tired. He went home tired. Three years later he came back again. In the meantime I had found out about the importance of posture, what an important thing it was to have the body held in a correct attitude, and I told him about it. I showed him how to stand, how to keep his chest up, how to keep his abdominal muscles pulled in, and in three weeks this man ceased to be tired and he went home. We lost a good paying patient. We lost him forever. He has never been back since. Several years afterward I met him in Boston. He told me he was enjoying splendid health. He measured two and a half inches less in his antero-posterior diameter than he did four years before. This one thing cured this man. I might tell you of hundreds of similar cases.

You ask the question Why is this question of posture so important? When a person stands with his chest raised there is a marked hollow here in the back. Why? It is necessary for poise, and it is necessary for balance. If the muscles of the abdomen are well drawn in, the chest is the most prominent part

of the body. As you walk and as you stand the chest is really the most prominent part of the figure because the muscles are being drawn in, and this hollow here, when the back is properly curved, it makes the chest the most prominent part. The front part of the chest falls over the toes. A line drawn from the ear here will touch the ball of the feet. If you are standing here, for example, and you want to rise upon your toes, instead of swaying forward as you will if you are not poised properly, you will go right straight up when you are properly balanced. When you are standing with your hips forward and chest collapsed and you want to get up on your toes, you have to go forward like that (illustrating), but if you are standing properly then if you rise on your toes you go right straight up.

What difference does that make? It makes a very important difference. There is a mechanism that controls the circulation of the blood. We ordinarily think it is the heart, but it is not. The thing that controls the circulation of the blood, determines how much blood is in your brain, muscles, liver and other

parts of your body is down here. It is these abdominal muscles. The abdominal muscles are large, strong muscles that form the anterior wall of the abdominal cavity here, and in this abdominal cavity there are large veins and large vessels, so large that they are capable of holding all the blood in the body. Just think of that. These large veins here in the abdomen below the diaphragm, these veins are capable of holding every drop of blood in the body. This forms a reservoir. Ordinarily these veins are only partly filled. It is important we should have this sort of overflow place as a reservoir because various things happen to us that change the amount of blood in other parts of the body. Suppose the bloodvessels are filled to their fullest capacity and you take a cold bath. The bloodvessels of the surface of the body will contract suddenly and the in-rushing blood in the body would bring such a strain upon the bloodvessels that they would rupture. So there must be a place for the surplus blood to run away. The blood runs into the abdominal vessels. They open and let the blood come in, relieve the strain and keep the pressure balance.

These bloodvessels are capable of resisting the pressure of blood from other parts of the body. Many times I have had occasion to open the abdominal cavity in performing surgical operations. When I have done this I have noticed at once these large veins in here, which are sometimes as big as the little finger, will at once swell out when the abdominal cavity is opened; but when the abdominal cavity is closed and these muscles are properly contracted these vessels are partially collapsed and are not distended. They only contain one-half or two-thirds the amount of blood that they are capable of containing.

These vessels might be compared to a sponge. When the sponge is allowed to expand fully it will soak up a large amount of water, but when there is a little pressure some of the water is squeezed out. Release the pressure a little and a little water will come in. The large organs in here (illustrating) are a sponge under compression. When the muscles relax they fill right up with blood from the rest of the body. I remember once a man complained of being very tired, tired all the time, and as he sat in his chair

I pretty soon told him I thought I could tell him what made him tired. He was rather surprised, but when I insisted I knew what made him tired he finally consented to let me tell him what I thought made him tired. I told him he had a wrinkle in his stomach. He was very much disgusted with the idea. I often wish I had a picture of the expression of disgust that came over his face when I told him he had a wrinkle in his stomach. He had consulted various doctors but they had not been able to find out what was the matter. He had consulted able physicians and being told that all his troubles were due to a wrinkle in his stomach he thought was a very ridiculous thing. Of course it was a ridiculous diagnosis. When I told him he had a wrinkle in his stomach he was not only digusted but he was incredulous. He hadn't any wrinkle in his stomach. He knew he hadn't.

But I asked him to unfasten his clothing and make an examination. He discovered he had a wrinkle, a sharp, deep wrinkle. He was really surprised. How could I know he had a wrinkle in his stomach when I had never examined him? The problem was a very simple one. He had a wrinkle in his vest. I noticed that the wrinkle in his vest did not

straighten out when he stood up so I knew it was an old wrinkle. So I explained to him he had a wrinkle in his vest. Of course I knew as the result of this wrinkle in his vest there was a wrinkle in his skin because of his habit of sitting in a collapsed position.

Of course I hastened to explain to him that there was nothing particularly resulting from the wrinkle to his skin, the trouble was behind the wrinkle in the abdominal cavity, because when there was a wrinkle in the skin there was a relaxed condition of the abdominal muscles, and so this great sponge inside was permitted to absorb all the blood it could. The result was the blood he wanted up here in his head was down here where he did not want it. Here was a large accumulation of blood in the abdomen that ought to be out in the circulation.

Now, the blood drives all the machinery of the body. It is the blood that keeps the mills all grinding and keeps the wheels running in the head. Most people have wheels in their heads. We all have more or less. It is the blood that keeps the wheels agoing. If we do not have blood enough in the head the result will

be one will feel tired. A person who is anemic does not have blood enough to supply his brain and he is tired all the time. That is one of the symptoms of anemia. Such a person never feels strong, never feels vigorous, never feels peppy, but he feels tired all the time because he has not a sufficient amount of blood. You may have blood enough, but if your blood is down here in the abdomen so your brain does not get it, the blood does not do you any good. So it is an important thing to keep these muscles well contracted in order to get the blood out in the circulation where you want it.

Haven't you seen a business man, not only a business man but a business woman who had been sitting in an office chair for a long time, or a woman who had been sitting in a rocking chair or an easy chair for a long time, with a hollow back, sitting in that sort of position for a long time, and by and by if you observe he will heave a sigh. It is a very common thing for a business man to throw his arms up in this way. Somebody comes in and he is interrupted about his work. He throws his arms overhead and takes

a deep breath. That is an involuntary appeal for air. It is his body crying out for more air because he has been sitting in a cramped position so he did not breathe properly. His bad posture has not only caused an excessive accumulation of blood in the abdomen here, but it has confined his chest so he did not get a sufficient amount of air. The air coming into our bodies is just like the air coming into a stove. The mouth is the draft, if you please, the lungs are the vestibule through which the air goes into the whole body. When you do not get air enough the fires of the body are smothered and one feels exhausted and has no energy because there is not enough oxygen to keep the vital fires burning brightly.

Let us note a few more things that make tired people tired. I am going to say something which I think will disturb the ladies very much. Coffee is a thing that makes you tired. It is one of the things that makes you tired. I am sure you will say I am wrong about that because you say, "When I feel tired I take a cup of coffee and I feel better right away." That is the reason why coffee makes you tired. When a person is really tired he has a sense of fatigue because a certain center here in the brain is

excited and notifies him that he ought not to work any more but that he ought to rest. It is a signal, it is a bell that nature rings which says that it is time to stop work and time to rest, time to lie down and rest. When a person feels that way and drinks a cup of coffee he does not feel tired any more. What has he done? He has simply put the signal to sleep. He has simply put out the signal light so he does not know there is danger of overdoing. He does not know that his battery has run down.

You know in every automobile nowadays there is a battery. That battery has to be charged. Sometimes the automobile charges it, but sometimes it does not and then you have to take it to a charging station to have it charged. That is exactly what the nerve centers are. They are batteries that have to be charged, and they are charged while we are asleep. That is what sleep is for. It is for charging our nerve batteries. And if these batteries get too far run down they cannot always be recharged. Sometimes they are so completely overdischarged, overdischarged to such a degree that they can not be recharged again.

When a person has got in that condition he may become an incurable neurasthenic. However there are not a great many of that class of people. Generally a good long rest will help them.

Coffee makes you think you have charged your battery when you have not; it makes you think you are not tired when you are. So you see what a terrible lie it is the Coca-Cola people are publishing all over the world. "Coca-Cola rests you in five minutes." It is a most pernicious lie. It is a thing so infamously false that I think the Coca-Cola people ought to be prosecuted for publishing such a thing. Coca-Cola does not rest anybody in five minutes. It could not charge your batteries in five minutes. All it does is to fool you. It makes you think you are rested when you are not rested, and thinking you are rested you go on working when you ought not to be working.

There is another thing. Coffee interferes with the recharging of your battery. That is the thing that is pernicious about coffee, that is the most pernicious thing of all. It interferes with the recharging of your battery because this sense of

fatigue in the fatigue center, this irritation in the fatigue center by the fatigue products that sets in operation the mechanism by which the battery is recharged is destroyed. In the first place, it makes you feel tired. In the second place, it makes you go to sleep and then it keeps you asleep until your battery is recharged. When one takes coffee it paralyzes the fatigue center so it cannot work efficiently, and the consequence is that you do not sleep long enough, and maybe you can not sleep at all. Many people take a cup of coffee at night and keep awake all night.

Some little time ago I had a very distinguished lady-- I guess coffee drinking is not so unconventional but that I could mention the fact. We had the Poet Laureate of Great Britian with us, Dr. Bridges, and Mrs. Bridges was here also. The next morning after they arrived I heard Mrs. Bridges was very ill and wanted to see me. I went up to see her at about ten o'clock, and she told me she was very ill. I said, "Are you suffering pain?"

"No."

"What do you think is the trouble?" She smiled and

said, "I hesitate to tell you."

"Well, do not hesitate, I am at your service to do anything I can to relieve you."

"Doctor," she said, "I did not have my cup of coffee this morning. If I had a cup of tea or coffee I would be all right."

She had a cup of coffee as medicine, as a part of her regular diet, and in ten or fifteen minutes she was perfectly all right.

What did that coffee do for her? What does it do for anybody who feels wretched in the morning, feels unprepared to meet the day's work. What does that coffee do? It simply makes you think you have had a good night's sleep when you have not. It is a nerve fooler. As a matter of fact it is plain Christian Science. It is a bogus Christian Science. It makes you think you have had a good night's sleep when you have not had a good night's sleep. It makes you think your batteries are well charged when they are not well charged. It makes you think you are ready for work when you are not

ready for work, when your batteries are overdischarged already and sends you on to overdischarge your batteries more. Overcharging batteries is bad for them. Overcharging a battery does not do it any harm at all. That is a good thing for it. When your battery gets too low you take it to the battery station and they overcharge it for you and that puts it in fine condition, but to overdischarge it hurts it. It hurts it so much so it can never be fully recharged again.

So you see why coffee is not a good thing for a tired man. It makes him think he is rested when he is not rested. It makes him go on working when he ought to rest and then interferes with his resting when he has a chance to rest.

Now I am going to mention another thing that makes the tired business man tired. The gentlemen will be very much disturbed because I am going to tell you smoking is one of the most certain means of making a man tired. You will say to me right away, "How do you know that? You are prejudiced about tobacco. You do not smoke yourself and you do not want anybody else to smoke and have

a good time." It is true I do not smoke, but I will tell you honestly I do not object to anybody smoking that wants to smoke. I have not the slightest objection provided he will not make me smoke. I do not think it is fair he should make me smoke along with him; that he should make individuals smoke that do not want to smoke. Tobacco smokers smoke in such a way that everybody has to participate whether they want to smoke or not. When I walk down the street on a warm summer night and the air is still and just a block ahead of me there is a man smoking and when I come along there I still will breathe his tobacco smoke, I say to myself that man is a public poisoner. He is out here polluting the lovely air that nature has provided for us all. He is spoiling the air so it is unfit for me to breathe. That is very unpleasant. I object to that.

I never fail to admire the courage and the loyalty of a poor wife who has married a man because she has seen excellent qualities in him and tolerates his smoking when it is forever unpleasant to her. Yet she loves that man and is loyal to him, stays

right by him year after year when every moment she is in contact with tobacco is misery to her. Many people never get used to it. That is why I object to tobacco. If anybody wants to smoke let him smoke in some secluded place where he can enjoy it all to himself. He can smoke as much as he wants and I will never utter a word of complaint about it.

How does tobacco make a man tired? How do I know?

I do not know from any experience I have had myself. Science says so. We all take off our hats to science. When a business man gets into trouble and he finds his foreman is at the end of his rope what does he do? He hunts up an expert, some expert that has had training in some technical school, the Boston Institute of Technology or some other place where men are trained in engineering and various other lines, and he brings this trained engineer over to his business and he puts him on the job and lets him apply science to his business so as to tell him what the difficulty is. That is exactly what I have tried to do with tobacco. I found men suffering from various diseases and various troubles and I tried to find out

what is the matter, and in investigating various causes of disease I have investigated tobacco.

I have not time to tell you all the things I found out about tobacco, but I will tell you why I know tobacco makes people tired. The professor of physiology down at the University of Michigan, a man of a good deal of learning and who has had long scientific training, made a study of this question of tobacco. He smokes but he made a scientific study of the question simply to determine the effect of tobacco upon the muscles. He had a delicate little machine called an ergograph, a machine that will measure and record exactly the amount of work done by a muscle, and he attached this machine to the end of the finger so as to make the muscle that moves the finger work. He measured the amount of work it could do. He found the amount of work it could do was 75 if I remember rightly. The number of times it was able to lift a certain weight was 84. Then he had this man who was the subject, he had him smoke five minutes and at the end of five minutes he renewed the test, and he was only able to lift the weight 12 times

instead of 84 times, and the total amount of work done was 15
instead of 75. Five minutes' smoking did that to a man's muscles,
and it was not simply his arm muscles but it was his leg muscles
and his chest muscles, his breathing muscles and his heart muscles
and every other muscle in his body was poisoned by the nicotine
so that his ability to work was less than one-fifth what it was
at the start. Now, it was actually an hour after the man smoked
five minutes and then stopped smoking before the muscles had re-
covered so they were able to do as much work as they did before.

This was one of the first studies of this sort made
accurately by means of scientific instruments for measuring the
effects of tobacco upon the muscles. But this is not a new idea
at all. Every trainer of athletes knows tobacco makes men tired.
That is the reason why men who are going to engage in a boat race,
for example, are never allowed to smoke.

I remember a long time ago I was chatting with a pro-
fessor from Yale University. It was not my good friend Professor
Fisher. His name I will not mention because he would not like to

have his name mentioned under the circumstances. The Professor said to me, "Today is the day of the boat race between Yale and Harvard and Yale is going to be beaten, and I am glad of it. I hope Yale will be badly beaten, as she ought to be."

I said, "You are not a very good rooster for Yale. I am much surprised to hear a Yale man talk like that."

"Well," he said, "I will tell you why I am hoping that Yale is going to be defeated. The trainer has allowed the men to smoke. He told them they could smoke a little. He did not want them to smoke much, but he told them it would not do any harm for them to smoke a little. They are going to be beaten and I hope they will be very badly beaten."

They were badly beaten indeed. He said, "If they are beaten then that trainer will be discharged and then they will have a new coach who knows better than to let the men smoke, so next time they will have a better chance." Well, there was some sense in that. He knew men who smoked, even smoked a little, would not be equal to men who did not smoke at all. No man who is a

sprinter, no man who seeks to win a race will dare to smoke.

Hansen and most other arctic explorers have prohibited smoking. Hansen, who crossed Greenland, when his men had to pull their own sleds (for some reason they could not employ dogs) they were not allowed any tobacco at all and they were not allowed any coffee. They tried coffee for a short time because they thought it would be very pleasant to have a cup of coffee in the afternoon and they enjoyed it very much. It cheered them up very much, but after three days they gave up their coffee voluntarily. After three days they avoided taking coffee except in the morning, a cup in the morning, and after a couple of days they gave that up because they found they could not do the work.

What do you think of a business man who sits in his office and smokes and smokes all day long? How can he work at all? The thing that amazes me is that the smoking business man can do any work, that he has any energy when his body is continually saturated with nicotine, which is so poisonous, which has such a potency in making men tired that all trainers of men who are

preparing men for wrestling matches or boxing matches, or for running matches, or for rowing matches, or for any sort of athletic contest, anything that requires strength, vigor and endurance, that such men prohibit the use of tobacco in toto. Why, my friends, it seems to me that the business man goes to work systematically to make himself tired. He smokes and smokes and smokes all day long. Why do you think he smokes? He thinks he is not tired when he smokes. He feels himself. Ask a business man a question. I remember a lawyer I used to consult sometimes. If I asked him a question he would never answer the question until he had rolled a cigaret and taken three or four puffs. I always thought that I had gotten a cigaret answer. I never accepted his replies until I had quizzed him over and over again, and very often I compelled him to change his answer. I did not trust a cigaret answer. The cigaret dulls the brain. Tolstoy said that he never had a qualm of conscience after the third whiff when he was a smoker. It puts the conscience to sleep and puts all the powers of the body to sleep to some extent. It lessens a man's muscle power, his nerve

power and moral power.

I once asked an eminent lawyer who was at that time Chief Justice of the State of Indiana--I said to him--he smoked a good many cigars a day. He came here and stayed some little time to get rid of the smoking habit, but after he returned home he started smoking again. I said, "Judge, do you think tobacco does you any good?"

"Oh, no."

"Does it help you in making a speech before a jury? If you had a speech to make before a jury do you think you could make as good a speech before you smoked as after?"

He said, "Years ago I found out that if I had to make a speech before a jury I must not smoke. If I do smoke I think I can make the best speech I ever made in my life, but it is not so good. It is not so convincing as it ought to be, and so I never smoke when I have to address a jury."

Men have found it out. Trainers have found it out. It is a matter of common observation. Science has clinched the nail.

It has driven the nail into this thing and clinched it that tobacco makes a man tired. It makes his muscles so tired that he can do only one-fifth as much work after he has smoked as he could before. It simply makes him think he is not tired when he is tired. It is worse than coffee in that particular, because coffee does actually give the man power for the moment to do more work than he probably would have done if he had not taken the coffee. Coffee makes a man feel so refreshed that he will actually do more work at the moment probably than he would have done if he had not taken the coffee.

You say, "I can't think unless I smoke. I put a cigar into my mouth and then I can think. Then my imagination begins to play. I can write, I can form a conclusion, and it helps me." I will admit it does a little bit. It is not the nicotine in the cigar; it is not the smoke of the cigar. What is it? It is the taste of the cigar. It is simply the tickle of your cigar. If you tickle your mouth with something else it will do the same thing. If you tickle your mouth with a peppermint lozenge, a toothpick or chewing

gum--i don't care whose brand--or take a little lump of sugar or a glass of cold water you will get the same effect. The cold water will do it a great deal better. Anything that stimulates the nerves of your mouth, the fifth nerve, will excite your brain a little and enable your brain to work a little bit better than it would without.

I am trying to tell you too much. This story is too much for the Question Box. I must hurry on to mention two other things.

Beefsteak makes a man tired. Well, you say that that can not be because beefsteak is the essence of strength. Isn't beefsteak muscle? Isn't muscle the thing that work comes from, and doesn't it come from a strong animal? If one wants to be strong should he not eat a strong animal to be strong? That is an idea that is common in certain parts of the world. That is accepted as a fact. If a man wants to be strong he must eat a strong man or a strong animal. Down in the Sandwich Islands it used to be the custom when one chief killed another he ate him. The reason why he ate him was not because he liked the taste of human flesh but because he wanted to possess himself of his courage, vigor and property.

Now, this idea that we get strength from beefsteak because it is from a strong animal is a cannibalistic notion which has no foundation at all. The beefsteak is already tired when you eat it, and you are going to get the weariness that is in it. You doubt that. Let me give you objective proof of it. A good many years ago we had a prize fight, I think, at Kalamazoo, one of our neighboring towns, a small village which is just west of us. There was a man in this fight whose name was Battling Nelson. Some of you have heard of Battling Nelson. He was badly defeated for the first time after a long series of victories. Everybody was surprised that he was defeated. The newspapers came out the next morning explaining why he was defeated. A reporter called upon him and this was an interview he had had with him. The heading of this article was "'Twas the Beefsteak That Done It." The newspaper reporter said he called upon Nelson and asked him, "How did it happen that you were defeated?"

He said, "It was the beefsteak that done it. I swiped an extra beefsteak when my trainer was not looking and it made me tired."

He knew what made him tired.

Now, there is just one thing more I am going to mention which is perhaps the most important of all things that make people tired. That is bad housekeeping. This house we live in needs to be kept clean. We give a great deal of pains to the exterior of it. I am amazed that people can be contented to go about with their bodies so filled with filth that ought to have been eliminated that actually the flavor of it is coming out. They actually have a bouquet, a sewer bouquet, if you please. That is very common. I meet them many times a day. Their breath fairly makes me sick.

BASIC DIET FOR TIRED BUSINESS MEN

Acid foods, especially breakfast foods, makes the business man tired.

Another thing which makes the business man tired is acidosis.

A member of the supreme court of Des Moines, could write just as good an opinion after dinner as before, after he became a vegetarian.

Member of the State Board of Health.

After-dinner drowsiness.

College professor who was always drowsy in the middle of the day, was able to gain two hours though time was spent in resting, after evacuating three times a day.

(The following is a portion of a lecture given by Dr. John Harvey Kellogg before the Six O'clock Club of Lansing, Michigan, Thursday, March 20, 1924.)

Another fad is the beefsteak fad. You know the average man thinks he must eat beefsteak in order to be strong. I do not see any reason for that idea unless it is because the ox is a strong animal. It is a common notion that you must eat meat in order to be strong, but it is quite a mistake. The strongest animals in the world are not meat-eaters. The elephant is certainly a very strong animal and the ox is a very strong animal. A lion could not keep up with an ox working in the field. Carnivorous animals are all lacking in endurance. Roosevelt wrote, "A horse with a large man on his back can run down a lion in a mile and a half any time." Why? Because the horse has more endurance. A lion has very little endurance.

Some years ago Professor Fisher of Yale University became interested in this idea of biologic living. He visited us and we showed him how to live, rejuvenated him and made a new man of him. He was so much interested that he came back and made some researches. He told me he wanted to make some endurance tests of our people at Battle Creek and then go back to Yale and test the men of Yale gymnasium. I said it would not be fair to test football players, boxers, wrestlers and other strong men of Yale and compare them with our nurses, doctors and bathroom attendants who never had any training. He said, "I admit it would not be fair, but if you should come out ahead in spite of such a handicap it would be all the better for you; it would show up so much better." So I let him go ahead.

but with fear and trembling, because I did not think we would ever come out anywhere at all. He had gotten the idea that there was a difference between endurance and strength.

The first test was to hold the arms like this. How long do you think a person could hold his arms out in this way?

A VOICE: Three minutes.

A VOICE: Five minutes.

Well, Professor Fisher found the first man held his arms out half an hour, the next man an hour, the next man an hour and a half until the last man held his arms out three hours and twenty minutes. He was surprised and I was astonished. I did not suppose it possible. These men went right about their work and did not seem to be affected at all by the test.

He went back to Yale to make these tests. Well, the first man he tested was the instructor in wrestling of Yale. He was a muscular athlete; he had enormous muscles. When this man had been holding out his arms about three or four minutes they began to shake and at the end of four or five minutes they were just going up and down like this. Professor Fisher said, "You can do better than that. Think of those Battle Creek boys holding out their arms two hours and a half. You are not going to fail." At seven minutes his arms fell to his sides and he could not raise them again. He almost fainted away. Well, there was not one single man at Yale who was able to hold his arms out 30 minutes. Fifteen of their strongest men were tested and there was not a single man there who could hold his arms out thirty minutes but one. That man they found was a vegetarian. He was a student who was boarding himself and in order to economize left meat out of his bill of

fare.

The average of our men was 90 minutes and the average of the men at Yale was less than ten minutes. Not a single one reached 30 minutes.

Professor Fisher has published these facts in a paper entitled, "The Relation of Flesh Eating to Endurance." We shall be glad to send you a copy of it. It was published in "The Yale Review" and afterwards it was published in the New York American. The non-flesh eaters always come out ahead.

I asked a hunter in Portland once about his dogs. I said, "What do you feed your dogs?"

"Oh," he said, "I feed them oatmeal, corn meal mush and bread."

"But don't you give them any meat?"

"Oh, I never given them any meat"

"Why not?"

"They can't run when fed on meat."

I was riding across the highlands of Scotland on top of a coach with the driver (I always find the people more interesting than the scenery) and I asked him what he ate. He said, "I eat brose, bannocks and potatoes."

"Do you eat meat?"

"Very seldom."

"Well, what do you feed your dogs?"

"I feed my dogs the same as I eat myself."

"You feed your dogs brose, bannocks and potatoes?"

"Yes."

"Don't you give them any meat."

"No."

"Why don't you?"

"Because they have nae so guid wind."

I asked a dog trainer who came along with a dog show and gave a performance at the Sanitarium what he fed his dogs.

"Oh," he said, "I feed them oatmeal, corn meal mush, bread, and potatoes sometimes."

"Don't you give them meat?"

"Oh, no."

"Why?"

"Because they won't learn anything. I can't teach them anything when they eat meat and then they are irritable and cross."

We have a nutrition laboratory where we try out all sorts of experiments with rats. We have one of the most learned and distinguished persons in the whole institution, a Dr. Mitchell, in charge of this laboratory. Dr. Mitchell is a Ph. D. of Yale and has devoted years of study to the feeding of rats. We spend twenty-five thousand dollars a year or more in these researches. We spend this large sum because these experiments are very important. We try everything out on rats first and if it succeeds with them then it is tried out on me and thus we get the facts. We are always looking for scientific facts. A fact is a thing you cannot get away from.

Old Seneca said, you know, "Religion consists of two things, to seek truth and do good." That is my religion. The Pastor told you I was a heretic. My religion is Seneca's creed, "Seek truth and do good." I do not know anything else worth while.

We find in the study of these animals we get a great deal of information of tremendous value because a rat lives its life in three years. A rat three years old is as old as a person 90 years old, and so in a few months it goes through its whole cycle of life -- it is young, middle-aged, old and senile. The changes which take place are so rapid that you can see the results.

As I was just saying, we find meat not conducive to strength and not conducive to endurance, and that is the reason why we dropped it out of our bill of fare. The reason why meat is conducive to fatigue is because it introduces into the body an excess of protein. You might get the same results from a large quantity of eggs. It is possible that you might get similar results from a large amount of vegetable protein. Since we get protein enough in the other food-stuffs, when we eat meat it is a burden to the body.

Possibly some of you remember a pugilist named Battling Nelson. He was a great pugilist many years ago and then he suddenly failed when it was certainly thought he was going to win the match. The next morning I waited to see what explanation Battling Nelson would give. It came out the next morning, "'Twas the beefsteak that done it. I swiped an extra beefsteak when my trainer was not looking and it made me tired."

Some of you remember when Firpo and Dempsey had their bout a short time ago. The New York Times gave as the reason why Firpo failed that he ate two or three beefsteaks in the afternoon whereas Dempsey trained on lettuce, celery, greens and simple foods. The Times said it would have been very hard on the vegetarians if Dempsey had failed. It would have been.

The trainers have been finding out it pays to give some attention to the matter of diet. The beefsteak made Nelson tired because it filled his body up with waste matters which made him tired. A person who gets up in the morning feeling tired is always suffering from toxic fatigue, and toxic fatigue may be the result of these waste matters poisoning the body.

Meat is not a very wholesome article of food because the animal may not be properly inspected before it is killed. Meat is always in a state of decomposition when it is eaten. That is what makes it tender. When meat is perfectly fresh it is so tough you would not relish it at all. It never gets tender until after it has undergone considerable decomposition. (Laughter). That is the truth.

You will find in this little book I am going to give you a little poster. The packers found out, the consumption of meat in this country has been diminishing very rapidly, about 25 per cent. in the last 25 years. They knew something had to be done, so they got out this poster. The packers have nearly gone to the wall. Mr. Armour has practically gone to the wall. He has just about lost the enormous fortune his father left him. He lost it in the packing business and I have not shed a tear about it. This man was in a bad business. The whole meat industry is a damage to the country. It is the biggest economic waste in the country. I will show you in just one second.

It cost the American people eighty dollars each for the meat they ate in the last year. Any doctor will tell you that three-quarters of the meat was unnecessary. It was treated just simply

as excretory matter. It did not stay in the body at all.

Dr. Sherman, of Columbia University, has shown that if a person takes two glasses of milk or even one glass of milk a day -- Dr. Sherman showed that if you take half a glass of milk a day you can drop beefsteak out entirely. The protein you get in oatmeal, corn meal mush, bread and other foods is sufficient to meet the needs of the body for protein and meat will add nothing whatever that the body needs.

Meat is not always as clean as it ought to be. The packers got so excited because they were losing so much money--Armour lost twenty-nine million dollars in one year and Swift & Co. lost fifteen million dollars--so they asked the government and got the government to get out a poster for them. They sent it out all over the country and put it up in every post office in the whole United States. "MEAT IS WHOLESOME. FOR HEALTH AND VIGOR EAT WELL BALANCED MEALS. USE A VARIETY OF KINDS AND CUTS OF MEAT." That is, won't you eat up the liver, kidneys, lights, lungs and other things so there won't be anything left? It is said that Armour utilizes everything about the pig but the whistle. They have a surplus of meat which they could not sell and did not know what to do with it so they got the government to send out this poster.

I got out a special edition of the poster. Just look over on the other side and you will see what there is in meat. You will be astonished to see what it contains.

Any farmer can kill any old thing, take it down to town and peddle it around and get people to bury it in their stomachs. It is a pitiful thing that we haven't proper inspection. The government

warns the people of the United States and states clearly there is no inspection for trichinae any more because they found that they could not inspect the animals carefully enough ^{to insure} people from getting trichinosis from eating pork. About ten per cent. of all hogs are infected with trichinae.

Cows that are sold to be slaughtered are practically always sick. They are kept until they get sick or do not give milk any more and then they are slaughtered. When the State Board of Health or the Board of Agriculture goes out to inspect a herd and find some of the cattle have tuberculosis, do they bury them? Do they give them a decent burial in some graveyard? No. Those animals are killed and unless the tuberculosis is found found to be diffused through the body, the animal is sent down to Detroit and put on the market right along with the other meat. I daresay there is not a person here who has not eaten a piece of tuberculous cow; that is, if you are a meat-eater.

The head of the Meat Inspection Bureau in Washington said before a Congressional committee that if every animal that was diseased was rejected not one animal in a hundred would be accepted. So the beefsteak fad is doing a great deal of harm.

I remarked a moment ago that out of eighty dollars per capita spent on meat three-quarters of it is unnecessary. Suppose you take out sixty dollars as being thrown away. Multiply it by 110,000,000 and what will it amount to? It amounts to \$660,000,000. That is what we throw away in extra beefsteaks we do not need.

As a matter of fact, Dr. McCollum, of Johns Hopkins, said in

a lecture just the other day that the man who eats the average amount of meat would be better off if he did not eat any meat at all.

(Professor W. E. G. Edwards, Professor of Animal Husbandry, M. A. C., Lansing, Michigan.)

PROFESSOR EDWARDS: I want to know if I understood Dr. Kellogg correctly when he said that nearly all cows were sick before they were killed. He gave the inference that an animal may be badly diseased and the people would be eating that diseased meat. Do I understand you correctly, Doctor?

DR. KELLOGG: In Germany statistics show that 75 per cent. of all cows slaughtered were tuberculous. Statistics from Germany show that.

PROFESSOR EDWARDS: You did not say you had reference to Germany.

DR. KELLOGG: In this country a large part of the cows that are slaughtered are not in the very best of health.

PROFESSOR EDWARDS: I want to make a statement for your information. The cattle that are killed for human consumption are inspected by government inspectors before they are killed and the carcasses are inspected by government inspectors who are not hired by the packing companies but are hired by the government. It is inspected several times before any of the meat is allowed to be put on the market for human consumption and the inference given by the Doctor is entirely erroneous in connection with the killing of diseased animals.

DR. KELLOGG: May I just say this: My remarks did not apply

to the animals that are killed in the packing houses but to animals that are killed in the little country slaughterhouses. There they are killed without inspection either before slaughtering or after, and the reports sent out not long ago by the Bureau of Animal Industry -- you can find it in your own library here -- show that more than 30 per cent of the animals slaughtered and eaten in this country have no inspection whatever.

August 8, 1924.

Last summer, 1923, Dr. John E. Herrity of 303 East 17th St., New York City, came into my office and said:

"My friend, Professor Chittenden, at Yale, told me I must see you and tell you my story. I first came here about August, 1911. I have been here four times since when I have returned here for examinations but I have never talked with you before as I was getting along so well I didn't think it necessary, but this time Professor Chittenden, under whom I have studied physiology in my medical course at Yale, told me I must be sure to tell you my story as he was certain you would be greatly interested. The occasion of my coming here first was this. I was not feeling very well and on consulting my physician, Dr. Sam Lambert, he discovered that I had casts and albumin in the urine. He told me I must take care of myself and told my family that within six months I would probably be in the hands of the undertaker. I learned of this and as I did not get any particular encouragement from Dr. Lambert, I inquired of other doctors what I might do that would possibly prolong my life and happening to meet my friend, Dr. Piffard, he advised me to come here to see you. He said, 'Go out to Battle Creek and get Dr. Kellogg to tell you how to live.' So I came. I saw Dr. Eggleston and he examined me and told me to stop eating meat, to stop smoking, to give up the use of tea and coffee, which I did, and at once I began to feel better.

"When I returned to New York Dr. Lambert told me, 'It is a great mistake to give up the use of meat. You should continue its use. It will be dangerous for you to go without it.' Feeling somewhat troubled about the matter, I ran over to New Haven to have a talk with Dr. Chittenden about it. I was particularly led to do this because

Dr. Chittenden had a little time before published the results of his great experiment for the purpose of determining the low protein ration in which he subjected more than twenty men to a low protein diet and entirely upset the old ideas respecting the protein ration. Dr. Chittenden said, 'Let me tell you a little story. When I decided to make the experiment and arranged with Gen. Wood to send sixteen soldiers to New Haven to serve as subjects with six of our college athletes and four college professors, I thought as the matter was such an important undertaking I would run down to Baltimore and have a talk with Dr. Welch and Dr. Osler about the matter. When they found what I was planning to do, they very earnestly protested, telling me that it was a very dangerous undertaking, that I would do those men great harm and that it was not a safe thing to do and, besides, it was not necessary to make such an experiment for Voit and Atwater had established the protein ration by very elaborate research and it would be useless for me to undertake to upset a standard which was so thoroughly established by scientific facts so I decided that I would first make the experiment upon myself and I began cutting down my intake of protein, finally making it about one-third of the amount usually taken. At that time I was suffering from the gout very severely. My joints were so painful it was very difficult for me to walk from my house to the college although the distance is not great and I had frequently very severe attacks of gouty headache and was besides very nervous.' (Dr. Herrity added "and terribly crabbed". He said "He was indeed the worst crab I ever knew and the boys at the college told me that he was getting worse all the time.") 'At the end of six months,' said Professor Chittenden, 'I found myself entirely relieved of my gout and headaches and wonderfully

improved in health in every way." (And the students reported that his disposition had improved as much as his health in other particulars.)

'So I felt it would be safe to proceed with the experiment and did so and I have continued on the low protein ration ever since.'

'With this encouragement' continued Dr. Herrity "I thought it perfectly safe to follow the advice given me here and have continued to do so ever since. I have a large and very busy practice and have been very active and yet have maintained first-class health. The symptoms of Bright's disease soon disappeared and I never see any indication of the disease except now and then a little albumin in the urine. I have not eaten meat since my first visit here and renounced the use of tobacco, tea and coffee and have lived biologically as nearly as possible. My examination shows that I am in perfect health. I have had no difficulty in getting all the life insurance I wanted.

I said to Dr. Herrity, "I can give you a few points which may be of interest to you and will throw some light on some points." Prof. Chittenden undertook his experiment by request of Mr. Horace Fletcher. Fletcher found himself in such bad health that he could not get life insurance. He got no help from physicians and finally undertook to see what he could do for himself. He said to himself, 'One thing I can do--I can chew.' He had heard that Gladstone required his children to chew each morsel forty times so he began chewing all his food until it was reduced to liquid in his mouth or as nearly so as possible, his rule being to chew until all the flavor of the food/morsel was/extracted. He soon discovered that he was entirely satisfied on about half the amount of food he had formerly eaten, his surplus fat began to disappear and he improved in health in every particular. He shortly observed also that his appetite for meat was greatly diminished so that he could eat only a very small amount of meat and indeed was inclined to dispense with it/altogether. He became convinced from this that

the amount of protein usually eaten is much greater than is actually required by the body. He visited a number of leading European physiologists and submitted himself to feeding experiments and to tests of strength and endurance with such results as to create a good deal of interest among them. It occurred to him that it would be a good thing to have a special research. He arranged with Prof. Gangee to undertake a research for the purpose of determining the actual protein requirement. At an expense of \$1200 or \$1500 he brought Prof. Gangee to this country to attend a meeting of American physiologists at Washington. After the meeting, Prof. Gangee told him that he had concluded that he could not undertake the experiment which was very fortunate for the reason that he was evidently not in good health and he died a year or two later. Shortly after the Washington meeting Fletcher came to Battle Creek, I think in the very early spring of 1903, the spring following our fire when we had our headquarters in West Hall. Mr. Fletcher told me at that time of his experience with Prof. Gangee and stated further that he had arranged with General Wood for sixteen soldiers to be made the subject of experiment and that Prof. Chittenden had agreed to conduct the experiment at New Haven, the soldiers to go there for the purpose to serve as subjects. Mr. Fletcher stated to me at the time that he was helping to finance the experiment and afterwards told me that he invested some three thousand dollars. He also incidentally mentioned several years later that he did not think Prof. Chittenden would ever have undertaken the experiment if he had not made him believe that he was a very wealthy man and awakened expectations that he would endow a chair for the professor. He felt considerably hurt because Prof. Chittenden he thought had never given him the amount of credit he deserved for having originated the research.

I presume Prof. Chittenden would have given him still less credit if he had known all the facts. After my talk with Fletcher I waited with much interest for news about the experiment. I was very anxious indeed to know the result at the earliest possible moment for Fletcher assured me that he was absolutely certain that the result would fully confirm the low protein idea and especially the rejection of meat from the dietary as had been practiced in Battle Creek for many years. He remarked, "Scientific research will absolutely confirm the very things you have been teaching and practicing here at Battle Creek!" I could not understand the long delay and had some apprehension that the project had been abandoned. It now appears that the reason for the delay was the discouraging attitude of Dr. Osler and Dr. Welch which led Prof. Chittenden to experiment upon himself for six months before beginning work with the large group.

I think the reason Dr. Piffard recommended Dr. Herrity to come to Battle Creek was this. For several years I had been in the habit of calling on Dr. Piffard when visiting New York to discuss with him some problems in electro physics and also to get from him information with reference to the physics of light to both of which subjects he was giving much attention. He treated me with much courtesy and we sometimes discussed questions of interest until midnight. On two occasions when midnight came he invited me out to a restaurant across the road from his house where he ordered a large Welsh rarebit, I think sausage, coffee and other things, which I regarded as quite unwholesome. Of course, I tasted nothing telling him that I was not in the habit of eating at that time of day, that I thought it was a very unwholesome thing for him to do and this led to a discussion of other questions of diet. I was not surprised when a few years later I learned that Dr. Piffard was suffering from arteriosclerosis and high blood pressure and a year or two

later he was dead. He doubtless realized that he had made a mistake in not eating more rationally so was prepared to give Dr. Herrity the advice which brought him here.

v-m 8/11/24

Ann Arbor, Apr. 2, 1925.

BIOLOGY TEACHERS IN RELATION TO THE HEALTH PROBLEM

What is the function of the teacher in our modern scheme of life?

Naturally, to promote education.

What is education? Wiggam says that education is a thing that enables us to get along without intelligence. By possessing ourselves of the products of the intelligence of other persons, we avoid the necessity of using our own.

We teach our hands to write and our feet to walk, and our tongues to talk automatically, so that these acts, as well as most of the common acts of life, are performed without conscious mental effort.

Habits are thought-saving devices.

A thoroughly well educated man is almost a mannikin, and can be depended upon to react to the contacts which he makes with his environment, in accordance with the training which he has received.

The teacher molds and controls this training.

Teachers as a class hold in their hands the destiny of the human race.

The teacher--the public school--is the one hope of humanity.

But education mismanaged may ruin us.

It would seem apparent that there must be something wrong with our educational system since, in spite of all the efforts of educators in the last 500 years since the race began to merge from the Dark Ages, we have lost ground both mentally and physically, instead of gaining.

Civilization is destroying us because of our misdirected educational system.

If we want to find a really healthy man, we have to go to the wilderness, or else to take the civilized man and make him live the life of the savage.

England's dum-dum bullets.

Case of Alexander Selkirk (1703)

Education is destructive unless properly applied.

Sanitation--Public Hygiene--Child Welfare work,--all the splendid things that are being done for the conservation of human life, only result in defeating the great biologic law which aims to secure the survival of the fittest; and, by keeping the unfit alive, weaken the race.

We imagine progress is being made because the average longevity is increased, overlooking the fact that the centenarians are disappearing.

The man of 45 to-day has less years to live than his father had at the same age.

Degenerative disorders^s of all sorts are multiplying. Last year 160,000 people died of disease of the heart and bloodvessels--more than from any other class of maladies,--as many as died from all infectious diseases put together.

More than 75,000 people died last year of cancer. 300,000 more are being slowly tortured to death. This disease has increased at the rate of nearly 500% in the last 50 years.

The insane and defectives of all sorts are multiplying faster than the sane and sound.

Harvard graduates, 3 for 1 baby.

1000 graduates will be represented by only 50 descendants in the 6th generation.

Indiana family descended from a pair of vagabonds--pilfering morons--now 12,000

WHAT TEACHERS OF BIOLOGY CAN DO

Biology should be made the center of education. Is capable of being made the most interesting of all subjects taught.

Should be taught in a practical way, and in every grade, from kindergarten to the senior years of the University, and should be continuous, just as the English language is.

Many students who can tell all about Caesar's bridge-building exploits, cannot give even a very superficial account of the itinerary of a breakfast.

The teacher of biology ought to make of his school an object lesson. Should lead his students in health surveys of the school buildings and grounds of the town.

Should make diet studies.

Should study nutrition and animal experiments.

Eugenics with plants and animals.

The resources of comparative physiology are enormously rich in material for creating interest.

Price

Self-res.

1. Respect for his body
2. Set of Health habits
Applied biology
- 3.

A FEW INTERESTING QUESTIONS

The difference between boys and girls (See P.F.)

Why do more men than women die of angina pectoris?

Why is the oldest inhabitant always a woman?

Why has a girl 3 years more to live than a boy, etc.?

Study of life expectancy.

Boy of 15 has 50 years to live. His biology teacher ought to put before him the fact that by proper conduct he might be

I out of 1000 to live 100 years

I of 100 to live 90 years

I of 10 to live 80 years

I of 3 or 4 to live to threescore years and ten.

Not all children would become permanently interested, but some would, and these are worth-while students.

The biology teacher has unequalled opportunities for making the greatest contribution in the interest of race betterment.

Something more than verbosity and psychologic speculation is needed to help the American boy. He certainly needs to give more attention to his conduct, but he doesn't need any greater variety of impressions than he is getting from the movies, the monthly magazines, the newspapers, the bill-boards, to say nothing of the school dances, public dance halls, shows, sports, and contacts with street gangs.

A more quiet life would be wholesome for the American boy; but what he needs most of all is to be made a good animal by biologic living.

Biologic living is clean living; it might not be conventional, it could not be; but it would necessarily be clean and wholesome morally as well as physically and mentally. Our modern sophisticated life is undermining the very foundations of human existence. The human race is decaying, dying, and the rate of decay is accelerating. And the real root of the matter is physical degeneracy. The increase of crime, the lowering of standards of morality, the lessened respect for religion, for parents, for the home, for all things sweet and sacred, are not simply the result of neglect of moral training, they are symptoms of the physical ^{and mental} degeneracy which was made apparent by the draft examinations which showed that one-third of our young men were unfit for military duty and that more than half

the young men of this country, and doubtless an equal proportion of young women, are morons.

And these morons marry and begin producing more morons when they are 16 to 20 years of age, while the more intelligent marry five to ten years later. Statistics show that these mentally weak individuals produce twice as many children to the family as do the intelligent. The very intelligent produce very few children. It takes three University women graduates to produce one baby. A thousand such women would be represented in the sixth generation by 50 descendants. A defective pair whose progeny have been studied, has 12,000 descendants in the sixth generation! (Wiggam)

Neither mental nor moral education will make normal persons of this vast army of defectives that every year is augmented by the addition of more than a million and a half defective babies who are destined to swell the ranks of hobos, struapets, murderers, bandits, pickpockets, drunkards, lunatics and idiots in the next generation.

A thoroughgoing reorganization of our human life is needed. The moron should be segregated and should cease to propagate his kind; but since he is already in the majority, how can the thing be done? It is probably too late to save our civilization; but it is possible that some way may be found to build a better one upon its ruins.

A LONG DISTANCE VIEW

Battle Creek College, its faculty, its students, and especially its ideals, always look good to me; but when I went away last fall for a work vacation, as the distance from home grew greater, the college grew bigger, and when I found myself on a little oasis in the Sahara, and I looked out upon the great ocean of sand, I saw a mirage and there was Battle Creek towering up above the great dunes, the biggest thing I saw in all my travels. And over it, across the sky in blazing letters, I seemed to see the words, "Race Betterment through biologic living."

Every moment I was gone, this college and its purposes were on my heart and I am most happy to be back again and to find you all here and everybody happy and hard at work.

The world is looking this way for light and knowledge and guidance. Every community is in need of an enthusiastic leader who is prepared to show men and women the way out of the paths which lead down to disease, degeneracy and death, into the royal road of health and efficiency through biologic, that is, scientific living. It is my hope that each year there will go out from this college an increasing number of young women and young men who are prepared to help the race in its struggle against the forces which are dragging it down and who will become heralds of the New Age of which the world has dreamed for centuries, when the tide of race degeneracy shall be turned back and an era of Race Betterment ushered in, and when each generation through eugenics and euthenics shall so improve upon the preceding that in time we shall have a new and better human race. Mr. Burbank, a most enthusiastic advocate of the biologic way told me that in his opinion six generations of sane, scientific living would show as

great a difference in the human race as is now seen between the average farm horse and the finest specimens of the horse race.

Battle Creek College has a great and noble mission in the world. Every teacher, every student, should be a missionary. The world expects something of us.

An Address to the Students of the School of Home Economics
in the Sanitarium Chapel, May 20, 1926

By

DR. JOHN HARVEY KELLOGG

I was riding down a country road some years ago taking a dietitian to a secondary schoolhouse to meet a group of country mothers and give them instruction about how to put up lunches for their children.

It is a very painful experience to look over the dinner pails of school children. It really distresses me to think what they are being fed upon. Take any child that is living under ordinary conditions and he is entirely at the mercy of his parents. He is just like a horse or any other creature that is kept in captivity; he is like a bird in a cage. He can eat nothing but what his parents supply; he has no choice himself as to what he shall eat. He eats just what is given to him.

The same situation exists in all the hospitals and all the insane asylums and all the prisons and all the college dormitories. Just think of it! All over the world people are entirely at the mercy of those who feed them and this is particularly true of children. They have not any chance at all to help themselves to anything else. They have to take just what is given to them.

I did not know where the schoolhouse was and I wanted to find out as quickly as possible. The dietitian had heard where it was and we had some general directions. I knew we were somewhere near the vicinity of the schoolhouse, within a mile or two, but I did not know just which way to turn and how to reach it. I stopped a small boy on the road. I stopped him and inquired if he could tell me about the school.

"Oh, yes," he said, "I know right where it is. I live just across the road from the schoolhouse."

So he began to tell me where it was. It occurred to me he might be going that way. I asked him if he was going home. Yes, he was. So I asked him to ride and I improved the opportunity, as I always do-- I considered it really a valuable opportunity, and I always improve it, to talk with a country boy. The country boys know a lot of things and some country girls too, but the country boy particularly has an opportunity to get out and get in contact with nature. He knows a lot of things.

I began to ask him questions. I pretty soon asked him if he knew "the bank where the wild flowers grow." That is a line of a song which perhaps you are familiar with. "Violets and cowslips, too."

"Yes," he said. "I know the very place."

He took me down there and showed me, sure enough, just where the cowslips and the violets were.

He said, "In three weeks from now there will be a yellow violet growing up here. He told me what the leaves were like.

"It has not appeared yet; it will be along in three weeks."

He showed me pretty soon where the other flowers would be coming up. That boy was really a botanist. He had studied the flowers, the flora, of the place. He knew all about it. He was a wide-awake boy.

I asked him some other questions. Pretty soon I asked him what he did, how he occupied his time, and he said he did "nawthin."

"Don't you work?"

"No, I don't work now. I worked in war time when they paid seventy-five cents a day, but boys can't get nawthin now so I don't work."

"You must occupy your time in some way. What do you do?"

He said, "I have some rabbits."

"Do you make your rabbits work for a living?"

"No," he said, "they make me work."

"What do they make you do?"

"I have to gather food for them."

I was getting now to the point I was after. I was looking for an opening to talk to him about diet, for that was my errand down there, to see that these boys were better fed.

So I said, "What do you give your rabbits?"

"Well, I feed them lettuce, grass, cabbage, carrots sometimes-- whatever I can get-- and greenstuffs of various sorts."

"Well," I said, "how often do you feed them a bone?"

"A bone? I never give a rabbit a bone."

"Why not?"

"He would not eat it."

"Why wouldn't he eat it?"

"Because it is not good for him."

"Do you think that a rabbit knows what is good for him to eat?"

"Why, of course he does."

I was getting at exactly the point I wanted to reach.

"Do you know what to eat? Do you know what a boy ought to eat?"

He said, "No, I don't believe I do."

"Well," I said, "your father must know."

He said, "I know dad don't know because the other day he had a headache and he believed it was from something he et, but he didn't know what it was."

Now, that is the situation of the whole population everywhere, and it is a most lamentable situation. It is a most terrible situation because, as you have already learned from your wise Dr. Mitchell, a large proportion of all the diseases that people suffer from are due to wrong feeding. Isn't it true, Dr. Mitchell?

Dr. Mitchell: Yes.

Wrong feeding is the foundation of nearly all chronic maladies and it also encourages acute maladies. Wherever there is a famine, as you know if you have studied history, there is a pestilence after the famine. There is always a pestilence along with it. War, famine, and pestilence are the world's three great curses, and they go right along together. Wherever they have war people give attention to fighting instead of to wholesome pursuits and very soon food production is diminished, food gets scarce and vital resistance is lowered, and when vital resistance is lowered then disease finds easy prey everywhere.

So the studies you have been making here with Dr. Mitchell are relative to the most important subject you can possibly study. It is the most important thing you can give consideration to, and I wonder how many of you have been thinking as you have been learning this and that and the other thing, "Now, what use can I make of that? How can I apply this? How can I make such use of this as to help somebody?" If there is anything in the world I know, anything which can be made of tremendous service in relation to human welfare, it is the study of nutrition for it is the thing that the world needs. In the midst of plenty the world is starving. The world is dying for lack of food in the

midst of plenty because it does not know what to eat. People don't know what to eat. They are just in the situation of the boy. The rabbit knows what to eat, but the boy does not know.

I got hold of that idea many years ago when Dr. Hillis, the famous Dr. Hillis, called on me one morning. He called on me and wanted me to tell him what I had for breakfast. He said he had been ridiculing me for some years because he did not agree with my ideas of diet. He was very fond of beefsteak. But he said he met a man in New York a short time before to whom he was expressing his views about my ideas of diet. I must not say my ideas but biologic ideas. He attributed them to me, which is not correct at all. But this man said, "But Dr. Kellogg works like a horse."

He said, "That made a great impression upon me because I cannot work as I want to work and it occurred to me maybe, after all, what one eats has something to do with his work. I stayed over night on purpose to see you. Tell me what you had for breakfast."

He apologized for making sport of me. He now had come in a different state of mind and wanted me to instruct him in what to eat. I thought I ought to get even with him for ridiculing me. I confess I felt as though I should improve the first opportunity I had to lampoon him a little bit. We all have a little of the villain in us, I suppose.

I said to him, "Your friend said to you I work like a horse, did he?"

"Yes," he said, "I just like to know how you do it. He said you work all day, work all night and keep right on working until you get ready to stop. I can't do it. I am all in in an hour or two and have to stop for a rest and eat a beefsteak or something else before I can get to work again."

I said, "I eat like a horse."

"Oh," he said-- and I thought his face took on a very happy expression-- "you think a man ought to eat a great deal when he works very hard?"

"No, I did not say eat as much as a horse, but eat like a horse. A horse uses horse sense when he eats, but most people (and I looked at him very savagely) have lost their horse sense if they ever had any."

I said, "Never a horse or a cow or a dog or a pig or any other animal ever came to me for information about what to eat. Here you are a college graduate, a public teacher, an author and lecturer and you ask me what to eat. Every animal in the world knows what to eat except the college graduate and learned people."

It is a most amazing thing. This ignorance on the subject of diet is world-wide. It is a great problem at the present day how to save people from destroying themselves by their neglects in relation to diet. Curiously, this thing seems to be world-wide. I used to think that this defect existed only in civilized man, but it is not true. It is worse in civilized people, but it is true among savage people as well.

The famous Dr. _____ was out in Africa and discovered the the pygmies. He was the first white man to really get acquainted with the pygmies. Dr. _____ told me when he found the pygmy chief he asked him among other questions-- they live entirely off the forest. As they move from place to place they pick up what they find very much as animals do.

He said, "I asked the chief, 'When you go into a new country how do you know what to eat?'"

"Oh," he said, "when I find a nut and I do not know whether it

is good or not I put it where a monkey can see it, then I go away and hide and watch to see what the monkey does. If the monkey eats it I eat it too, but if he throws it down I do not have anything to do with it."

So you see that was a very interesting observation because it shows that the wild man learns from the monkey. We have not got wise enough to study the ape as we ought to, these anthropomorphic animals, animals that are most like human beings, the higher apes. We have not yet begun to study these animals as we ought, but Mr. Akeley is out in Africa. I had a letter from him a few months ago. He wrote the book "Brightest Africa." He is connected with the Natural History Museum of New York and is one of the most distinguished hunters. He is a sculptor also and a marvelous taxidermist. He has made the most famous mountings of elephants and other wild animals that ever have been made. He discovered a new method of doing it. His method is to first model the animal. He studied sculpture and became a very admirable sculptor. He has succeeded in developing skill in that direction until he makes most lifelike figures. He makes the figure in clay first, over which he puts plaster and then covers this with the skin. Instead of making a bag and stuffing it with straw and framework, he now makes a complete figure of the animal just as he expects it to be, as lifelike as possible, and then spreads the skin over it.

He wrote me some months ago he was going out to Africa and I read in the paper the other day he is now there. He is making a further study of the gorilla. He promised me when he went back to Africa he would make a special study of the diet of the gorilla and he will bring home a lot of most valuable information. I am sure I shall hear from him because

he is interested in this idea of biologic living and he is thoroughly persuaded that the proper thing for man to do is to follow the example of our nearest relatives, these higher anthropoid apes.

I wish I had some time to tell you all that I have in mind about the opportunities, but we will talk about that a little later.

Now, I would like to ask you this question: What do you think are the most important things you have learned that you can do the most good with to the people? What stands out as the great things you have learned during the years you have been staying here? What are the great things you need to impress upon the people you will come in contact with? The reason I ask you this question is this: It is a very distressing idea to me that anybody should graduate from our school and go out from here with the idea of simply making a living as a dietitian or making a living in directing the dietary or the cuisine of some hospitals or some other place simply working at it for a living. That is a terribly low aim because you are not industrialists. You are not merely industrialists. You are not merely workers any more when you get your diplomas from the school. You are professional people. You have entered a profession and a profession is always something a little more than a gainful occupation. A profession is a gainful occupation, which it ought to be-- sometimes it is not, but it ought to be-- but at the same time it is something a great deal more than ~~that~~. It is an occupation or a vocation which is of service, which renders service and makes service its main aim and the gainful element is a secondary thing.

So it is very distressing to me that anyone of you should do such a thing as to go out into the world merely to earn a living and to be right in contact with the great opportunities and not see them, not

recognize them and not make use of your opportunities and not render the service you are capable of rendering. I want every one of you to feel when you go out from here that wherever you go you are going to put things on a little higher level, that you are going to give people a touch that will inspire, and that you are going to put new ideas into the place to which you go because you have the power to do it. Education is power, and you have got knowledge put into your hands the world needs so much. It is dying just for lack of it, and you have an opportunity to rescue not a few people but hundreds.

What are the big things, the very biggest things you have gotten hold of while you are here? It is difficult, perhaps, to say which is larger than the other, but mention them without discrimination? Which is the greatest? Won't you mention some of the big things that occur to you? Who is willing? Tell us (addressing a student) what big thing you have found to take back to your country?

A Student: I think the biggest thing I can do is to go and teach mothers how to raise their children. That is the first thing I can do. The next thing is correcting those who are brought up wrong-- the things I did not know myself. I did not know what to eat. I did not know of the importance of different foods and of their relation to the body. I learned those things here and I will try to teach those things to others.

What is your idea?

A student: I think the most important thing is to have every element in your food.

There is no doubt that is the biggest question of all in diet-- deficiency foods. We are made of what we eat. As a matter of fact, this question of deficiency really covers almost the whole subject of diet. In my opinion it is the most important thing of all because if one thing that

is essential is lacking the body cannot supply it. If there is one foundation stone lacking the whole building is weak.

A Student: I think the most important thing is emphasizing body elimination and we cannot have good body elimination without having a proper diet.

That is very good, indeed.

Suppose we pause for a moment with reference to this matter of deficiency diet. In every single hospital in the whole United States-- I do not make any exception at all-- the same old diet that has been followed for centuries is still being given to patients. I do not know of any one single hospital where proper attention is being given to this matter of deficiency. For instance, here are patients put on what they call a light diet. Look over the hospital dietaries even in your textbooks. Look them over. You will see a number of diets arranged there and lists of foods that are notably deficient. There may possibly be some textbook just out which I have not seen, but until the last five years there was not a single textbook on diet that made a thoroughgoing application of the newer knowledge with reference to vitamins and salts. And if you did find it in your textbooks, you will not find it in current use in the hospitals.

Here is a patient suffering from typhoid fever put on a fever diet. What is it? It is gruels. I have known many cases of typhoid fever go through a whole course of typhoid fever, several weeks, without any vitamin C, without any vitamin B, and very little vitamin B. These patients are put on a diet that will make a well person sick. You give a well person the diet that is ordinarily given fever patients and that person would become weak and sick in a very short time and would not be

able to work. The same thing is true with reference to surgical cases. There is a universal lack in our hospitals of the proper adaptation of diet to the conditions of patients, especially in applying this newer knowledge of nutrition to individual cases.

But in our insane asylums it is a perfect tragedy. In the insane asylums the diet is managed by the steward. You can hardly find an insane asylum in the whole United States, places where they have thousands of people gathered together, in some cases as many as six or seven thousand, and in one institution seventy-five hundred, that has a dietitian, and if you find one that has a dietitian you will discover that the whole work of that dietitian is to order the food supplies and to hire and manage the help.

I was shocked when I went to a large insane asylum. I am perfectly willing to tell you where it was, right over at Kalamazoo. Three or four years ago one of our dietitians went over there and I thought there was going to be a change, for I knew the superintendent was in sympathy with a change. I visited the place occasionally and met the Doctor occasionally and inquired how they were getting along, but found they did not make any change. Finally I went over there to have a talk with him about it to see if they had not got ready to make some kind of a start in giving those insane people a chance. It worries me to think of those people entirely at the mercy of the steward who is not a medical man and has no interest in diet, or his chief interest in diet, at any rate, is to make the cost as little as possible. You actually see in the reports of these insane asylums congratulatory expressions in relation to the small per capita cost of food. I saw a report of the Kalamazoo asylum about five years ago that the per capita cost for them was eighteen cents a day. I spoke to the superintendent the other day about it. I said, "It is a disgrace."

He said, "I know it. It is sometimes less than that."

I talked with the dietitian and I was ashamed to see our dietitian had not made any radical changes in their diet which I thought she was going to do since he was in sympathy with it.

He said, "I will tell you, Doctor, she does not have any time. Her time is all taken up with making out her requisitions and hiring and managing the help."

I discovered that the dietitian is not arranging diets for patients at all. That is true of almost all hospitals. The dietitian is the buyer. They go out and buy foods and make the requisitions. The dietary of the patients at the Kalamazoo asylum and every other state hospital in the State of Michigan is arranged by a committee appointed by one man up at Lansing. They make out a budget. They are allowed so many ounces of green vegetables, so many ounces of fruit, so many ounces of meat, so many ounces of fat, etc. They are allowed so much per capita. They cannot have anything more except by a very special effort.

That state of things is going to change because the increase of insanity is so tremendous-- six hundred per cent. It is more than that. It is about seven hundred per cent. Within the last hundred years it has increased to seven hundred per cent. It is simply terrible, the increase of insanity. At the present time the insane population of the United States is more than one per cent. of the whole population. The situation has become such that there has got to be a change. It is going to come.

I wanted you to understand about this because there are great opportunities before you. You are just the ones to improve the opportunity that is just right before you. It has to come.

Professor Metchnikoff showed that the colon is a source of poisons which produce old age and shorten life, and Bouchard showed that the colon is a source of poisons which are the cause of chronic disease. For the last 25 or 30 years in all parts of the civilized world medical men have been studying the colon, and while there has been a great deal of opposition to this doctrine of auto-intoxication and a great deal of sport has been made of it, the movement toward recognition of the importance of this thing has marched right steadily along until at the present time it is universally recognized that something has got to be done about the colon.

About 25 years ago Dr. Arbuthnot Lane at Metchnikoff's suggestion, and perhaps to a considerable degree by independent observations--but they cooperated after they got started, at any rate-- it occurred to him to remove the colon and that by removal of the colon he could get rid of the trouble. The colon was the root of the whole thing. All he had to do was to take it out. So he began removing the colon and some of his patients died. At first his mortality was 40 per cent. and then he reduced it to 30 per cent. When he had removed about 30 or 40 colons about two-thirds of his patients were alive. The other third had died after the operation. That made it a pretty serious operation, you see. He afterwards reduced his mortality somewhat, but it always remained high. At first the results were wonderful. Patients that had been wretched invalids for years were in a few weeks now able to see a wonderful change. I saw a nurse, for instance, that had been an invalid for fifteen years. She would occasionally get a little better and then she would be terribly sick again with bilious headaches. Her skin was yellow, sallow, cadaverous. He removed her colon. I saw the nurse myself a few weeks later and she was in blooming health.

Her skin was clear.

I went over to see Dr. Lane to study this question with him about 20 years ago. He sent me his papers and I tried one of his operations on a lady that had not had a natural bowel movement since she could remember. She was the color of leather. Her breath was terrible. She had a daughter with her, a tall girl who had a wonderfully clear complexion. Her skin was as white as milk and there were roses on her cheeks. She was a picture. She had a most wonderful complexion, and the difference between her and her mother was very great. They both had the same colored eyes and the same colored hair and looked very much alike otherwise. I operated upon this lady and the very next day her bowels moved naturally, and three weeks later her complexion was as good as her daughter's. They had complexions just alike. It was a wonderful transformation. But three years later this poor woman had all the old troubles she had before.

So I went over to Dr. Lane to study the question to see what could be done to make the results permanent. I made up my mind the results could not be made permanent. I saw Dr. Lane operate on one of his old patients. On opening the abdomen there was the small intestine converted into a colon and instead of having a colon five feet long it was fifteen feet long.

I saw that that operation was a failure, so I said to Dr. Lane, "You will have to give up this operation. The thing to do is to reform the colon because the trouble is not with the colon; it is with the contents of the colon. It is what is in the colon, not with the colon itself. Now, if we reform the colon the difficulty will be relieved."

I said to him, "You see the reason why these patients suffer is because a putrefactive residue remains here in the colon producing toxins, and that is the source of the trouble. If we eliminate that, if we change the character of this residue so instead of being putrefactive it is non-putrefactive, we won't have any difficulty. The patients will be relieved, and in most cases that can be done."

Well, now, Dr. Cotton down at Trenton, New Jersey, found that he was having very little success in curing up the lunatics that came there. It is a large hospital at Trenton. He saw his patients were accumulating so rapidly they had to have a new building almost every year. The insane population was increasing so rapidly as much as 20 years ago they discovered that one per cent. of the whole population of New Jersey were mentally defective. New Jersey seems to be rather getting the start of the rest of the country in that particular. So he undertook to do something to change the situation there and improve the results, to increase the number of people who could be discharged and sent back to the community cured. He began with the tonsils and teeth. His attention was called to the importance of the teeth and they had remarkable results. When he got to the colon he found he had really reached the headquarters of the trouble; that the colon had more influence upon the mental states than all the other things combined, and so finally he actually adopted it as a routine practice to remove the colon of his insane patients. He removed hundreds of colons. I saw in a room at an exhibit at the American Medical Association at Atlantic City a couple of years ago whole walls covered with specimens and pictures of colons that had been removed at the Trenton hospital.

He went on in this way until a year or two ago. I should remark that seven years ago Professor Irving Fisher, who knew about Dr. Cotton's work, brought him here and he spent several days with us. I labored with him earnestly to persuade him that he should adopt a method of changing the flora instead of removing the colon. I saw I did not make much impression upon him.

I learned a while ago that he had changed his method and that he himself had become tired of his operations because so many of his patients died. So I wrote him a letter and told him what I heard and so forth and congratulated him on the fact that he had aroused a great deal of interest in the study of the colon and in the importance of treating these patients instead of letting them go without treatment.

I got this letter in reply:

"I want to thank you for your very nice letter of recent date. I appreciate your interest and your commendation. It has been a considerable effort to get institutions to undertake any form of treatment whatever, and when one thinks of the large number of patients who could be benefited if something was done it makes one very much discouraged. However, I believe we are making some progress and in spite of opposition more and more are coming around to our point of view.

"I shall always remember my visit to your institution and only regret that I did not pay more attention then to the colon work that you are doing. At that time we were interested largely in the surgical side of the proposition."

Then he tells how he went to London and saw Dr. Lane and increased his recoveries from 25 to 40 per cent. and reduced his death rate from 30 per cent. to 12 per cent. So you see what a terrible thing has been going on there for several years,--removal of the colon a routine practice and 30 per cent. of his patient's dying as a result of the operation. Just think of it.

It goes on to say that Dr. Ewing examined their colons and he found three classes: one that needed to be removed, a second class in which it was doubtful whether any operation was necessary, and a third class in which he says they could not find anything the matter with the colon.

"We have resected very few colons in the last two years. Our method of procedure now is to put the patients through physiotherapy treatment first and then after a reasonable time, if we do not get results, consider operation, either release of adhesions or colectomy if indicated. As to diet, we are using your own antitoxic diet on practically all our cases. Dr. McClellan of the Dayton State Hospital claims considerable as the result of diet."

Dr. McClellan has been up here, got converted and he has been in contact with Dr. Cotton and now Dr. Cotton has adopted our dietary.

When I received this letter from Dr. Cotton we had with us here in the institution a Dr. Currie. Dr. Currie is superintendent of a large insane asylum at Morristown, New Jersey. He has 3,400 patients under his care. He said he came here for a few weeks to take a little rest, but I very soon discovered that his purpose here was to learn how to do it. He has become thoroughly converted to this idea of treating these patients physiologically and he has gone home and he is going to do it. He told me when he left here the first thing he is going to do is this thing.

I wrote Dr. Cotton and I had several letters from him, and in his last letter he begged me to send a dietitian. He wants a dietitian who will introduce the Battle Creek regimen in a thoroughgoing and practical way, cutting out meat and in many cases eggs, and who knows how to change the flora and how to regulate the diet in such a way as to correct these conditions of the colon. It is going to be done. Dr. Cotton asked me to go down there and I am going down there. He begs me to come. I have had several letters in the last few

weeks begging me to come and that they want to do this thing right and are willing to do anything if they can know just how to do it. They are attacking the colon in the most thoroughgoing way. The time is not far distant when there will be a great demand for dietitians from these institutions everywhere.

I want to say that I am not going to send any dietitian to any state hospital unless I feel sure that the dietitian has this thing thoroughly in hand; that she thoroughly believes in the fundamental ideas of a physiologic diet, and that she is going to set a good example when she goes there. What a disaster it would be to send a dietitian to such a place as that and make a failure of the thing. We must have dietitians who know this thing, believe it and have tested it and tried it out. You have had an opportunity for that and I know that every one of you will qualify, so you must not any of you be discouraged by the remarks I have made.

I must say a word further about Kalamazoo. I sent a copy of Dr. Cotton's letter to Dr. Ostrander, of Kalamazoo, and in three or four days he was down here to see me and he said, "We want an additional dietitian. We have got to have more help and I want you to come down here and talk to our doctors." So a week ago last Friday I was down at Kalamazoo and he had all the doctors together and I did my best to inoculate them with the idea of changing the flora. The thing we are doing with the colon is being adopted all over the country in this country and in Europe and the results obtained are so excellent that it is becoming a universal thing.

QUESTION BOX LECTURE IN THE SANITARIUM PARLOR, OCTOBER 4, 1926

BY

DR. JOHN HARVEY KELLOGG, M. D.

Ladies and Gentlemen: I understand you have been looking at a film of our sunshine playground. I am very glad you have seen it because when you go home I want you to set the same thing agoing in your own community.

I hope that each one of you while you are here will pick up some ideas which you think are worth taking home. In fact, we would like to have everyone carry off everything you can lay your hands on while you are here.

This institution is an experiment station. We are every day making some new experiment in relation to human health. My whole job for my whole lifetime, for 60 years at least, has been to try to find out how human beings ought to behave themselves in captivity. We are all born wild and our education is a process of taming. Some of us get tamed too much and our teachers unfortunately teach us many things we ought not to know and to do. We get many bad habits. I think one of the most important things in the world is for us to become uncivilized to a considerable degree, to return to savagery in a mild way.

Some time ago a man wrote a book entitled, "The Cause and Cure of Civilization." Really, it was a very interesting book because he proved civilization is a morbid condition, an abnormal perverted state of living, and the proof of it is the fact that there are so many doctors. I would not be here if it was not for

the fact we have somehow gone wrong. The world has gone wrong somehow.

A good many years ago there was a conversation held between two very eminent men, Socrates and Glaucon, and these two old philosophers sat down to talk things over as to how people ought to live, a very interesting question. This is not a modern question at all. It is an old question. Aristotle gives an account of this dialogue. You will find it in Plato's book "The Republic."

These two men, Glaucon and Socrates, sat down to talk the question over How ought people to live? One of the first questions that they considered was what ^{should} ~~ought~~ people ~~to~~ eat?

Glaucon asked the question and Socrates said, "Well, I think they would sit down on a grassy bank under shady trees and with food surrounding them spread upon palm leaves eat fresh figs and bread and ~~grapes, a portion of nuts and a few green things,~~ ^{other simple things}" and so he proceeded to tell them what they would have for their bill of fare.

Glaucon said, "Is that the way we would feed them if we wanted to have a healthy city? But should we not have some meats?"

Socrates said, "Yes, we might have meats if you like, but then if we had meats we would necessarily very soon require doctors, and if we had doctors then we would have more diseases; and, besides, if we ate meat as our population increased we would by and by need more pastures for our cattle, and needing more pastures we would pretty soon have to cut a slice off our neighbors' territory, and then what do you think our neighbors would do, Glaucon?"

Well, Glaucon admitted their neighbors would make war upon them if they took off a slice of their territory.

A

quote from book

"So you see," said Socrates, "while we may eat meat if we choose instead of the simple bill of fare which I have described, we will in consequence suffer from more diseases, so we will have to have more doctors, and beside that we will have war instead of peace with our neighbors, so you see the eating of flesh of animals is the cause of disease, the cause of crime, social disorder, etc."

I have given you just a little sketch of this dialogue. I think you would find it worth while to read it, Plato's book "The Republic." It is an old book. It is not taught in our public schools.

The portions of the old classics selected for reading and study, the Greek and Latin classics, always seem to me are those portions which are of the least consequence. They are portions which are perhaps interesting from a literary standpoint but of the least value in many respects at least.

Pythagoras was one of the famous old philosophers. He was the man who first compiled and put into a composite form the ^{science} ~~subject~~ of arithmetic. ~~It was said the Arabs originated arithmetic, but that Pythagoras was the first man who compiled it, so he was a man of some consequence. Most of you have studied geometry in your lives and you remember something about the Pythagorean problem, I am sure. That is one of the interesting problems in geometry. He was a great man, a great scientist. He was the first man that ever conceived the idea of the ^{solar system} ~~earth going around the sun and the earth turning over on its axis instead of the sun going around the world. It took the world more than two thousand years to ^{learn} ~~see~~ that Pythagoras was right about it.~~~~

Pythagoras had some other notions as well. He studied ~~this~~ ^{the} question of how we ought to live. He studied it very profoundly and

he reached some very definite conclusions, ~~and~~ what we are teaching you today about the way we ought to eat, ~~for example,~~ is ^{essentially} exactly the things that this old Greek philosopher taught and the things Socrates believed.

~~Now, my friends, I believe that what we are talking to you about how to live is quite worth while. I have tried it myself for 60 years, ^{of biologic living} and I find the results most excellent, ~~have not eaten meat, for example, for 60 years. I go~~~~

~~a little farther than I ask anybody else to go except under special conditions and under special circumstances. I not only do not eat meat but eggs and milk. I avoid all animal protein altogether because I have tested it out carefully and I find I am much better by avoiding them altogether and they are not at all necessary.~~

~~I once in a while find a person for whom it is quite an advantage to avoid all kinds of animal proteins. Animals were never intended for human food. You cannot eat flesh food and be quite as well as you would be if you did not eat ^{it} the flesh of an animal because the flesh of animals was never intended to be eaten. Animals are not eatables. Eatables are things to be eaten. An animal is not an eatable;~~

~~An animal is an eater. A thing cannot be both an eater and an eatable.~~

~~Isn't that plain? Isn't that simple? An apple is an eatable, ^{and} but an apple does not eat other apples or potatoes or anything else. A potato is an eatable and bread is an eatable. All wholesome ^{foods} ~~things that you can think of~~ are eatables. None of them are eaters. Suppose ~~you~~ ^{you} went~~

~~to the table, for example, and found the potatoes were nibbling ^a the apples and the loaf of bread was crawling over to seize the butter or ^{everything eating something else} something of that kind. Why, you would certainly be astonished at the ^{and appalled} situation and you would refuse to eat such things.~~

That meat is not a natural human
diet it is easily proven by experiment. The subject
will be

I am sure none of you will dispute the results of this
experiment I am going to ask that you make when you go home. You
~~get a two year old~~ ^a baby for example that has not yet begun to eat
~~meat~~ ^{one} never tasted meat—a baby just beginning to eat solid food, a
year and a half old or a year, and offer it a peach, plum, cherry,
apple, pear or berry and see what the baby ^{will} do with it. You
know what it ^{will} do. It ^{will} proceed to eat it at once. ^{Now} Instead
of an apple, pear, plum or berry offer the baby a delicate lovely
little white mouse ^{or even a piece of raw meat will} and see what the baby would do with that.

~~Why~~, If you offer a mouse to a kitten it ^{will seize and} would eat it,

If you offer it to a kitten the kitten would seize it with its mouth
and eat it, but if you offer it to a baby, ^{it will show an aversion rather} a young human being that
has never eaten meat, you cannot imagine such a thing as a young human
being seizing that mouse and eating it. A young lion would do it,
a puppy would do it, any young animal that is a natural meat eater, but
a young human being would not eat it, it would refuse it. ^{Children}
have to be taught to eat meat. ^{Young}

~~I think it is of a good deal of consequence. I would not~~
~~have spent so much time upon it unless it was a matter of a good deal~~
~~of consequence. I would like to thoroughly convert every one of you~~
~~before you go home, not because it is a fad of mine that I am opposed~~
~~to meat eating or that it is a part of my religion or anything of that~~
~~sort and not because I am working for a cause, but because I think it~~
~~is a matter of consequence to every one of you, that it makes a differ-~~
~~ence as regards the number of years you are going to live and it makes~~
~~a difference as regards your efficiency, whether or not he~~
~~lives biologically~~
I heard a doctor telling some other doctors something today

CB

Flirty

~~I was very glad to hear.~~ Years ago I met a young doctor who was smoking. He was a bright young fellow and used to come here ~~and to~~ teach some special classes in the institution here. He was a member ^{of the faculty of} of a great university and was a very brilliant man. We used to have some classes for our young doctors here and he used to come to teach these young doctors. I found him ^{and} a very interesting man. So I used to talk to him about smoking. I urged him not to smoke. I felt he had such a splendid career before him it was ~~an awful thing~~ ^{too bad} for him to ~~smoke and injure his prospects.~~ ^{by smoking} He said, "Smoking does not hurt me," ^{and continued to smoke.} I met him repeatedly for a number of years and I always appealed to him to renounce his cigar. The first time I heard today a message from this man ~~it did not come directly to me but indirectly~~ ^{but I} heard a doctor telling some other doctors that he met this doctor ~~not~~ long ago and the doctor said, "Dr. Kellogg has been trying to get me to stop smoking for years ~~and~~ ^{but} I would not pay any attention to his talk. About four years ago I began to notice tobacco was ~~beginning~~ ^{really} to hurt me and I gave it up and I found ^{great benefit in doing so,} a very great improvement as the result of giving up the use of tobacco. I discovered when I gave ~~it up~~ how much harm it was doing me and I am now convinced it was doing me harm all the time."

~~That is why I think it is worth while to preach a propoganda, if you please, against all these bad habits that we have acquired in our civilized state and earnestly to convince people of the harm that is being done when they do not feel harm, because after you begin to feel harm irreparable damage is done.~~

The reason why the Doctor did not think tobacco was doing him harm 30 years ago was because he had ^{large vital reserves,} a certain amount of reserve.

He was like a man who ^{with} had a large bank account who ^{was} spending money ^{care} ~~recklessly~~, extravagantly, ^{without suffering inconvenience so long as his} I heard of a man who had lots of money who ^{was} used to ride down the middle of the street and throw out five dollar ^{bits} bills. He used to hire a whole train to carry him a thousand miles as fast as he could go. Anything to make a sensation. There was no use appealing to that man because he still had millions in the bank. He would say, "It does not do me any harm. I don't miss it." But this man went on and by and by he got to the point where he did not have money to pay his board bill. He had to jump his board bill and flee the town to avoid arrest because he had thrown his capital away.

That is the trouble with you, my friends. You have jumped your board bill and have come over to Battle Creek hoping to find some way to recoup your fortunes. You have lost that great bank account of health you had. You have thrown it away. It is gone and it is gone forever, my friends. I am sorry to have to tell you it is gone forever. You never can get it back again. The most you can possibly do is to get back a little capital, enough to make a respectable appearance, perhaps, and to do business in a quiet, small way; but that splendid capital you once had that you could use for doing splendid things, for exploitations, for splendid adventures, that is gone and you never can get it back again. What we lose of this reserve that Nature supplies us with when we are born is lost forever and we never can get it back. What an awful pity it is.

How do we know smoking does so much harm? I am going to offer you an argument that I am sure you will all admit and you will see the force of with reference to smoking--a very short way of getting at it. Everybody knows that smoking is not good for boys. There is no father who smokes who wants to have his boy smoke except among very, very

ignorant people. I understand there are some places down in the South in some of the remote mountain districts where there are people who actually put quids into their children's mouths, but those people are terribly ignorant. To intelligent people it is universally known it is bad for children to smoke. They know when boys smoke they do not grow as they ought to grow; they do not develop properly.

A lady came back from Paris a few years ago and she came to tell me she had a very interesting experience over there she thought I ought to know about. She said, "I met a man one day in the market place who had some little dogs for sale, the smallest dogs I ever saw in my life, not much larger than rats, and I said to him, 'How in the world do you manage to get such small dogs as these? How do you manage it?'"

He said, "There is a secret about it I do not wish to tell."

She said, "I live in America. I am going to leave Paris right away and I won't tell anybody."

He finally confided the fact, "I feed them nicotine and they do not grow. I take them when they are very little and just feed them nicotine."

For dozens of years it has been universally known among observing people that tobacco stunts growth. If a boy smokes he does not grow properly. Dr. Seaver more than 30 years ago proved it at Yale University. He measured and weighed all the boys that came in, the freshman class, and then the next year weighed and measured them again, got their height, weight and lung capacity, and he found the boys who did not smoke grew faster. They grew an inch more than the boys who did smoke and on an average their lung capacity was 10 per cent. greater among the non-smokers than the smokers, and their weight

was greater. They were larger boys and they were better advanced in their studies, in their intellectual development, as well as in their bodily development.

There is proof that nicotine is a vital poison. It is a poison to the body; it is a poison to the living cells.

You say, "Well, that is all true for boys, but after a man gets his growth he can smoke and then it won't hurt him because it cannot stop a man's growth after he has got his growth." That is no proof, however, that it does not hurt him. When a man has attained his development he has gone through one cycle of his life. ~~One phase of life has been passed through and completed.~~ He has completed his growth. *But he*

~~He has another thing to complete. What is that? That is longevity. First he grows in length of body; he first attains his maximum length of body. The next thing is to obtain the maximum length of life and maximum efficiency during his life. That is the next thing he has to do. Now, then, it is reasonable to suppose that the same thing which interferes with the full development of a man's stature would likewise interfere with the full development of his longevity.~~ But have we any proof of it? Yes, we have proof of it. The New York Life Insurance Company--there I let the secret out. I promised not to do it. It is too late now. I cannot call it back. But, as a matter of fact, two very prominent officials of the New York Life Insurance Company, the Actuary and the Medical Director, more than ten years ago independently undertook to investigate this question of the influence of tobacco upon longevity. After they had studied the question for some time they sat down at a table together. One of them told me

of this circumstance. The doctor said to the Actuary, "You write down on a card what is your opinion after your investigation of this subject to what degree does tobacco shorten human life?" What do you think he wrote down? Each of them wrote down on a card and they compared the cards. They were just alike. What do you think it was? It was "ten per cent."

This is the way the Doctor put it as he told me about it:

(D)

"If there were ~~living~~ in a community ~~two thousand men,~~ one thousand who smoked and another thousand who did not smoke, living under the same conditions, when a hundred ^{men} smokers died, ~~out of one thousand,~~ 110 smokers would die."

The point I want to impress upon you, my friends, is we are not dealing with whims, fancies, or untried things, but we are endeavoring to persuade you to live physiologically, to live according to the laws of our creator as planted in our bodies, to live uprightly, to acquire physical righteousness, if you please, to live biologically as Nature intended us to live, to eat the kind of food intended for us, to get the exercise and the fresh air and the sunshine and to do all the things that are necessary to do, all the things that a healthy animal living in the wild does so far as it is possible to do in civilization.

We have got to reform or civilization itself will disappear, my friends. The most eminent scientists who have studied this question at the present time have become absolute pessimists as regards the future of the human race. I was down in New York three or four years ago at a meeting of the World's Eugenic Congress. I happened to be a member of the committee on arrangements so I had to be looking into

things and I had an opportunity to know the views and opinions of these men. One evening we were sitting at a table together, a number of us, and Major Darwin, the son of the celebrated Charles Darwin, who had come over to attend this congress, he made a little talk and after speaking a few words he bowed his head and with a look of the greatest sadness and depression upon his face, he said, "My friends, if our present civilization survives, and I fear it will not, it will have to be because the United States saves it for there is no hope in any other part of the world." That is what Major Darwin, one of the most eminent scientists, said. Not a soul in the whole convention there, the whole congress, raised one single note of hope.

Dr. Davenport, of the Carnegie institution, said, "Of course we all know that the human race will ultimately perish, but if we will give attention to eugenics we can hope to postpone the catastrophe somewhat."

That is the most hopeful view anybody took, and the newspapers did not publish very lengthy reports about the congress. The newspapers said there was a very pessimistic note in the congress.

I am not teaching pessimism. I do not believe it. I believe the human race is going to survive. The members of the human race that do survive will be those who give attention to biologic living. Those who smoke are going to die. Their posterity is going to run out. There will be nobody to represent them five or six generations ^{hence} ~~from now~~. Every smoker whose successors smoke, whose sons smoke, whose sons' sons smoke, whose great, great grandchildren smoke, there will not be any great, great, great grandchildren. "The soul that sinneth it shall die," the old prophet said. It is not only the individual that dies, ^{but} ~~by~~ the race that sins will die. ~~We know that.~~

"How do you know what you have just been saying is true," you say. "That is a very broad statement."

We have proved it. Some years ago Dr. Hooker made some experiments with rats to determine the effect of tobacco upon rats. He induced rats to smoke. He put them in a room and burned a little tobacco and let them breathe the smoke for four minutes. He did this four or five times a day. I asked him how thick the smoke was in that room. He said, "It was about the same as in a college smoker. It was not any worse, and the rats were merely in the room. They did not smoke." One could not induce a respectable rat to smoke, but what they did do was simply to inhale the fumes of tobacco just as everybody has to do that associates with smokers.

Now, what was the result? The first generation went on all right. Young rats were born and grew up just like the old rats and developed all right, but when it came to the second generation then there was a difference. He had two sets of rats, one set of rats smoked and the other set of rats did not smoke, and the rats that did not smoke, in the second generation when they were six weeks old weighed twice as much as the rats that did smoke.

That was a very interesting experiment to me because Dr. Fairfield Osborne, the President of the Natural History Museum of New York City gave an address which was published in "Science" which is, as you know, a very well known and most reliable scientific publication. "Science" published the address of Dr. Osborne and said that Dr. Osborne had made a careful study of the heights, the average heights, of the people of this country as determined by the measurements made in the Civil War, measurements of scores of thousands of soldiers

made in the Civil War in the draft examinations. Comparing these measurements with the measurements made in the last war, Dr. Osborne found that there had been a falling off of two inches in the height, the average height, of the American people of two inches in 60 years.

The cigaret was brought from the Crimea to Paris and from Paris it was brought to the Centennial Exhibition in 1876. I was there and saw it. Its manufacture very soon began to increase and increase until at the present time it has reached a hundred million. Think of it, my friends, a hundred million cigarets are manufactured and consumed in this country every year. First it was just a few million and then a few billion and today it is a hundred billion. One hundred billion cigarets are being consumed by the people of this country every year and the manufacturers are not at all satisfied. Look at the magazines and newspapers and see what efforts they are making to get every man, woman, boy and girl in the whole republic to consuming cigarets so as to increase the size of their bulging pocket-books.

Now, some of these men have stopped smoking. One of the officials of the American Tobacco Company came here seven years ago and he said to me, "Can't you do anything for me, Doctor? I am 67 years old and the doctors say I have myocarditis. I have been to the biggest doctors in this country and they can do me no good so I have come here. Do you think you can do something for me. I would like to live in this fine old world a little longer." His face looked very sad, very haggard, and very sallow. He looked like an old man, too old for 67.

I said, "Sir, you are an officer of a great tobacco company,

so I suppose you smoke."

"Oh, yes, I smoke ten or twelve cigars every day and have been doing it for forty years. You don't think that could be a cause of my trouble, do you?"

I said, "I have known people to have had this same trouble you have and we could not find any reason for it but smoking and we persuaded them to stop smoking and they got a great deal better. If I were you I would stop smoking."

He said, "I am willing to do anything that is necessary in order to have the privilege of living a few more years in this fine old world. If you say I must stop I will do it right away."

Six weeks later he came into my office. He said, "I have made up my mind tobacco has done a great many people a great deal of harm" and he paused a moment. "The fact is it does not do anybody any good. In fact, I have given it up myself."

Today you would not think there ever was anything the matter with him. He has rosy cheeks and a clear complexion. There are very few ladies in this room who would not envy his clear skin, bright eyes and erect carriage. Every time he meets me he shakes my hand and says, "Doctor, my visit to the Battle Creek Sanitarium has added 20 years to my life." He lives right up to the Sanitarium code to the letter except that he backslid on the smoking. He holds a cigar in his hand, takes six whiffs from it and throws it away so he won't be a non-smoker. In his business it would hardly do for him to be a non-smoker.

Question: What is the cause of hiccough?

Answer: I don't know. I am perfectly willing to confess when

when I don't know. But I can tell you how to cure hiccough. I got this from old Dr. Hippocrates who lived 500 years B. C.. He was a wonderful old man, Dr. Hippocrates, and he taught me how to cure hiccough. I did not find it in any modern medical books. It is to tickle your nose and sneeze. Put a feather in your nose and sneeze. That will cure hiccough. Hiccough is a kind of spasm of the diaphragm and it is rhythmical. If you are hiccoughing hold a watch in your hand and you will see that the hiccough comes every so many seconds, 5, 10 or 12 seconds, and with perfect regularity. Now, the idea is to tickle your nose and sneeze just so you will sneeze just when the hiccough is coming. Sneeze instead of hiccoughing and you get the start of nature, so to speak, and you get up a sneeze instead of a hiccough and so you break up that bad habit. If we could break up certain other bad habits as easily it would be a good thing.

It will not always succeed because it is sometimes due to deep seated causes. I remember once I was called to see a patient and found a man very ill indeed with typhoid fever. He had been hiccoughing steadily for 24 hours and nothing could stop it. I examined him and made up my mind he had a loaded stomach. I passed a stomach tube into his stomach and took out two quarts of material and the hiccoughing ceased. It is a good thing to remember that sometimes hiccoughing is due to accumulation of food in the stomach.

Question: What is the best way to reduce the quickest?

Answer: The best way to reduce is to exercise all you can and eat as little as you can. Eat little and work much. That is the cure for obesity. In that way you will reduce rapidly.

However, I must tell you a little bit about that. You must not eat everything. Change the character of what you eat. As a matter of fact, it is better to eat more instead of less. Eat more instead of less. Eat very bulky material. For instance, live on cabbage, lettuce, spinach and celery. When you want to reduce you do not want to cut down the iron you need or lime or vitamins or protein. As a matter of fact, there are only two things you want to diminish. You want to lessen the fat and the starch. In that way you will reduce your weight as rapidly as you like, Perhaps not as rapidly as you like, but at a reasonably rapid rate.

A person loses when he stops eating altogether one-eightieth of his weight a day. You do not want to lose weight so rapidly as that. Half a pound a day would be fast enough. If you want to lose weight permanently, if you want to become of good proportion and keep it, it is better to lose ^{at} a smaller rate than that, about a pound and a half to two pounds a week and continue this rate of loss for months. Change your habits of eating. No one should ever suppose he can reduce his weight and go back to his old habits again. Obesity is usually due to wrong habits. You must correct the habit and keep on correcting it. The thing to do is to exchange the bread and the butter and the sugar and other fat making things for cabbage, lettuce, turnips and fruits, all the fruit you want to eat and fresh vegetables.

Question: I am five feet six inches in height and I weigh 101 pounds. How can I gain in weight? I cannot drink milk.

Answer: One problem is just as easy as the other. If you want to gain as rapidly as possible go to bed, take a week's rest or two weeks' rest or even a month's rest. Take only a little exercise,

deep breathing exercises in bed and twisting and bending your arms and legs, but not very much, not enough to amount to reducing work, and eat a little more than you need to maintain your weight.

How much ought one to eat? I will just show you how to make up a bill of fare. This lady weighs 101 pounds. Well, she ought to weigh 140 pounds. We must add to that one-third for protein. The protein should be one and one-third calories for each pound of body weight. You will see what it will be. It would be 186 calories of protein. The fat would be four times as much as the protein, 744 calories. The protein will be 186 and the fat will be 744. Now, the carbohydrate would be just twice the fat. If we are making this a practical dietary we will say 200 protein, 750 fat and 1,500 carbohydrate. Altogether that would be 2,450 calories. This lady wants to get fat rapidly so we will add more carbohydrate, but we won't add more fat or protein. Instead of 1,500 carbohydrate we will make it 2,000 or a little more. We will add carbohydrates enough, say 550. That will make the total ration 3,000 calories.

If this lady will do this she will make a rapid gain. It is better to add carbohydrates instead of fat. Why? Because if you want to gain rapidly you will make better progress that way, because for each ounce of fat that you eat you only get one ounce of fat--for each ounce of fat you eat in addition to what you need to sustain your body you will get one ounce of fat, one ounce increase in weight; but for every ounce of carbohydrate, that is, starch and saccharine material which you eat you will get three or four ounces of increased weight. Please remember that. If you want to increase your weight rapidly eat carbohydrates because carbohydrates will increase your weight at the rate of

three or four ounces for every ounce you eat.

There is another important reason and that is that the carbohydrates are very easily digested, whereas the fats are not so easily digested.

Still another reason is the fats remain long in the stomach and are slow in passing out of the stomach, delaying the whole digestive process, whereas the carbohydrates pass out very readily.

I must say another thing to both of these patients. They must not neglect to change the intestinal flora and keep the colon empty.

Question: Will you please explain the connection between mucous colitis and nervousness?

Answer: The connection is simply this: When a person has mucous colitis the lining membrane of the intestine is sore. It is the same thing as though you had eczema on your arm. There is a raw surface. Now, this raw surface if it is neglected it will become offensive. There will be an ugly discharge from it. So you have from this surface in the bowel an ugly discharge. You have a continual secretion. It passes off in the form of mucus. Mucus is a protection nature throws out.

These germs that produce mucous colitis are essentially the same as germs that make a breaking out on the skin.

There is another thing that is of very great importance. These materials that lie in the bowel undergoing putrefaction are absorbed. Ordinarily they are not absorbed very much because the mucous membrane lining the colon is a filter and it is so constructed that it does not take in these poisons very readily. They are taken in only in very small quantity, but when colitis exists, when there is a sore surface then there is no filtration and these poisons flood into the blood very readily and the consequence is

when a person has an attack of colitis these fecal poisons find there way into the blood and the whole body is intoxicated. It is just the same thing as though you had swallowed a drug. It is exactly the same condition only these poisons are generated in your own body and absorbed from your colon.

That is the cause of nervousness. The old idea that the colitis was due to the nervousness was exploded a long, long time ago. Unfortunately most people and some doctors, I am sorry to say, have not heard the explosion and they do not know that that old theory was abandoned by thinking men who had investigated this subject a long time ago.

Question: Why does one have gas after taking Lacto-Dextrin?

Answer: It is not because Lacto-Dextrin disagrees, but because there are bad germs in the colon. If you take carbohydrates they will produce gas. This is a great improvement over the situation that existed before. Before taking carbohydrate in the form of Lacto-Dextrin or any other form of carbohydrate, these poisons, the Welch's bacillus and other poisonous germs, these pernicious bacteria are making poisons; but when Lacto-Dextrin appears or other carbohydrates, lactose or dextrin or any other form of carbohydrate which they can utilize, they stop producing poisons and produce gas instead. The gas is more inconvenient, perhaps, but it is nothing like so bad as the poison, and the production of this gas is a part of the process by which the flora is changed. These pernicious bacteria produce gas and along with the gas they produce acids and the acids destroy the germs which produce gas, so by persevering for a few days the whole phenomena disappears and you will be relieved by the change of your intestinal flora.

Question: Is a diet of 1,200 calories a day a proper diet for an inactive person?

Answer: Well, that depends upon his size. A person who is five feet tall would get along very comfortably with such a diet if he were keeping perfectly still lying in bed, but a person who weighs 150 or 200 pounds would require 1,600 or even 1,800 calories.

Question: Why do small dark spots appear on the hands after a certain age?

Answer: They do not come after a certain age. They sometimes come before a certain age and sometimes after. Sometimes they do not come. I do not see them on my hands. I have been looking for them. I have been expecting them to appear one of these days but I do not see them yet. These dark spots are an advertisement--Nature hangs out the sign to let everybody know you are getting old. That is what these brown spots are. They are simply a sign that you are getting old, and the cause of these brown spots is pigment produced in the body, in the colon by putrefactive changes taking place there.

Question: How does a rapid pulse affect the health?

Answer: It is not the pulse that affects the health, it is the health that affects the pulse. A person may have a rapid pulse because he has a weak heart or because he has a febrile condition or infection taking place or there may be a nervous state. People get a rapid pulse when they are worried or depressed and it is an indication of the disturbance produced in the body by these powerful emotions. One should endeavor to find out the cause and have the cause removed, whatever it may be.

Question: How can I keep my tongue clean?

Answer: Keep your colon empty. It is a great deal more important to know what is in your colon than to know what you have in the bank because what you have in the bank is getting better all the time, getting interest, but what you have in the colon is getting worse every minute. If you find your tongue coated and you have a bad taste in the mouth it is because poisons are being absorbed into your body. There are other causes, but that is the most common cause. You should go to bed every night with your colon empty. If you go to bed with your colon loaded the next morning when you get up you have no appetite. You have a heavy and tired feeling and are wretched and miserable. If you take care to know your colon is empty every night before you go to bed you can go to bed and sleep in peace. You won't dream but will sleep sound and wake up in the morning with a keen appetite for breakfast and a clear head.

See that your colon is empty every night before you go to bed. If it is necessary to use mechanical means, an enema, do it. You do not need to be any more afraid to wash your colon than to wash your face. It won't do harm to introduce water into the colon. There is always water in the colon, dirty water, so certainly clean water cannot do harm when dirty water does not. You can readily see there is no answer to that argument. The only danger is in using too large a quantity at once. It can be overstretched and distended. It isn't likely to be, however, because it will resent it. Two quarts is a sufficiently large quantity. It is only necessary to take a little time about it. Sometimes the colon rather resents the introduction of any water. Then it must be done very slowly and the water must be quite hot, 110 to 120 degrees. One hundred fifteen to 118 degrees is a very good temperature. It is better to use very hot water because when the colon re-

quires help of this sort it is generally because it is in a spastic state; it is contracted, shut up, and the hot water will cause it to relax.

Question: Does any food contain hydrochloric acid?

Answer: Hydrochloric acid of course is present in common salt, but free hydrochloric acid is not found in any of our common food-stuffs.

Question: I have been here ten weeks trying to get rid of stomach trouble and have been feeling worse than when I came. What is the reason?

Answer: Well, I know one man who felt worse and he came to see me about it. I said, "How many calories are you eating?"

He said, "I don't know."

"Well," I said, "suppose you sit down and figure up what you have had for breakfast."

He told me what he had for breakfast, dinner, and supper and I added it up. How much do you think it was? Four thousand calories, two thousand calories of fat. He did not need over two thousand calories. I cut his bill of fare right in two in the middle and then he had no trouble. He began getting better right away.

If your stomach is feeling worse there is something wrong. You are not giving attention, the attention you ought to give, to your diet. If you have consulted your doctor about it and think you are giving attention and not getting relief, come to see me and I will find out what is the matter, and we will get you on the right track right away. You can be sure we can find out what is the trouble. Of course it is possible for a person to have a difficulty that cannot be cured. Those cases, however, are really very few.

Question: Is the solar plexus purely a subconscious organ in its function?

Answer: I think we sometimes are conscious of our solar plexus, but I doubt if our solar plexus is conscious of us. I am inclined to think it is subconscious.

Question: Is phenolphthalein a perfectly harmless laxative?

Answer: There is no such thing as a harmless medicinal laxative. It does not exist. Why? Because these drugs all act as irritants and we do not want to move the bowels by means of irritants. When the bowels are slow or inactive, when one is constipated, it is not because the bowels need irritating, it is because they need help. They do not need a whip. They need assistance.

There are two ways to help a horse over the top of a hill with a heavy load, two ways to get him over. One is to apply a whip and another is to get off, get behind and push.

That is what you need to do, push. Most of you who have bad colons need to get off and get behind and push. You need to give your colon a better chance. Get off your load, if you please, by changing your diet. Instead of eating fine flour bread eat coarse bread and bran. How much bran? You know people are afraid of bran. Bran is one of the most wholesome and important of our foods. The millers take it out and they charge us an extra price for the fine flour after they have taken it out, an extra cent a pound, and then put the bran up in packages and sell us the bran at twenty-five cents a pound. They publish articles against the use of bran, stating it is terribly irritating and you must not eat graham flour because it is likely to be musty and unwholesome and you must eat fine patent flour, and then they put bran

Question: Does chocolate contain caffeine?

Answer: No, but it contains theobromine which is a cousin of caffeine and the whole family are bad, the whole kin. They all belong to the xanthin family. Now, you know the bad Jones family. There was Tom Jones, Mary Jones and Jim Jones and they were all bad, all hard cases. That is just the same thing here. We have the caffeine in coffee and the thein in tea and the theobromine in chocolate and they all belong to the xanthin family and it is a tough family.

Question: Please tell me what to do in case of cramps and griping from too large doses of Lacto-Dextrin.

Answer: Well, now, it is not the large doses of Lact-Dextrin. You have got an enormous number of germs in the colon, bad germs, Welch's bacillus, and the thing to be done is simply to empty the colon. A hot enema will always give relief. If you go right on taking big doses in a short time you will get over it. The important thing is to take a large enough dose to change the flora, three or four ounces, and you will have it over with and then you will find the tongue clearing off and your symptoms improving right away.

Question: What foods are the best blood builders? Is milk one?

Answer: No, it is not for the reason that it contains so little iron. The best blood builders are green leaves. The next best things are dates, raisins and figs. All sorts of greens are good, spinach, chard, lettuce, cabbage and kale.

I must tell you about kale. I wish you would come up to my garden at the back of my house and you will see long rows of the most beautiful plants. They belong to the cabbage family. They look like ostrich feathers,

beautiful curly leaves about two or three feet high. That is kale. If I took some kale in the house, cooked and served it upon the table you would not enjoy it, but we are waiting for a freeze to come and by and by that kale will freeze up solid as brittle as glass. If you take hold of a leaf it will snap off like a piece of thin glass. If you cut it up and put it in some water and cook it you will find it is the most delicious green you ever tasted. So every time it freezes it gets a little better. You can leave it out all winter long. You can keep it in the garden the whole winter long and it is getting, as I said, more and more tender and delicious all the time. Next spring see your gardener plants a supply of kale. Kale is green. It has dark green leaves. Green cabbage leaves are not very palatable. I think they are better when they are frozen, but they are not very palatable anyway. Kale is delicious.

I am telling you of it because the white leaves of cabbage and the white leaves of lettuce are of no value. They are of almost no value at all. Dr. Sherman, of Columbia University, has made a study of this and found that the iron and the vitamins are not there. The iron and vitamins are in the green leaves. It is the green leaf you want to have. Ask your waiter to bring you green leaves. We fortunately have found a kind of lettuce which is just as palatable, more palatable, in fact, of green leaves than the white leaves, the heart of lettuce, the head lettuce that is commonly preferred. It is known as Matchless lettuce. Next spring do not forget to sow Matchless lettuce. It has the advantage that it remains good the whole season. If you have a very hot sun it is better to cover it up. It will be more tender and a little more palatable if it covered than exposed to the hot sun. Sometimes it gets a little bitter in midsummer and it needs protection. The green leaves contain iron.

The ox gets fine red blood from green grass. The iron is associated with the chlorophyll of the grass. If you haven't any green color the iron is not there. It is important to get the green leaf. Ask your waiter to give you green leaves.

Question: What causes the body and limbs to jerk and twitch while you are asleep?

Answer: You are too tense. It is high tension. You have got fidgets. You are troubled more or less with twitching when you are awake as well as when you are asleep. You must get rid of the cause of this tension. It is most likely to be irritation of the alimentary tract somewhere in the small intestine or colon.

Question: Urinary report shows acid as 20. What is the significance of this?

Answer: The significance is that your blood and your tissue fluids contain 20 times as much acid as they ought to contain. Not quite that. Take the body as a whole, there is much more acid than there ought to be. The urine is an extract of the tissues and when the report is 20 that means the urine is 20 times as acid as it ought to be. That means there is a great excess of acid in the tissue fluids. That is very unwholesome. That tends to produce hardening of the arteries and tends to wear out the kidneys prematurely and interferes with all the vital processes of the body.

Question: What effect has Fleishmann's yeast if taken regularly three times a day?

Answer: Well, the effect is not unwholesome. Fleishmann's yeast is not unwholesome. It contains vitamins. That is the only advantage in

taking it. It supplies the body with vitamins. If you have neglected to eat food that contains proper amounts of vitamins then you might get it in the form of yeast if you choose. It is not necessary, however, to take it in that form. Fleischmann's yeast contains one vitamin, vitamin A. This vitamin is found very abundantly in spinach and in bran and in fresh vegetables. If you are eating spinach you do not need to eat Fleischmann's yeast.

It is not a laxative only in the sense that it supplies vitamins and it is a stimulant to the intestine. Vitamin A is not a tonic or a stimulant. It is something that the nerves need; it is an energizer of the nerves. McCarrison made a careful study of this subject and he proved that vitamin A energizes the intestine greatly and encourages bowel action. That is the only reason why Fleischmann's yeast is useful for that purpose.

But this same vitamin is found in other foods. A very convenient way is to get vitamin A is to get it in the extract of yeast. The extract of yeast, known in England as Marmite, is known here as Savita. In this preparation you have all the qualities of the yeast, all the properties of yeast concentrated ten fold, so that in a teaspoonful of Savita, making a cup of Savita broth or bouillon, you have all the good properties of yeast and in much more palatable form.

Question: What are the after effects on the system when the gall-bladder is removed?

Answer: If the gall-bladder needs to be removed the effects are good. It is very rarely that the gall-bladder should be removed unless it is in an advanced state of disease. When it is diseased and you remove it you get rid of a source of infection, focal infection, infection which is extending continually to the liver and disturbing the liver and often a

a source of great pain and disturbance.

Question: What are diseased tonsils?

Answer: They are diseased when the little pockets in the tonsils are infected and they become breeding places of germs which produce poisons which are absorbed and often disturb the whole body, and the infection itself sometimes travels in the body and produces neuritis and chronic inflammation of the muscles, myositis, inflammation of the joints, some forms of rheumatism and sometimes possibly grave nervous disorders and even mental disorders.

Question: Can goiter be cured?

Answer: Yes, sometimes very easily by a change of diet and by small doses of iodine and by X-ray applications. Sometimes operations are required but rather rarely.

Question: Would a moist abdominal bandage be good for a man who has ptomain poisoning?

Answer: Yes, indeed. It is more important for him to change his diet and intestinal flora. That is the all-important thing.

Question: What is the fat content of olive oil and its food value?

Answer: Well, the fat content of olive oil is oil, and the food value is 250 calories to the ounce.

Just a word of greeting to the members of the Three-Quarters Century Club, the only club of its kind in the world and one of the largest clubs in the city, besides being, on the average, the oldest club. It is no small honor to be a member of the Three-Quarters Century Club. It takes a lot of pluck and stamina, energy, self-control and character to weather the storms of life for three-quarters of a century, and a good deal of adroitness to escape the snares and pitfalls which beset the feet of every human being. Only one person in six has the ability to reach seventy-five years. Besides, one has to have a good heredity to start with. So you see, the members of this club are the cream of society, the very salt of the earth, an aristocracy, in fact, and every member is to be congratulated, and has reason to be proud and happy of his ancestors and of his own ^{himself} attainments.

We are all happy that our venerable friends, Mr. Garner, is still with us, having passed his 99th milestone yesterday. In behalf of the oldest and biggest Three-Quarters Century Club in the world, I send him hearty congratulations. He is still a few laps ahead of Old Father Time in the race, and has a chance to reach a hundred years, which we are all entitled to do, according to the eminent English doctor, Sir Lauder Brunton. It begins to look as though we would have to organize a sub-division for centenarians before very long.

But I see I have only two minutes more to talk and so I am going right now to let you into a little secret. I am getting up a surprise for our young friend Wheelock. You know he is tremendously fond of ancient history, and he is particularly enthusiastic about the early history of

Battle Creek. Mr. Wheelock has done so much for this club, I think we should do something to show our appreciation, and so I ask that each one of you will put on your thinking cap and try to recall some of the happenings of long ago here in Battle Creek which had something to do with the development of the town, or for other reasons are worth remembering, and then at the next annual meeting we will have a rich treat for our good secretary in listening to the interesting stories, ^{which} those of of you who are old residents will have to tell.

And this will be a sort of rehearsal for the great centennial celebration of the founding of the best town in America to be held three or four years hence, when this club will be one of the big features, and we must all try to be there and ready to do our part in making the great event a success. And so you must not fail to take good care of yourselves. Be sure to get plenty of fresh air, but never allow yourself to get chilled. There's nothing so dangerous for an elderly person as a chill. Keep warm by dressing warm, but beware of overheated rooms.

And don't worry, even if you have a good deal of spare time. Remember, the great English poet, Milton, wrote, "They also serve who only stand and wait." And so let us all keep our heads up and keep smiling till we meet again. Good night.